

**Sun. Nov 10, 2019****Room 1**

Oral Sessions | Open Session

**[O1-1]**

**Great East Japan Earthquake Memorial Symposium:  
Passing Down Disaster Experience - Its True  
Meaning and Reality**

11:00 AM - 12:30 PM Room 1 (Main Hall)

**[O1-1-01] Great East Japan Earthquake Memorial**

**Symposium: Passing Down Disaster Experience  
- Its True Meaning and Reality**

Noriyuki Kurosaka<sup>1</sup>, \*Chihiro Minato<sup>2</sup>, \*Natsuki  
Ikezawa<sup>3</sup>, \*Hiroyasu Yamauchi<sup>4</sup>, \*Kenji Shiga<sup>5</sup>,  
\*Masashige Motoe<sup>6</sup> (1. Disaster-Resilient and  
Environmentally-Friendly City Promotion Office, City  
Planning Policy Bureau, City of Sendai, 2. Department  
of Information Design, Faculty of Art and  
Design, Tama Art University, 3. Author / Poet, 4. Rias  
Ark Museum, 5. Hiroshima Peace Memorial Park, 6.  
Graduate School of Engineering, Tohoku University /  
Central Memorial Site Consideration Commission)

11:00 AM - 12:30 PM

Oral Sessions | Open Session

**[O1-2]**

**The past and present role of national universities  
experienced the 2011 Tohoku Earthquake and  
tsunami for discussion on the future BOSAI**

2:00 PM - 3:30 PM Room 1 (Main Hall)

**[O1-2-01] The past and present role of national**

universities experienced the 2011 Tohoku  
Earthquake and tsunami for discussion on the  
future BOSAI

\*Fumihiko Imamura<sup>1</sup>, Akira Iwabuchi<sup>2</sup>, Hideo Ohno<sup>1</sup>,  
Katsumi Nakai<sup>3</sup>, Kiyoshi Murakami<sup>2</sup> (1. Tohoku  
University, 2. Iwate University,, 3. Fukushima  
University)

2:00 PM - 3:30 PM

Oral Sessions | Session

**[O1-3]**

**Accelerating formulation of local DRR plans  
toward the next 10 years of their implementation -  
How to achieve Global Target (e) of the  
Sendai Framework?-**

4:00 PM - 5:30 PM Room 1 (Main Hall)

**[O1-3-01] Accelerating formulation of local DRR plans  
toward the next 10 years of their  
implementation - How to achieve Global Target  
(e) of the Sendai Framework?-**

\*Moderator Prof. Kimio Takeya<sup>1</sup>, \*Four (4) Speakers<sup>2</sup>,  
Wataru Ono<sup>1</sup> (1. Japan International Cooperation  
Agency (JICA), 2. National and/or local authority  
related to DRR, Planning and Finance)

4:00 PM - 5:30 PM

Oral Sessions | Open Session

**[O1-4]**

**3.11 DENSHO ROAD to Hand down the Lessons of  
the Great East Japan Earthquake ~Activities of  
Memorializing the Earthquake in Industry-academia-  
government-citizen Collaborations ~**

6:00 PM - 7:30 PM Room 1 (Main Hall)

**[O1-4-01] 3.11 DENSHO ROAD to Hand down the**

Lessons of the Great East Japan  
Earthquake ~Activities of Memorializing the  
Earthquake in Industry-academia-government-  
citizen Collaborations ~

\*Akira Matsumoto<sup>1</sup> (1. Tohoku Regional Bureau,  
Ministry of Land, Infrastructure, Transport and  
Tourism)

6:00 PM - 7:30 PM

**Room 2**

Oral Sessions | Open Session

**[O1-6]**

**"Moving Hearts" With Experiences and Lessons ~  
Connecting Stories to Specific Disaster Prevention  
Measures**

2:00 PM - 3:30 PM Room 2 (Tachibana)

**[O1-6-01] "Moving Hearts" With Experiences and  
Lessons ~ Connecting Stories to Specific  
Disaster Prevention Measures**

\*Emiko Kuriyagawa<sup>1</sup> (1. Miyagi Prefectural  
Government)

2:00 PM - 3:30 PM

Oral Sessions | Session

**[O1-7]**

**Cross-cutting the Disaster-Related Sciences:  
Challenges of a Multidisciplinary Team in Tohoku**

**University**

4:00 PM - 5:30 PM Room 2 (Tachibana)

**[O1-7-01] Cross-cutting the Disaster-Related Sciences:**Challenges of a Multidisciplinary Team in  
Tohoku University\*Junko Okuyama<sup>1</sup>, \*Fumihiko Imamura<sup>1</sup>, \*Shuji Seto<sup>1</sup>,  
\*Toru Matsuzawa<sup>1</sup>, \*Toshiki Iwasaki<sup>1</sup>, \*Hiroki  
Takakura<sup>1</sup>, \*Yu Fukuda<sup>1</sup>, \*Kiyoshi Ito<sup>1</sup> (1. Core  
Research Cluster of Disaster Science, Tohoku  
University)

4:00 PM - 5:30 PM

Oral Sessions | Open Session

**[O1-8]****Thinking about Disaster Storytelling: How to Use  
Oral Narratives to Prevent Future Fatalities**

6:00 PM - 7:30 PM Room 2 (Tachibana)

**[O1-8-01] Thinking about Disaster Storytelling: How to  
Use Oral Narratives to Prevent Future Fatalities**\*Jun Suzuki<sup>1</sup>, \*Mana Abe<sup>4</sup>, \*Tatsuya Kishimoto<sup>5</sup>,  
\*Muzailin Affan<sup>2</sup>, \*Sushil Gyewali<sup>3</sup> (1. The Kahoku  
Shimpo, 2. Syiah Kuala University, 3. Government of  
Nepal, 4. TV-U FUKUSHIMA, 5. THE KOBE SHIMBUN  
DAIRY NEWSPAPER)

6:00 PM - 7:30 PM

**Room 3**

Oral Sessions | Session

**[O1-9]****Media and Bosai: A Crucial Combination for Saving  
Lives**

11:00 AM - 12:30 PM Room 3 (Hagi)

**[O1-9-01] Media and Bosai: A Crucial Combination for  
Saving Lives**\*Takaaki Takai<sup>1</sup>, \*Minori Takao<sup>1</sup> (1. NHK World-  
Japan)

11:00 AM - 12:30 PM

Oral Sessions | Open Session

**[O1-10]****Disaster Risk Reduction and Women's Leadership**  
2:00 PM - 3:30 PM Room 3 (Hagi)**[O1-10-01] Disaster Risk Reduction and Women's  
Leadership**Taga Enomoto<sup>1</sup>, \*Asako Osaki<sup>2</sup>, \*Naomi Sato<sup>3</sup>,\*Naomi Yatsu<sup>4</sup>, \*Yaeko Kisu<sup>5</sup>, \*Midori Shigeno<sup>6</sup>, \*Isao  
Yamauchi<sup>7</sup> (1. Sendai Gender Equal Opportunity  
Foundation, Citizen Cooperation and City Planning  
Department, Community Affairs Bureau, 2. Kansei  
Gakuin University / NPO Gender Action Platform, 3.  
We Are One Kitakami, 4. Approved NPO After  
School Paruke, 5. NPO The National Council of  
Women's Centers, Sendai Gender Equal  
Opportunity Foundation, 6. Nishitaga-kita  
Neighborhood Association / Women Bosai Leaders  
Network, 7. Yama-no-dera United Neighborhood  
Association)

2:00 PM - 3:30 PM

Oral Sessions | Open Session

**[O1-11]****Creating new disaster prevention industry based on  
the lessons learned from the Great East Japan  
Earthquake**

4:00 PM - 5:30 PM Room 3 (Hagi)

**[O1-11-01] Creating new disaster prevention industry**based on the lessons learned from the Great  
East Japan EarthquakeNobuhiro Sato<sup>1</sup>, \*Yoshihiro Okami<sup>2</sup>, \*Barbara  
Noonan<sup>3</sup>, \*Shohei Sakoda<sup>4</sup> (1. Industry Promotion  
Section, Industrial Policy Department, Economic  
Bureau, City of Sendai, 2. Industrial Policy  
Department, City of Sendai, 3. Public Sector Sales  
APAC, Nokia Solutions & Networks, Singapore, 4.  
Industry Creation Policy Division, Ministry of  
Economy, Trade and Industry)

4:00 PM - 5:30 PM

Oral Sessions | Open Session

**[O1-12]****Teachers' Capacity Development for Enhancing  
Disaster Risk Reduction at School**

6:00 PM - 7:30 PM Room 3 (Hagi)

**[O1-12-01] Teachers' Capacity Development for**

Enhancing Disaster Risk Reduction at School

\*Takashi Oda<sup>1</sup>, \*Shinichi Takeda<sup>1</sup>, \*Takeshi Sato<sup>2</sup>,  
\*Shinya Morimoto<sup>3</sup>, \*Masaaki Oka<sup>1</sup>, \*Takashi  
Muramatsu<sup>1</sup>, \*Tuba Gokmenoglu Karakaya<sup>4</sup> (1.  
Miyagi University of Education, 2. Tohoku  
University, 3. Ministry of Education, Culture, Sports,  
Science and Technology, 4. Republic of Turkey)

Ministry of National Education)

6:00 PM - 7:30 PM

**Room 4**

Oral Sessions | Session

**[O1-13]****State-of-the-art research on wind related disaster risk reduction**

11:00 AM - 12:30 PM Room 4 (Shirakashi 1)

**[O1-13-01] State-of-the-art research on wind related disaster risk reduction**

\*Kazuyoshi Nishijima<sup>1</sup>, \*David O. Prevatt<sup>2</sup>, \*Frank Lombardo<sup>3</sup>, \*Tetsuya Takemi<sup>1</sup>, \*Murray Morrison<sup>4</sup>, \*Shuyang Cao<sup>5</sup>, Yukio Tamura<sup>7</sup>, Yuichi Ono<sup>6</sup> (1. Kyoto University, 2. University of Florida, 3. The University of Illinois at Urbana-Champaign, 4. Insurance Institute for Business & Home Safety, 5. Tongji University, 6. Tohoku University, 7. Chongqing university)

11:00 AM - 12:30 PM

Oral Sessions | Session

**[O1-14]****Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements**

2:00 PM - 3:30 PM Room 4 (Shirakashi 1)

**[O1-14-01] Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements**

\*Riyanti Djalante<sup>1</sup>, \*MIZAN BUSTANUL FUADY BISRI<sup>1</sup>, Giulia Roder<sup>1</sup>, \*Giles Sioen<sup>2,3</sup>, \*Sachi Suzuki<sup>4</sup> (1. United Nations University-Institute for the Advanced Study of Sustainability, 2. FutureEarth, 3. The University of Tokyo, 4. UNESCO)

2:00 PM - 3:30 PM

Oral Sessions | Session

**[O1-15]****Research, Development, and Utilization of Beppu Model Disability-inclusive Disaster Risk Reduction: Towards Seamless Connections between Normal and Disaster Times**

4:00 PM - 5:30 PM Room 4 (Shirakashi 1)

**[O1-15-01] Research, Development, and Utilization of Beppu Model Disability-inclusive Disaster Risk Reduction: Towards Seamless Connections between Normal and Disaster Times**

\*Shigeo Tatsuki<sup>1</sup>, \*Junko Murano<sup>2</sup>, \*Kazuhiko Abe<sup>3</sup>, \*Anna Matsukawa<sup>6</sup>, \*Bill Ho<sup>4</sup>, \*Taku Sugano<sup>5</sup>, \*Aya Tsujioka<sup>1</sup> (1. Doshisha University, 2. Beppu City, 3. Tohoku Fukushi University, 4. Asian Disaster Preparedness Center, 5. Osaka City University, 6. Disaster Reduction and Human Renovation Institution)

4:00 PM - 5:30 PM

Oral Sessions | Session

**[O1-16]****Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases**

6:00 PM - 7:30 PM Room 4 (Shirakashi 1)

**[O1-16-01] Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases**

\*Takako Izumi<sup>1</sup>, \*Rajib Shaw<sup>2</sup>, \*Jessica Alexander<sup>3</sup>, \*Sangita Das<sup>4</sup>, \*Akilesh Surjan<sup>6</sup>, \*Miwa Abe<sup>5</sup>, \*Takeshi Komino<sup>7</sup> (1. Tohoku University, 2. Keio University, 3. Sophia University/UNICEF Geneva, 4. CWS Japan, 5. Kumamoto University, 6. Charles Darwin University, Australia, 7. Asian Disaster Response and Reduction Network (ADRRN))

6:00 PM - 7:30 PM

**Room 5**

Oral Sessions | Session

**[O1-17]****Creating a disaster-resilient society through industry-academia collaboration**

11:00 AM - 12:30 PM Room 5 (Shirakashi 2)

**[O1-17-01] Creating a disaster-resilient society through industry-academia collaboration**

\*Fumihiko Imamura<sup>1</sup>, \*Hiroo Shimada<sup>2</sup>, \*Akihiro Hayashi<sup>3</sup>, \*Anawat Suppasri<sup>1</sup>, \*Ryu Miyamoto<sup>1</sup> (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Tokio Marine & Nichido Fire Insurance Co., Ltd., 3. Tokio Marine & Nichido Risk Consulting Co., Ltd.)

11:00 AM - 12:30 PM

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Oral Sessions | Session

[O1-18]

NATECH Risk in Asia Pacific

2:00 PM - 3:30 PM Room 5 (Shirakashi 2)

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[O1-18-01] **NATECH Risk in Asia Pacific**

\*Rajib Shaw<sup>1</sup>, \*Ana Maria Cruz<sup>2</sup>, \*Fatma Lestari<sup>3</sup>,  
\*Kampanart Silva<sup>3,4</sup>, \*Devendra Narayan Singh<sup>5</sup>,  
\*Antonia Loyzaga<sup>6</sup>, \*Emily Chang<sup>7</sup>, \*Takako Izumi<sup>8</sup>  
(1. Keio University, 2. Kyoto University, 3.

University of Indonesia, 4. Thailand Institute of  
Nuclear Technology, 5. IIT Bombay, 6. Manila  
Observatory and Philippines National Resilience  
Council (PNRC), 7. Chinese University of Hong  
Kong, 8. Tohoku University)

2:00 PM - 3:30 PM

**Sun. Nov 10, 2019****Flash Talk Presentation 1**

Flash Talk Presentation

**Disaster Heritage to Promote Dark Tourism for Resilient Community**

Nurjanah Jane

3:35 PM - 3:50 PM Flash Talk Presentation 1 (Meeting Room 6)

**[MP1-E] Disaster Heritage to Promote Dark Tourism for Resilient Community**

Nurjanah Jane (Tokyo Metropolitan University)

3:35 PM - 3:50 PM

Flash Talk Presentation

**Recent Activity for DRR in Republic of Korea**

Dr./Mr. Kang Chang Hyun

5:35 PM - 5:50 PM Flash Talk Presentation 1 (Meeting Room 6)

**[MP1-F] Recent Activity for DRR in Republic of Korea**

Dr./Mr. Kang Chang Hyun (Dankook University)

5:35 PM - 5:50 PM

**Flash Talk Presentation 2**

Flash Talk Presentation

**Current state of SFDRR related research and education by universities and institutions**

Mikio ISHIWATARI

12:45 PM - 1:00 PM Flash Talk Presentation 2 (Meeting Room 7)

**[MP1-01] Current state of SFDRR related research and education by universities and institutions**

Mikio ISHIWATARI (Japan International Cooperation Agency/ University of Tokyo)

12:45 PM - 1:00 PM

Flash Talk Presentation

**Proposition of a New Ground-based Observation Network of Infrasound for Tsunami Disaster Mitigation**

Masa-yuki Yamamoto

1:05 PM - 1:20 PM Flash Talk Presentation 2 (Meeting Room 7)

**[MP1-02] Proposition of a New Ground-based**

Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto (Kochi University of Technology)

1:05 PM - 1:20 PM

Flash Talk Presentation

**Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"**

Hideaki Murai.

Ikuo Oikawa

1:25 PM - 1:40 PM Flash Talk Presentation 2 (Meeting Room 7)

**[MP1-03] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"**

Hideaki Murai. Ikuo Oikawa (All Japan Council Company)

1:25 PM - 1:40 PM

Flash Talk Presentation

**Recovery Institutions to Build Back Better**

Paul Rosenberg

1:45 PM - 2:00 PM Flash Talk Presentation 2 (Meeting Room 7)

**[MP1-04] Recovery Institutions to Build Back Better**

Paul Rosenberg (UNDRR/International Recovery Platform)

1:45 PM - 2:00 PM

Flash Talk Presentation

**Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR**

Eric Ariel Gonzales Rocha

3:35 PM - 3:50 PM Flash Talk Presentation 2 (Meeting Room 7)

**[MP1-05] Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR**

Eric Ariel Gonzales Rocha (United Nations Office for Disaster Risk Reduction)

3:35 PM - 3:50 PM

Flash Talk Presentation

**You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!**

KAZUYUKI TOHYAMA

5:35 PM - 5:50 PM Flash Talk Presentation 2 (Meeting Room 7)

**[MP1-06] You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!**

KAZUYUKI TOHYAMA (TRUSTIA CORPORATION)

5:35 PM - 5:50 PM

Sun. Nov 10, 2019

Reception

Reception

Reception

8:00 PM - 9:40 PM Reception (Hotel Metropolitan Sendai)

[RC-01] Reception

8:00 PM - 9:40 PM

Sun. Nov 10, 2019

Room 1

WBF Pre-Opening

WBF Pre-Opening

9:00 AM - 10:00 AM Room 1 (Main Hall)

[PO-01] WBF Pre-Opening

9:00 AM - 10:00 AM

Sun. Nov 10, 2019

Room 1

WBF Opening

WBF Opening

10:00 AM - 10:45 AM Room 1 (Main Hall)

[OP-01] WBF Opening

10:00 AM - 10:45 AM



Sun. Nov 10, 2019

Room 1

Keynote Speech

A Changing Risk Paradigm

Andrew Maskrey

9:41 AM - 9:53 AM Room 1 (Main Hall)

[K00] A Changing Risk Paradigm

Andrew Maskrey (Risk Nexus)

9:41 AM - 9:53 AM

**Mon. Nov 11, 2019****Room 1**

Oral Sessions | Session

**[O2-1]****Local production for local protection (Chisan Chibo)****- Proposing standardized local-level bosai****operations from Toho****8:30 AM - 10:00 AM Room 1 (Main Hall)****[O2-1-01] Local production for local protection (*Chisan******Chibo*) – Proposing standardized local-level  
bosai operations from Tohoku****\*Shohei Sakota<sup>1</sup>, \*Fumihiko Imamura<sup>2</sup>, \*Satoru****Nishikawa<sup>3</sup>, \*Haruo Hamachi<sup>4</sup>, \*Tomohisa Sashida<sup>5</sup>,****\*Kanao Iuchi<sup>2</sup> (1. Ministry of Economy, Trade and  
Industry, 2. Tohoku University, 3. Nagoya University,  
4. National Research Institute for Earth Science and  
Disaster Resilience, 5. Tokio Marine & Nichido Fire  
Insurance)****8:30 AM - 10:00 AM**

Oral Sessions | Session

**[O2-2]****Public Understanding on Typhoon and Related****Disaster (Lessons Learned from the Past Disaster)****10:30 AM - 12:00 PM Room 1 (Main Hall)****[O2-2-01] Public Understanding on Typhoon and Related****Disaster (Lessons Learned from the Past  
Disaster)****\*Chihun Lee<sup>1</sup>, \*Meteorology Expert<sup>1</sup>, \*Hydrology****Expert<sup>1</sup>, \*DRR Expert<sup>1</sup>, \*Typhoon Committee****Secretary<sup>1</sup> (1. UNESCAP/WMO Typhoon****Committee)****10:30 AM - 12:00 PM**

Oral Sessions | Session

**[O2-3]****How to deal with intensifying cyclone disasters -****lessons from the Built Back Better process-****1:30 PM - 3:00 PM Room 1 (Main Hall)****[O2-3-01] Lessons from the Built Back Better process -****How we will deal with intensifying  
meteorological disasters -****\*Ronnan Christian M. Reposa<sup>2</sup>, \*Francisco Pereira<sup>3</sup>,****Augusta Maita<sup>4</sup>, \*Ahmad Dading Gunadi<sup>5</sup>, Masaaki****Chida<sup>1</sup>, Hiroyuki Takamatsu<sup>1</sup>, Takuya Ito<sup>1</sup> (1. Pacific**Consultants Co., Ltd., 2. Palo Municipality, Republic  
of the Philippines, 3. Reconstruction Cabinet,  
Republic of Mozambique, 4. National Disasters  
Management Institute, Republic of Mozambique, 5.  
SMEs and Cooperatives Development, BAPPENAS,  
Republic of Indonesia)**1:30 PM - 3:00 PM**

Oral Sessions | Session

**[O2-4]****Contribution from meteorology, hydrology and DRR  
for the Platform on Water Resilience and Disasters****3:30 PM - 5:00 PM Room 1 (Main Hall)****[O2-4-01] Contribution from meteorology, hydrology and****DRR for the Platform on Water Resilience and  
Disasters****\*Tetsuya Ikeda<sup>1</sup> (1. ICHARM)****3:30 PM - 5:00 PM**

Oral Sessions | Session

**[O2-5]****GADRI Activities and Contributions to the Science****and Technology Roadmap for the implementation of****SFDRR Agenda 2015-2030****5:30 PM - 7:00 PM Room 1 (Main Hall)****[O2-5-01] GADRI Activities and Contributions to the****Science and Technology Roadmap for the  
implementation of SFDRR Agenda 2015-2030****Wilma James James<sup>1,2</sup>, \*Hirokazu Tatano<sup>1,2</sup>, \*Tetsuya****Takemi<sup>1,2</sup>, \*Kazuyoshi Nishijima<sup>1,2</sup>, \*Subhajyoti****Samaddar<sup>1,2</sup>, \*Ana Maria Cruze<sup>1,2</sup>, Ayuna Matthews<sup>1,2</sup>,****\*Andrew Collins<sup>2,3</sup>, \*Paul Kovacs<sup>2,4</sup> (1. Kyoto****University, Japan, 2. GADRI, Japan, 3. Northumbria****University, UK, 4. Western University, Canada)****5:30 PM - 7:00 PM****Room 2**

Oral Sessions | Session

**[O2-6]****New Horizon of IRIDeS-NTT Innovative Research****8:30 AM - 10:00 AM Room 2 (Tachibana)****[O2-6-01] New Horizon of IRIDeS-NTT Innovative****Research****\*Naoko Kosaka<sup>1</sup>, \*Kenjiro Terada<sup>2</sup>, \*Shunichi****Koshimura<sup>2</sup>, \*Masashige Motoe<sup>2</sup>, \*Masayuki Ihara<sup>1</sup>,**

\*Satoshi Kubota<sup>1</sup>, \*Tomohiro Kokogawa<sup>1</sup> (1. NTT, 2. Tohoku University)  
8:30 AM - 10:00 AM

Oral Sessions | Session

[O2-7]

Practical use of recovery experiences from the Great East Japan Earthquake for support to Central Sulawesi in Indonesia

10:30 AM - 12:00 PM Room 2 (Tachibana)

[O2-7-01] Practical use of recovery experiences from the Great East Japan Earthquake for support to Central Sulawesi in Indonesia  
Atsutoshi Hirabayashi<sup>1</sup>, \*Sumedi Andono Mulyo<sup>4</sup>, \*Samuel Pongi<sup>5</sup>, \*Takafumi Kawaguchi<sup>2</sup>, \*Hisashi Konno<sup>3</sup>, \*Masatsugu Komiya<sup>7</sup>, \*Hitoshi Ara<sup>1</sup>, Ahmad Dading Gunadi<sup>4</sup>, Hasanuddin Atjo<sup>6</sup> (1. Japan International Cooperation Agency (JICA), 2. Higashimatsushima city, 3. Kamaishi city, 4. The Ministry of National Development Planning (BAPPENAS), Indonesia, 5. Department of Cooperatives & MSME, Sigi, Central Sulawesi Province, Indonesia, 6. BAPPEDA, Central Sulawesi Province, Indonesia, 7. Yachiyo Engineering Co., Ltd)  
10:30 AM - 12:00 PM

Oral Sessions | Session

[O2-8]

Transdisciplinary Approach(TDA) for Building Societal Resilience to Disasters -Efforts towards Achieving the Goals of Sendai Framework -  
1:30 PM - 3:00 PM Room 2 (Tachibana)

[O2-8-01] Transdisciplinary Approach (TDA) for Building Societal Resilience to Disasters - Efforts towards Achieving the Goals of Sendai Framework -  
\*Mikio Ishiwatari<sup>1</sup>, \*Romeo S. Momo<sup>2</sup>, \*Kenichi Tsukahara<sup>3</sup>, \*Senro Kuraoka<sup>4</sup>, \*Youb Raj Paudyal<sup>5</sup>, \*Khamarrul Azahari Razak<sup>6</sup>, \*Takako Izumi<sup>7</sup> (1. the University of Tokyo / Japan International Cooperation Agency (JICA), 2. Construction Workers Solidarity, the Philippines, 3. Kyushu University, Japan, 4. Nippon Koei Co., Ltd., Japan, 5. National Reconstruction Authority, Nepal, 6. Universiti Teknologi Malaysia (UTM), Malaysia, 7. International Research Institute of

Disaster Science (IRIDeS), Tohoku University, Japan)  
1:30 PM - 3:00 PM

Oral Sessions | Session

[O2-9]

Preparation for "SUPER-ISE-BAY Typhoon", 60-Years After Ise Bay Typhoon

3:30 PM - 5:00 PM Room 2 (Tachibana)

[O2-9-01] Preparation for "SUPER-ISE-BAY Typhoon", 60-Years After Ise Bay Typhoon  
\*Tetsuro Tsujimoto<sup>2</sup>, \*Norimitsu Koike<sup>3</sup>, \*Makoto Takeda<sup>4</sup>, \*Takashi Tashiro<sup>2</sup>, \*Yuji Toda<sup>2</sup>, \*Atsuko Mizoguchi<sup>5</sup>, \*Osamu Matsuo<sup>1</sup>, Yoshihumi Kodama<sup>1</sup>, Michio Toya<sup>1</sup>, Hirokazu Kawashima<sup>1</sup>, Yoshinobu Mizutani<sup>1</sup> (1. Chubu Regional Development Bureau of the Ministry of Land, Infrastructure, Transport and Tourism, 2. Nagoya University, 3. Aichi Institute of Technology, 4. Chubu University, 5. Meijo University)  
3:30 PM - 5:00 PM

Oral Sessions | Session

[O2-10]

Enhancing Resilience of Coastal Communities through Reduction of Ocean Risks  
5:30 PM - 7:00 PM Room 2 (Tachibana)

[O2-10-01] Enhancing Resilience of Coastal Communities through Reduction of Ocean Risks  
\*Nagisa YOSHIOKA<sup>1</sup>, Atsushi WATANABE<sup>1</sup>, Hajime TANAKA<sup>1</sup>, Osamu MATSUDA<sup>2</sup>, Hiroshi TAKAGI<sup>3</sup>, Marlon de Luna ERA<sup>4</sup>, Riyanti DJALANTE<sup>5</sup> (1. The Ocean Policy Research Institute, Sasakawa Peace Foundation, 2. Hiroshima University, 3. Tokyo Institute of Technology, 4. De La Salle University, 5. United Nations University )  
5:30 PM - 7:00 PM

## Room 3

Oral Sessions | Session

[O2-11]

Recent Progress of the Global Centre for Disaster Statistics(GCDS)  
8:30 AM - 10:00 AM Room 3 (Hagi)

[O2-11-01] Recent Progress of the Global Centre for Disaster Statistics (GCDS)

\*Daisuke Sasaki<sup>1</sup>, \*Yuichi Ono<sup>1</sup>, \*Makoto Okumura<sup>1</sup>,  
\*Rajesh Sharma<sup>2</sup>, \*Sogo Fujisaki<sup>3</sup>, \*Hidemi Tanaka<sup>3</sup>,  
\*Hiroaki Ishiwata<sup>4</sup> (1. International Research  
Institute of Disaster Science (IRIDeS), Tohoku  
University, 2. United Nations Development  
Programme (UNDP), 3. Fujitsu Limited, 4. Pacific  
Consultants Co., Ltd.)  
8:30 AM - 10:00 AM

Oral Sessions | Session

[O2-13]

Variation of Build-Back-Better: Asian Perspectives

1:30 PM - 3:00 PM Room 3 (Hagi)

[O2-13-01] **Variation of Build-Back-Better: Asian Perspectives**

\*Toshihisa Toyoda<sup>1</sup>, Teuku Alvisyahrin<sup>2</sup>, Linsheng  
Gu<sup>3</sup>, Win Ohnmar<sup>4</sup>, Katsumi Matsuoka<sup>5</sup>, Tara Nidhi  
Lohani<sup>1</sup>, Shinya Horie<sup>1</sup> (1. Kobe University, 2. Syia  
Kuala University, 3. Sichuan Institute of  
Administration, 4. Department of Disaster  
Management of Myanmar Government, 5. Iwate  
University)  
1:30 PM - 3:00 PM

Oral Sessions | Session

[O2-14]

Technology and disaster management education for  
"adult"

3:30 PM - 5:00 PM Room 3 (Hagi)

[O2-14-01] Technology and disaster management  
education for "adult"

\*Muneyoshi Numada<sup>1</sup> (1. Institute of Industrial  
Science, The University of Tokyo)  
3:30 PM - 5:00 PM

Oral Sessions | Session

[O2-15]

Fostering U-Inspire alliance- Youth and young  
professionals in Science, Engineering, Technology,  
and Innovation for DRR in Asia and the Pacific

5:30 PM - 7:00 PM Room 3 (Hagi)

[O2-15-01] **Fostering U-INSPIRE Alliance - Asia and the Pacific youth and young professionals in Science, Engineering, Technology, and Innovation for DRR**

Sachi Suzuki<sup>1</sup>, \*Mizan Bustanul Fuady Bisri<sup>5,7,9</sup>,

\*Ranit Chatterjee<sup>4,6,9</sup>, \*Reza Abedi<sup>10,11</sup>, \*Glenn  
Fernandez<sup>3,8,9</sup>, \*Li Fan<sup>3</sup>, \*Anna Shinka<sup>2</sup>, \*Yu  
Watanabe<sup>2</sup> (1. UNESCO, 2. International Research  
Institute for Disaster Science (IRIDeS), Tohoku  
University, 3. Sichuan University-Hong Kong  
Polytechnic University Institute for Disaster  
Management and Reconstruction, 4. CRRP (U-  
INSPIRE India), 5. UNU-IAS, 6. Kyoto University, 7.  
U-INSPIRE Indonesia, 8. U-INSPIRE Philippines, 9.  
IRDR Young Scientist, 10. U-INSPIRE Malaysia, 11.  
Malaysian Youth Delegation)  
5:30 PM - 7:00 PM

Room 4

Oral Sessions | Session

[O2-16]

The tale of the two 2018 tsunamis in Indonesia from  
a health perspective.

8:30 AM - 10:00 AM Room 4 (Shirakashi 1)

[O2-16-01] The tale of the two 2018 tsunamis in  
Indonesia from a health perspective.

\*Masdalina Pane<sup>2,3,4</sup>, \*Fiona Yin Mei Kong<sup>1</sup>, \*Tri  
Bayu<sup>5,3</sup>, \*Mugi Wahidin<sup>2,3</sup> (1. The Center for  
Applied One Health Research and Policy Advice,  
City University of Hong Kong, 2. The National  
Institute of Health Research and Development,  
Ministry of Health, Republic of Indonesia, 3.  
Perhimpunan Ahli Epidemiologi Indonesia (PAEI), 4.  
Sari Mutiara Indonesia University, 5. Sumatera Utara  
Islamic State University)  
8:30 AM - 10:00 AM

Oral Sessions | Session

[O2-17]

Health System Disruption at Primary Health Center  
Level Affected by Earthquake, Tsunami, and  
Liquifaction in Three Districts of Central Sulawesi,  
Indonesia

10:30 AM - 12:00 PM Room 4 (Shirakashi 1)

[O2-17-01] Health System Disruption at Primary Health

Center Level Affected by Earthquake,  
Tsunami, and Liquifaction in Three Districts of  
Central Sulawesi, Indonesia  
\*Mugi Wahidin<sup>1,2,3</sup>, Masdalina Pane<sup>1,4,3</sup>, Tri Bayu  
Purnama<sup>5</sup>, Siti Maemun<sup>6</sup> (1. NIHRD, Ministry of

Health, Indonesia, 2. University of Esa Unggul, Jakarta, Indonesia, 3. Indonesia Epidemiological Association, 4. Sari Mutiara Indonesia University, Medan, Indonesia, 5. Islamic State University, North Sumatera, Indonesia, 6. Sulianti Saroso Center of Infectious Disease Hospital, Jakarta, Indonesia)  
10:30 AM - 12:00 PM

Oral Sessions | Session

[O2-18]

### Participatory Monitoring of Health Security by Nurses for Disaster Risk Reduction

1:30 PM - 3:00 PM Room 4 (Shirakashi 1)

[O2-18-01] Participatory Monitoring of Health Security by Nurses for Disaster Risk Reduction

Sushila Paudel<sup>4</sup>, \*Sakiko Kanbara<sup>1</sup>, Ma. Regina E. Estuar<sup>2</sup>, Shoko Miyagawa<sup>3</sup>, Hyeon Ju Lee<sup>1</sup>, Ngatu Rogers<sup>5</sup> (1. Univ. of Kochi, Japan, 2. Ateneo de Manila Univ., Philippines, 3. Keio Univ., Japan, 4. Nursing Association of Nepal, 5. Congo Heiwa Mura, Congo)  
1:30 PM - 3:00 PM

Oral Sessions | Session

[O2-19]

### Immediate capacity assessment of infectious disease surveillance officer after disaster in Central Sulawesi Province earthquake and tsunami, Indonesia

3:30 PM - 5:00 PM Room 4 (Shirakashi 1)

[O2-19-01] Immediate capacity assessment of infectious disease surveillance officer after disaster in Central Sulawesi Province earthquake and tsunami, Indonesia

\*Tri Bayu Purnama<sup>1,2</sup>, \*Masdalina Pane<sup>3,2</sup>, Siti Maemun<sup>4,2</sup> (1. Islamic State University of North Sumatera, Medan, Indonesia, 2. Indonesian Epidemiological Association, 3. National Institute of Health Research and Development, Ministry of Health, Indonesia, 4. Prof Sulianti Saroso Infectious Disease Hospital, Indonesia)  
3:30 PM - 5:00 PM

Room 5

Oral Sessions | Session

[O2-22]

### Innovative remote sensing technologies for enhancing disaster management

10:30 AM - 12:00 PM Room 5 (Shirakashi 2)

[O2-22-01] Innovative remote sensing technologies for enhancing disaster management

\*Shunichi Koshimura<sup>1</sup>, \*Naoto Yokoya<sup>2</sup>, \*Christian Gei<sup>3</sup>, \*Marc Wieland<sup>3</sup>, \*Fumio Yamazaki<sup>4</sup>, \*Hiroyuki Miura<sup>5</sup>, Günter Strunz<sup>3</sup>, Erick Mas<sup>1</sup> (1. International Research Institute of Disaster Science, Tohoku University, Japan, 2. RIKEN AIP Center, Japan, 3. German Aerospace Center, Germany, 4. National Research Institute for Earth Science and Disaster Resilience, Japan, 5. Graduate School of Engineering, Hiroshima University, Japan)  
10:30 AM - 12:00 PM

Oral Sessions | Session

[O2-24]

### Is relocation an effective solution to increased coastal community resilience? Sharing international perspectives

3:30 PM - 5:00 PM Room 5 (Shirakashi 2)

[O2-24-01] Is relocation an effective solution to increased coastal community resilience? Sharing international perspectives

\*Kanao Iuchi<sup>1,2</sup>, \*Robert Olshansky<sup>5</sup>, \*Michio Ubaura<sup>3,1</sup>, \*Wiriya Puntub<sup>4</sup>, \*Margaret Arnold<sup>6</sup>, \*Paivi Koskinen-Lewis<sup>6</sup> (1. International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster Science, Tohoku University, 3. Department of Architecture and Building Science, Tohoku University, 4. Technical University of Dortmund, 5. University of Illinois at Urbana-Champaign, 6. World Bank)  
3:30 PM - 5:00 PM

Oral Sessions | Session

[O2-25]

### Planning for resettlement after disaster: Lessons from the case of Dar es Salaam, Tanzania

5:30 PM - 7:00 PM Room 5 (Shirakashi 2)

[O2-25-01] Planning for resettlement after disaster: Lessons from the case of Dar es Salaam, Tanzania

\*Venkata Narayanan AEKBOTE  
LAKSHMINARAYANAN<sup>1</sup> (1. University of Grenoble)

Alpes & Technical University of Darmstadt)  
5:30 PM - 7:00 PM

Mon. Nov 11, 2019

Poster & Exhibition

Poster Sessions

Core Time

12:15 PM - 1:15 PM Poster & Exhibition (Sakura)

[P-01] TRACING 3.11.11

\*Akari Nakai Kidd<sup>1</sup>, \*Daniel Gibbs<sup>1</sup> (1. Deakin University, School of Architecture and Built Environment, Geelong, Australia)

12:15 PM - 1:15 PM

[P-02] Joint Development and Implementation of a Community Engagement Model Practical Education Program Based on Disaster Response Expertise : Community Planner Training at Miyagi University and the University of Hyogo

\*Shun Nakazawa<sup>1</sup>, Yu Takahashi<sup>1</sup>, Kanae Sato<sup>1</sup>, Hideyuki Sasaki<sup>1</sup>, Masaharu Goko<sup>1</sup> (1. Miyagi University)

12:15 PM - 1:15 PM

[P-03] **Response of port infrastructure to tsunami impacts: Damage observations from the 2011 Tohoku tsunami**

\*Constance Ting Chua<sup>1,2</sup>, Adam Douglas Switzer<sup>1,2</sup>, Anawat Suppasri<sup>3</sup>, Kwanchai Pakoksung<sup>3</sup>, Linlin Li<sup>2,4</sup>, David Lallemand<sup>1,2</sup>, Susanna Jenkins<sup>1,2</sup>, Amanda Cheong<sup>1</sup>

(1. Asian School of the Environment, Nanyang Technological University, 2. Earth Observatory of Singapore, 3. International Research Institute of Disaster Science, Tohoku University, 4. Department of Civil and Environmental Engineering, National University of Singapore)

12:15 PM - 1:15 PM

[P-04] National Diet Library Great East Japan Earthquake Archive: HINAGIKU

\*Hiroshi Maeda<sup>1</sup> (1. National Diet Library, Japan)

12:15 PM - 1:15 PM

[P-05] Tsunami Simulation in the 28 September 2018 Palu Bay, Indonesia, Using Submarine Landslide Source and Two-layer Depth-integrated Modeling

\*kwanchai pakoksung<sup>1</sup>, Anawat Suppasri<sup>1</sup>, Fumihiko Imamura<sup>1</sup>, Cipta Athanasius<sup>2</sup>, Amalfi Omang<sup>2</sup>, Abdul Muhari<sup>3</sup> (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Center for Volcanology and Geological Hazard Mitigation, Geological Agency of Indonesia, Bundung, Indonesia, 3. Coastal Disaster Mitigation Division, Ministry of Marine Affairs and

Fisheries, Jakarta, Indonesia)

12:15 PM - 1:15 PM

[P-06] Spatial distribution of cause of death based on resident address of the deceased in the 2011 Tohoku Tsunami: A case study of Ishinomaki City, Miyagi prefecture

\*Tomoki Serikawa<sup>1</sup>, Shuji Seto<sup>2,3</sup>, Hirokazu Kamata<sup>4</sup>, Anawat Suppasri<sup>2,3</sup>, Fumihiko Imamura<sup>2,3</sup> (1. Graduate school of Engineering, Tohoku University, 2. International Research Institute of Disaster Science, Tohoku University, 3. Core Research Cluster of Disaster Science, Tohoku University, 4. School of Engineering, Tohoku University)

12:15 PM - 1:15 PM

[P-07] **Spanish cooperation in the field of training for disaster risk reduction in Latin America and the Caribbean**

\*Jose Pastrana<sup>1,3</sup>, Angela Potenciano<sup>2</sup>, Elisa Gavari<sup>1</sup> (1. National Distance Education University (UNED), Spain, 2. National School of Civil Protection, Spain, 3. Consell Insular de Menorca, Spain)

12:15 PM - 1:15 PM

[P-08] Cascading effects of tsunami disasters

\*Anawat Suppasri Suppasri<sup>1</sup>, Miwako Kitamura<sup>1</sup>, Syamsidik Syamsidik<sup>2</sup>, Abdul Muhari<sup>3</sup>, Fumihiko Imamura<sup>1</sup>, David Alexander<sup>4</sup> (1. Tohoku University, 2. Syiah Kuala University, 3. Ministry of Marine Affairs and Fisheries, Indonesia, 4. University College London)

12:15 PM - 1:15 PM

[P-09] The cause of death analysis based on the deceased' s data in the 2011 Tohoku Tsunami: A case study of Miyagi prefecture

\*Shuji Seto<sup>1,2</sup>, Tomoki Serikawa<sup>3</sup>, \*Hirokazu Kamata<sup>4</sup>, Anawat Suppasri<sup>1,2</sup>, Fumihiko Imamura<sup>1,2</sup> (1. International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster Science, Tohoku University, 3. Graduate School of Engineering, Tohoku University, 4. School of Engineering, Tohoku University)

12:15 PM - 1:15 PM

[P-10] The analysis of location data related to the deceased in the 2011 Tohoku Tsunami: A case study of Miyagi prefecture

\*Shuji Seto<sup>1,2</sup>, Hirokazu Kamata<sup>4</sup>, Tomoki Serikawa<sup>3</sup>, Anawat Suppasri<sup>1,2</sup>, Fumihiko Imamura<sup>1,2</sup> (1. International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster

Science, Tohoku University, 3. Graduate School of Engineering, Tohoku University, 4. School of Engineering, Tohoku University)

12:15 PM - 1:15 PM

- [P-11] A Case Study of Cooperation between Historians and Psychologists in Providing and Assessing Community Psychosocial Support in Tsunami-affected Areas

\*Machiko Kamiyama<sup>1</sup>, Daisuke Sato<sup>1</sup>, Masae Sato<sup>3</sup>, John Morris<sup>2</sup> (1. International Research Institute of Disaster Research, Tohoku University, 2. Miyagi Gakuin Women's University, 3. Ishinomaki Senshu University)

12:15 PM - 1:15 PM

- [P-12] Fuel stocking proposal to connect life at the time of disaster

\*mitsuaki kizaki<sup>1</sup> (1. NIPON BCP INC)

12:15 PM - 1:15 PM

- [P-13] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hiroaki Enoki<sup>1</sup>, \*Chikako Adachi<sup>1</sup> (1. All Japan Council Company)

12:15 PM - 1:15 PM

- [P-14] Making use of uncertain earthquake forecast information: Challenges toward disaster risk reduction against the anticipated Nankai Trough Earthquake (M8-M9), western Japan

\*Yo Fukushima<sup>1</sup>, Hiroaki Maruya<sup>1</sup>, Makoto Okumura<sup>1</sup>, Motoyuki Kido<sup>1</sup>, Natsuko Chubachi<sup>1</sup>, Ryota Hino<sup>1</sup>, Kanan Hirano<sup>1</sup>, Shunichi Koshimura<sup>1</sup>, Miwa Kuri<sup>2</sup>, Shuji Moriguchi<sup>1</sup>, Yusaku Ohta<sup>1</sup>, Hiroyuki Sasaki<sup>1</sup>, Motoaki Sugiura<sup>1</sup>, Tetsuya Torayashiki<sup>3</sup>, Fumihiko Imamura<sup>1</sup> (1. Tohoku University, 2. Japan Meteorological Agency, 3. Disaster Reduction and Human Renovation Institution)

12:15 PM - 1:15 PM

- [P-15] Concepts of Urban System's Resilience and a Mathematical Model

\*Yuto Shiozaki<sup>1</sup> (1. Kanazawa University)

12:15 PM - 1:15 PM

- [P-16] Study on Emergency Management Using Incident Response Log Classification Based on Activity Objectives

\*Naoko Kosaka<sup>1</sup>, Takeshi Yamaguchi<sup>2</sup>, Tomohiro Kokogawa<sup>1</sup>, Satoshi Kubota<sup>1</sup>, Kentaro Inui<sup>2</sup> (1. NTT, 2. Tohoku university)

12:15 PM - 1:15 PM

- [P-17] **BUILDING DISASTER RESILIENT COMMUNITIES THROUGH SERVICE LEARNING: REFLECTIONS AND LESSONS OF UNIVERSITY OF SANTO TOMAS NATIONAL SERVICE TRAINING PROGRAM CWTS/LTS**

\*Adrian Dela Cruz Romero<sup>1</sup>, Sheila Masangkay<sup>1</sup>, Eric Aboboto<sup>1</sup>, Jasmin Victoria<sup>1</sup>, Justine Joseph Gopeng<sup>1</sup> (1. University of Santo Tomas)

12:15 PM - 1:15 PM

- [P-18] Non-structural approach to volcanic disaster risk reduction through BOSAI project phase2 in Guatemala: activities for capacity development of communities, municipalities and national institution.

Shusuke IRABU<sup>1</sup>, Nishikawa Tomoyuki<sup>2</sup>, Yoshitaka Yamazaki<sup>3</sup>, Jun Onodera<sup>4</sup>, Noritoshi Maehara<sup>5</sup>, Abraham Marroquin<sup>6</sup>, Edy Mardonado<sup>6</sup>, Mario Ovalle<sup>6</sup>, José Giron<sup>6</sup>, \*Yeison Carrera<sup>6</sup>, Sergio Cabañas<sup>6</sup> (1. Japan International Cooperation Agency, 2. Nippon Koei Co., Ltd., Japan, 3. OYO international corporation, Japan, 4. Earth Science System, Japan, 5. IDEA consultants, Japan, 6. Executive secretary of National Coordination for Disaster Risk Reduction (SE-CONRED), Guatemala)

12:15 PM - 1:15 PM

- [P-19] Health-Related Studies After the Great East Japan Earthquake: A Literature Review

\*Akiko ETO<sup>1</sup>, Yasuhiro KANATANI<sup>2</sup> (1. National Institute of Public Health, 2. Tokai University, School of Medicine)

12:15 PM - 1:15 PM

- [P-20] The analysis of tsunami evacuation behavior considering tsunami victim's data from a case study in Kesennuma city

\*Anna Shinka<sup>1</sup>, Shosuke Sato<sup>2</sup>, Mizutani Daijiro<sup>2</sup>, Fumihiko Imamura<sup>2</sup> (1. Graduate School of Engineering, Tohoku University, 2. International Research Institute of Disaster Science)

12:15 PM - 1:15 PM

- [P-21] Research on the education for disaster reduction: Effects of " Starter Guide" shelter management game (HUG).

\*Takeshi Miyawaki<sup>1</sup>, Atsushi Kimura<sup>1</sup> (1. Nhon university)

12:15 PM - 1:15 PM

- [P-22] Personal Networks Among Selected Elderly in Post-Disaster Community in Tacloban City



\*Reggy Capacio Figer<sup>1</sup> (1. Hokkaido University)

12:15 PM - 1:15 PM

- [P-23] Emergency nutritional support in Japan: history, bottleneck, and future perspective with technology  
\*Kanakan Masuno<sup>1</sup>, Mayu Yokota<sup>1</sup>, Ayako Shimizu<sup>1</sup>, Masako Yokotsuka<sup>1</sup> (1. Showa Women's University)

12:15 PM - 1:15 PM

- [P-24] SEARCH (Search Engine for Research on Risk and Resilience) - CARI! (Cerdas Antisipasi Risiko Bencana di Indonesia)

\*MIZAN BUSTANUL FUADY BISRI<sup>1</sup> (1. United Nations University-Institute for the Advanced Study of Sustainability)

12:15 PM - 1:15 PM

- [P-25] Toward Resilient cities: *disaster Risk Reduction* analysis of Urban Water Infrastructures in A Potential Earthquake (Case study: Region 2 of Tehran Municipality)

\*seyedmohsen alavi<sup>1</sup>, Mohammadreza Rezaei<sup>2</sup> (1. York University, 2. Yazd University)

12:15 PM - 1:15 PM

- [P-26] Local production for local protection (*Chisan Chibo*) – Proposing a standardized local-level *bosai* operations from Tohoku

\*Fumihiko Imamura<sup>1</sup>, Kanako Iuchi<sup>1</sup> (1. Tohoku University)

12:15 PM - 1:15 PM

- [P-27] **HERSTORY: FACILITATING PARTICIPATORY DISASTER RISK ASSESSMENT TO THE SINGLE-MOTHERS OF SUB-URBAN POOR RESETTLEMENT HOUSING IN PHILIPPINES**

\*Imelda N. Oponda<sup>1</sup>, \*Adrian Dela Cruz Romero<sup>2</sup>, Letecia Saju<sup>1</sup>, Anna Monica Octubre<sup>1</sup>, Lilia Mondano<sup>1</sup>, Lissa B. Palero<sup>1</sup>, Reyna Liza Borres<sup>1</sup>, Evangeline Piñero<sup>1</sup>, Synel Perante<sup>1</sup>, Evelyn Sibai<sup>1</sup>, Maria Villa Degumbis<sup>1</sup>, Jenelyn Cortes<sup>1</sup>, Yolanda Javier<sup>1</sup>, Norma Bernal<sup>1</sup>, Laurencia Daang<sup>1</sup>, Ruby Ana Bernardo<sup>3</sup>, Jolly M. Lugod<sup>3</sup>, Cedric Bermiso<sup>3</sup>, Wilmor Pacay<sup>3</sup> (1. Samahang Kamanlalakbay Phase 1k, Kasiglahan Village, Rodriguez, Rizal, 2. University of Santo Tomas National Service Training Program (NSTP CWTS/LTS), 3. Alliance of Concerned Teachers-Philippines)

12:15 PM - 1:15 PM

- [P-28] **Climate Change Induced Rural Socio-Economic Vulnerability: An Empirical Regional Analysis from Sub-Himalayan West Bengal, India**

\*Manoranjan Ghosh<sup>1</sup> (1. Indian Institute of Technology Kharagpur)

12:15 PM - 1:15 PM

- [P-29] Disaster Awareness Improvement by Flood Simulated Experience in Virtual Reality

\*Miho Ohara<sup>1</sup>, Daisuke Kuribayashi<sup>2</sup>, Masatoshi Denda<sup>1</sup>, Yoshimasa Morooka<sup>1</sup>, Tsuyoshi Koyabu<sup>3</sup> (1. International Centre for Water Hazard and Risk Management (ICHARM), Public Works Research Institute, Japan, 2. International Centre for Water Hazard and Risk Management (ICHARM), Public Works Research Institute, Japan (Previous), 3. Disaster Information System Division, IDEA Consultants, Inc.)

12:15 PM - 1:15 PM

- [P-30] How to save people from earthquake?

\*Kazuo Sasaki<sup>1</sup>, Yamaimaiti Nizhamdong<sup>1</sup> (1. Challenge Co.,Ltd)

12:15 PM - 1:15 PM

- [P-31] A proposed framework for clarifying consequence impacts chain of tsunami hazards on global seaborne network

\*An chi CHENG<sup>1</sup>, Takuro OTAKE<sup>2</sup>, Anawat SUPPASRI<sup>3</sup>, Fumihiko IMAMURA<sup>3</sup> (1. Graduate School of Civil Engineering, Tohoku University, 2. NTT Data Corporation, 3. International Research Institute of Disaster Science, Tohoku University)

12:15 PM - 1:15 PM

- [P-32] **Long term recovery and resilience construct- The lessons learned from Jiji earthquake**

\*JIEHJIUH WANG WANG<sup>1</sup> (1. MING CHUAN UNIVERSITY)

12:15 PM - 1:15 PM

- [P-33] **Fire Service experts enhancing bush fire disaster resilience education with Primary School Geography students: A case study from New South Wales, Australia**

\*Tony Jarrett<sup>1</sup> (1. School of Education and Arts, CQUniversity, Rockhampton, Australia)

12:15 PM - 1:15 PM

- [P-34] **A review of stressors affecting organisational resilience of emergency facilities and infrastructure in cascading crises**

\*Gianluca Pescaroli<sup>1</sup>, David Alexander<sup>1</sup>, Virginia Murray<sup>2</sup> (1. Institute for Risk and Disaster Reduction, University College London, 2. Public Health England)

12:15 PM - 1:15 PM

**[P-35] Comprehensive Investigation of active faults and its impacts in South East Aceh Region**

\*Muksin Umar<sup>1,2</sup>, Ibnu Rusydy<sup>1</sup>, Wiwik Ayu Ningsih<sup>1,2</sup>, Andrean Simanjuntak<sup>1,3</sup>, Arifullah Arifullah<sup>1,2</sup>, Yunita Idris<sup>1</sup>, Irwandi Nurdin<sup>1,2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC), Universitas Syiah Kuala, Banda Aceh, Indonesia, 2. Department of Physics, Universitas Syiah Kuala, Banda Aceh, Indonesia, 3. Mata le Geophysical Station of BMKG Aceh, Aceh Besar, Indonesia)

12:15 PM - 1:15 PM

**[P-36] Investigating Planned Elevated Road for Mitigating Impacts of Tsunami on Banda Aceh, Indonesia**

\*Syamsidik Syamsidik<sup>1,3</sup>, Tursina Tursina<sup>1,3</sup>, Anawat Suppasri<sup>2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC) of Universitas Syiah Kuala, Banda Aceh-Indonesia, 2. International Research Institute of Disaster Science (IRIDeS) of Tohoku University, Japan, 3. Civil Engineering of Universitas Syiah Kuala, Banda Aceh-Indonesia)

12:15 PM - 1:15 PM

**[P-37] AN OVERVIEW OF POST-DISASTER RISKS TO SCHOOL FACILITIES IN ACEH PROVINCE OF INDONESIA**

\*Ella Meilianda<sup>1,3</sup>, Yunita Idris<sup>1,3</sup>, Roberto Gentile<sup>2</sup>, Carmine Galasso<sup>2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC) Syiah Kuala University, 2. University College London, 3. Civil Engineering Department, Engineering Faculty, Syiah Kuala University)

12:15 PM - 1:15 PM

**[P-38] Extreme weather, displacement, and conflict: New insights from Somalia**

\*Christian Webersik<sup>1,2,3</sup>, Lisa Thalheimer<sup>4</sup>, Felix Pretis<sup>5</sup>, Simon Abele<sup>6</sup>, Friederike E. L. Otto<sup>4</sup> (1. University of Agder, Norway, 2. Centre for Integrated Emergency Management (CIEM), Norway, 3. Disaster Research Unit, Freie Universität Berlin, Germany, 4. Environmental Change Institute, University of Oxford, UK, 5. Department of Economics, University of Victoria, Canada, 6. School of Geography and the Environment, University of Oxford, UK)

12:15 PM - 1:15 PM

**[P-39] Using tsunami deposits and modeling to study tsunami history and sources in Washington State, USA**

\*Carrie Garrison-Laney<sup>1</sup> (1. Washington Sea Grant/Univ. of Washington)

12:15 PM - 1:15 PM

**[P-40] Typhoon Wind Speed VS. Storm Surge Inundation: Understanding Risk of Building Damage from Statistical Analysis**

\*Natt Leelawat<sup>1</sup>, Tanaporn Chaivutitorn<sup>1</sup>, Thawalrat Tanasakcharoen<sup>1</sup>, Jing Tang<sup>1</sup>, Carl Vincent C. Caro<sup>2</sup>, Alfredo Mahar Lagmay<sup>3</sup>, Anawat Suppasri<sup>4</sup>, Jeremy Bricker<sup>5</sup>, Volker Roeber<sup>6</sup>, Carine J. Yi<sup>7</sup>, Fumihiko Imamura<sup>4</sup> (1. Chulalongkorn University, 2. Philippine Disaster Resilience Foundation, 3. University of the Philippines Diliman, 4. Tohoku University, 5. Delft University of Technology, 6. Université de Pau et des Pays de l'Adour, 7. R. Park & Associates Inc.)

12:15 PM - 1:15 PM

**[P-41] Sleep disturbance among people in Minamisanriku town after the Great East Japan Earthquake**

\*Yayoi Nakamura<sup>1</sup>, Tomomi Suda<sup>1</sup>, Aya Murakami<sup>1</sup>, Hiroyuki Sasaki<sup>1</sup>, Ichiro Tsuji<sup>2</sup>, Yumi Sugawara<sup>2</sup>, Masafumi Nishizawa<sup>3</sup>, Kazuaki Hatsugai<sup>3</sup>, Shinichi Egawa<sup>1</sup> (1. Division of International Cooperation for Disaster Medicine, International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Division of Epidemiology, Department of Public Health and Forensic Medicine, Tohoku University Graduate School of Medicine, 3. Minamisanriku Hospital)

12:15 PM - 1:15 PM

**[P-42] Strengthening Disaster-response Capabilities of Expressway**

Ryosuke Koga<sup>1</sup>, \*Yuji Sasaki<sup>1</sup>, \*Yuri Fukushi<sup>1</sup>, Rei Kasahara<sup>1</sup>, Koichi Noro<sup>1</sup> (1. East Nippon Expressway Company Limited Tohoku Regional Head Office)

12:15 PM - 1:15 PM

**[P-43] Influence of leisure time on the mental health of affected high school students by the disaster**

\*Junko Okuyama<sup>1,2</sup>, Shunichi Funakoshi<sup>3</sup>, Jun Onobe<sup>4,1</sup>, Izumi Shinichi<sup>1</sup> (1. Department of Physical Medicine and Rehabilitation, Tohoku University Graduate School of Medicine, 2. The Core Research Cluster of Disaster Science, 3. Miyagi Psychiatry Center, 4. Department of Rehabilitation, Faculty of Medical Science & Welfare, Tohoku Bunka Gakuen University)

12:15 PM - 1:15 PM

[P-44] The Asia-Pacific Disaster Report 2019: Pathways  
for resilience, inclusion and empowerment

\*Maria Bernadet Karina Dewi<sup>1</sup> (1. United Nations  
ESCAP)

12:15 PM - 1:15 PM

[P-45] Investigation of typhoon no. 19 induced flood  
damages and historical characteristics of flood  
hazards around Yoshida River in Miyagi Prefecture,  
Japan

\*Masakazu Hashimoto<sup>1</sup> (1. International Research  
Institute of Disaster Science, Tohoku University, Japan)

12:15 PM - 1:15 PM

[P-46] Disaster Risk Reduction Knowledge Service

Juanle Wang<sup>1,4</sup>, Kun Bu<sup>2,4</sup>, \*Yuelel Yuan<sup>1,4</sup>, Yujie Wang<sup>1,4</sup>,  
Xuehua Han<sup>1,3,4</sup> (1. Institute of Geographic Sciences and  
Natural Resources Research, Chinese Academy of  
Sciences, 2. Northeast Institute of geography and  
Agroecology, Chinese Academy of Sciences, 3. University  
of Chinese Academy of Sciences, 4. International  
Knowledge Centre for Engineering Sciences and  
Technology under the Auspices of UNESCO)

12:15 PM - 1:15 PM

[P-47] Water-Related Disaster Security: Assessing National  
Risk in Asia

\*Ilpyon Hong<sup>1</sup> (1. Korea Institute of Civil Engineering and  
Building Technology (KICT))

12:15 PM - 1:15 PM

## Mon. Nov 11, 2019

### Flash Talk Presentation 1

Flash Talk Presentation

#### Enterprise Risk Management platform to minimize economic losses from disasters

Yudai Tsuda

12:15 PM - 12:30 PM Flash Talk Presentation 1 (Meeting Room 6)

[MP2-01] Enterprise Risk Management platform to minimize economic losses from disasters

Yudai Tsuda (Tech Design Co.,Ltd.)

12:15 PM - 12:30 PM

Flash Talk Presentation

#### New Sports Day for Bosai

~ Disaster Prevention “Revolution” by Entertainment force~

DAIKI AKASAKA

12:35 PM - 12:50 PM Flash Talk Presentation 1 (Meeting Room 6)

[MP2-02] New Sports Day for Bosai

~ Disaster Prevention “Revolution” by Entertainment force~

DAIKI AKASAKA (IKUSA Inc.)

12:35 PM - 12:50 PM

Flash Talk Presentation

#### The Creation of “Investment Crowdfunding Platform for Non-Profit Organization”

Yusaku Izumi

12:55 PM - 1:10 PM Flash Talk Presentation 1 (Meeting Room 6)

[MP2-03] The Creation of “Investment Crowdfunding Platform for Non-Profit Organization”

Yusaku Izumi (KOKUA)

12:55 PM - 1:10 PM

Flash Talk Presentation

#### why free restaurants for children can be bosai platform.

Kojiro Akiyama

1:15 PM - 1:30 PM Flash Talk Presentation 1 (Meeting Room 6)

[MP2-04] why free restaurants for children can be bosai platform.

Kojiro Akiyama (Kodomo-shokudo support organization)

1:15 PM - 1:30 PM

Flash Talk Presentation

#### Forestry technology to DRR field

Akihiro Matsushita

3:05 PM - 3:20 PM Flash Talk Presentation 1 (Meeting Room 6)

[MP2-05] Forestry technology to DRR field

Akihiro Matsushita (CINQ.Co., Ltd)

3:05 PM - 3:20 PM

Flash Talk Presentation

#### Development of the new disaster information analysis system which looking ahead for the next-generation Japan.

Akihiro Nakamura

5:05 PM - 5:20 PM Flash Talk Presentation 1 (Meeting Room 6)

[MP2-06] Development of the new disaster information

analysis system which looking ahead for the next-generation Japan.

Akihiro Nakamura (LPP (Life Protect Plan))

5:05 PM - 5:20 PM

### Flash Talk Presentation 2

Flash Talk Presentation

#### Fuel stocking proposal to connect life at the time of disaster

Mitsuaki Kizaki

12:15 PM - 12:30 PM Flash Talk Presentation 2 (Meeting Room 7)

[MP2-07] Fuel stocking proposal to connect life at the time of disaster

Mitsuaki Kizaki (Nippon BCP Inc)

12:15 PM - 12:30 PM

Flash Talk Presentation

#### Gender in disaster: Elderly caregiver circumstances during the Great East Japan Earthquake example study of rural coastal area in Iwate prefecture

Miwako Kitamura

12:35 PM - 12:50 PM Flash Talk Presentation 2 (Meeting Room 7)

[MP2-08] Gender in disaster: Elderly caregiver

circumstances during the Great East Japan Earthquake example study of rural coastal area in Iwate prefecture

Miwako Kitamura (Tohoku University Graduate school of Engineering)

12:35 PM - 12:50 PM

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Flash Talk Presentation

## Enhancing the Access of Foreigners to the Disaster Relief Assistance

Ikuyo Kikusawa

12:55 PM - 1:10 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP2-09] Enhancing the Access of Foreigners to the Disaster Relief Assistance

Ikuyo Kikusawa (Chief Researcher, Fukuoka Urban Research Center)

12:55 PM - 1:10 PM

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Flash Talk Presentation

## Disaster Management through Augmented Reality and Satellite Data

Ariston N. Gonzalez

1:15 PM - 1:30 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP2-10] Disaster Management through

Augmented Reality and Satellite Data

Ariston N. Gonzalez (Adarna Aerospace)

1:15 PM - 1:30 PM

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Flash Talk Presentation

## Crisis Management in the field of Tourism

Hokuto Asano

3:05 PM - 3:20 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP2-11] Crisis Management in the field of Tourism

Hokuto Asano (Japan Tourism Agency)

3:05 PM - 3:20 PM

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Flash Talk Presentation

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5:05 PM - 5:20 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP2-12] -

5:05 PM - 5:20 PM

Mon. Nov 11, 2019

Room 1

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Keynote Speech

[K01]

Hidden Stories of the Sendai Framework negotiation processes?

-How Japanese BOUSAI experiences embedded to Sendai Framework-

Kimio Takeya

8:00 AM - 8:20 AM Room 1 (Main Hall)

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[K01] Hidden Stories of the Sendai Framework negotiation processes?

-How Japanese BOUSAI experiences embedded to Sendai Framework-

Kimio Takeya (Distinguished Senior Adviser to the President of JICA)

8:00 AM - 10:00 AM

## Tue. Nov 12, 2019

## Room 1

Oral Sessions | Session

## [O3-1]

## Toward Restoration after Fukushima Daiichi Nuclear Accident

8:30 AM - 10:00 AM Room 1 (Main Hall)

## [O3-1-01] Toward Restoration after Fukushima Daiichi Nuclear Accident

\*Nobuyoshi Hara<sup>1</sup>, \*Akira HASEGAWA<sup>2</sup>, \*Masatoshi SUZUKI<sup>3</sup>, \*Masashi KONYO<sup>4</sup>, \*Yutaka WATANABE<sup>5</sup>

(1. Institute for Disaster Reconstruction and Regeneration Research, Tohoku University, 2. School of Engineering, Tohoku University, 3. International Research Institute of Disaster Science, Tohoku University, 4. Graduate School of Information Sciences, Tohoku University, 5. Center for Fundamental Research on Nuclear Decommissioning, Tohoku University)

8:30 AM - 10:00 AM

Oral Sessions | Session

## [O3-3]

## Value of advance information for earthquake damage reduction and its feasibility

1:30 PM - 3:00 PM Room 1 (Main Hall)

## [O3-3-01] Value of advance information for earthquake damage reduction and its feasibility

Toshihiro Mori<sup>1</sup>, \*Izumi Tobo<sup>2</sup>, \*Ken Umeno<sup>3</sup>, \*Yukio Fujinawa<sup>4</sup>, Atsushi Oono<sup>1</sup>, Takashi Mii<sup>1</sup>, Tadahiro Eguchi<sup>1</sup>, Morihiro Matsuda<sup>1</sup>, Michiaki Yokoyama<sup>1</sup> (1. OPTAGE Inc., 2. Mitsubishi Research Institute, Inc., 3. Kyoto University, 4. Organization for Development of Resilient Communities)

1:30 PM - 3:00 PM

Oral Sessions | Session

## [O3-4]

## Support to Disaster Risk Reduction by private sector

3:30 PM - 5:00 PM Room 1 (Main Hall)

## [O3-4-01] Support to Disaster Risk Reduction by private sector

\*Hisashi Hamada<sup>1</sup> (1. JAPAN TOBACCO INC.)

3:30 PM - 5:00 PM

## Room 2

Oral Sessions | Session

## [O3-5]

## Spiritual care and relevant faith-based activity in disaster relief and recovery

8:30 AM - 10:00 AM Room 2 (Tachibana)

## [O3-5-01] Spiritual care and relevant faith-based activity in disaster relief and recovery

Takaaki Ito<sup>3</sup>, Nobuhiko Katayama<sup>2</sup>, \*Emiko Kubo<sup>1</sup> (1. Soka Gakkai International, 2. World Vision Japan, 3. Sophia University)

8:30 AM - 10:00 AM

Oral Sessions | Session

## [O3-6]

## BOSAI DIVERSITY Diversity in disaster preparation

10:30 AM - 12:00 PM Room 2 (Tachibana)

## [O3-6-01] BOSAI DIVERSITY

Diversity in disaster preparation.

\*Shuichi Nishida<sup>1</sup>, Takahiro Koga<sup>1</sup> (1. Yahoo Japan Corporation)

10:30 AM - 12:00 PM

Oral Sessions | Session

## [O3-7]

## The Asia-Pacific Disaster Report 2019: Pathways for resilience, inclusion and empowerment

1:30 PM - 3:00 PM Room 2 (Tachibana)

## [O3-7-01] The Asia-Pacific Disaster Report 2019: Pathways for resilience, inclusion and empowerment

\*Laura Louise Hendy<sup>1</sup>, Maria Bernadet Karina Dewi<sup>1</sup> (1. United Nations ESCAP)

1:30 PM - 3:00 PM

Oral Sessions | Session

## [O3-8]

## "FUKUSHIMA" its disasters archives, current revitalization status and the future

3:30 PM - 5:00 PM Room 2 (Tachibana)

## [O3-8-01] "FUKUSHIMA" its disasters archives, current revitalization status and the future

\*Hideya KITAMURA<sup>1</sup>, \*Shubun ENDO<sup>2</sup>, \*looking for suitable person looking for suitable person<sup>3</sup> (1. Business Council for the Fukushima Innovation Coast Initiative (representative of Tokyo Electric Power

Company), 2. Futaba Inc, 3. Fukushima prefecture or  
University of Fukushima)  
3:30 PM - 5:00 PM

### Room 3

Oral Sessions | Session

[O3-10]

Interdisciplinary Strategies in General Education for  
Disaster Risk Reduction: The Six-Year Experience by  
DRMAPS at the University of the Philippines  
10:30 AM - 12:00 PM Room 3 (Hagi)

[O3-10-01] **Interdisciplinary Strategies in General  
Education for Disaster Risk Reduction:  
The Six-Year Experience by DRMAPS at the  
University of the Philippines**  
\*Benito M. Pacheco<sup>1</sup>, \*Flaudette May V. Datuin<sup>1</sup>,  
\*Aurora Odette C. Mendoza<sup>1</sup>, \*Elenita N. Que<sup>1</sup>,  
\*Leonardo C. Rosete<sup>1</sup>, \*Mark Albert H. Zarco<sup>1</sup> (1.  
University of the Philippines Diliman)  
10:30 AM - 12:00 PM

Oral Sessions | Session

[O3-11]

BOSAI POINT. A new disaster-preventing  
service, using your untouched points to raise  
donations  
1:30 PM - 3:00 PM Room 3 (Hagi)

[O3-11-01] **BOSAI POINT.  
A new disaster-preventing service,  
using your untouched points to raise  
donations.**  
\*JUNSHIRO KAMEYAMA<sup>1</sup> (1. BOSAI POINT  
PROJECT)  
1:30 PM - 3:00 PM

Oral Sessions | Session

[O3-12]

The future of wide area disaster response by drones  
and air mobilities  
3:30 PM - 5:00 PM Room 3 (Hagi)

[O3-12-01] The future of wide area disaster response by  
drones and air mobilities  
\*Shintaro Takahashi<sup>1</sup>, Kotara Chiba<sup>1</sup>, Kenichi  
Ohmae<sup>1</sup>, Yukihiro Maru<sup>2</sup> (1. Drone Fund, 2. Leave  
a Nest)

3:30 PM - 5:00 PM

### Room 4

Oral Sessions | Session

[O3-13]

Advances of International Collaboration on M9  
Disaster Science  
8:30 AM - 10:00 AM Room 4 (Shirakashi 1)

[O3-13-01] Advances of International Collaboration on  
M9 Disaster Science  
\*Kenjiro Terada<sup>1,4</sup>, \*Shunichi Koshimura<sup>1,4</sup>, \*Jorge  
Leon<sup>3,6</sup>, Randall J LeVeque<sup>2</sup>, Gabriel Gonzalez<sup>3,7</sup>,  
\*Patricio Catalan<sup>3,6</sup>, Elizabeth Maly<sup>1</sup>, \*Dan  
Abramson<sup>2</sup>, Carrie Garrison-Laney<sup>2</sup>, \*Michael  
Motley<sup>2</sup>, \*Naoko Kuriyama<sup>5</sup>, \*Lan Nguyen<sup>2</sup>, \*Adams  
Adams<sup>2</sup>, Anawat Suppasri<sup>1,4</sup>, Erick Mas<sup>1,4</sup>, Shuji  
Moriguchi<sup>1</sup> (1. IRIDeS, Tohoku University, 2.  
University of Washington, 3. CIGIDEN, Chile, 4. Core  
Research Cluster of Disaster Science, Tohoku  
University, 5. Kobe University, 6. Universidad  
Federico Santa Maria, 7. Universidad Católica del  
Norte)  
8:30 AM - 10:00 AM

Oral Sessions | Session

[O3-14]

Fuel stocking proposal to connect life at the time of  
disaster  
10:30 AM - 12:00 PM Room 4 (Shirakashi 1)

[O3-14-01] Fuel stocking proposal to connect life at the  
time of disaster  
mitsuaki kizaki<sup>1</sup>, \*Masataka Nakai<sup>1</sup>, \*Toru  
Matsunaga<sup>1</sup> (1. NIPON BCP INC)  
10:30 AM - 12:00 PM

Oral Sessions | Session

[O3-15]

Support for affected areas by "local residents" in the  
Great East Japan Earthquake "Connecting" town  
development by "collaboration"  
1:30 PM - 3:00 PM Room 4 (Shirakashi 1)

[O3-15-01] Support for affected areas by "local residents"  
in the Great East Japan Earthquake  
"Connecting" town development by  
"collaboration"



\*Hideaki Murai<sup>1</sup>, \*Chikako Adachi<sup>1</sup>, Hiroaki Enoki<sup>1</sup>,  
 \*Fumihiko Sugawara<sup>1</sup> (1. All Japan Council  
 Company)  
 1:30 PM - 3:00 PM

10:30 AM - 12:00 PM

Oral Sessions | Session

[O3-16]

The Factors Regulate to Community Participation in  
 Sustainable Disaster Recovery Program: An  
 Experience of Cyclone Aila Disaster Affected Coastal  
 People Bangladesh

3:30 PM - 5:00 PM Room 4 (Shirakashi 1)

[O3-16-01] **The Factors Regulate to Community**

**Participation in Sustainable Disaster Recovery  
 Program: An Experience of Cyclone Aila  
 Disaster Affected Coastal People Bangladesh**

\*Emadul Islam<sup>1</sup>, Haris Abd Wahab<sup>1</sup> (1. University of  
 Malaya, Malaysia)

3:30 PM - 5:00 PM

## Room 5

Oral Sessions | Session

[O3-17]

Redefining and be preparing for disasters: the  
 lessons from the Moken sea nomads of Thailand

8:30 AM - 10:00 AM Room 5 (Shirakashi 2)

[O3-17-01] Redefining and be preparing for disasters: the  
 lessons from the Moken sea nomads of  
 Thailand

\*Narumon Arunotai<sup>1</sup> (1. Research Unit on  
 Indigenous Peoples and Alternative Development,  
 Social Research Institute, Chulalongkorn University,  
 )

8:30 AM - 10:00 AM

Oral Sessions | Session

[O3-18]

IFIP session on IT in Disaster Risk Reduction (ITDRR)

10:30 AM - 12:00 PM Room 5 (Shirakashi 2)

[O3-18-01] IFIP session on IT in Disaster Risk Reduction  
 (ITDRR)

\*Yuko MURAYAMA<sup>1</sup>, \*Jun Sasaki<sup>2</sup>, \*Takashi Yoshino<sup>3</sup>  
 (1. Tsuda University and IFIP(International  
 Federation for Information Processing), 2. Iwate  
 Prefectural University, 3. Wakayama University)

## Tue. Nov 12, 2019

### Flash Talk Presentation 1

Flash Talk Presentation

#### SERVICE LEARNING THROUGH NSTP CWTS/LTS:

The Community Based Disaster Risk Reduction

Program of University of Santo Tomas-National

Service Training Program (NSTP) CWTS/LTS

Mr. Adrian D. Romero; Ms. Sheila Ruth Masangkay, Ms. Jasmin Victoria

12:15 PM - 12:30 PM Flash Talk Presentation 1 (Meeting Room 6)

#### [MP3-01] SERVICE LEARNING THROUGH NSTP

CWTS/LTS: The Community Based Disaster Risk Reduction Program of University of Santo Tomas-National Service Training Program (NSTP) CWTS/LTS

Mr. Adrian D. Romero; Ms. Sheila Ruth Masangkay, Ms. Jasmin Victoria (University of Santo Tomas-National Service Training Program CWTS/LTS)

12:15 PM - 12:30 PM

Flash Talk Presentation

A social-ecological approach to disaster risk management applied to the case study of the Marche Region, Italy

Alessandra Colocci

12:35 PM - 12:50 PM Flash Talk Presentation 1 (Meeting Room 6)

#### [MP3-02] A social-ecological approach to disaster risk management applied to the case study of the Marche Region, Italy

Alessandra Colocci (Universita Politecnica delle Marche)

12:35 PM - 12:50 PM

Flash Talk Presentation

#### Mobilizing Local Knowledge in Local Disaster Risk Reduction Strategies

Dr Aaron Opdyke

12:55 PM - 1:10 PM Flash Talk Presentation 1 (Meeting Room 6)

#### [MP3-03] Mobilizing Local Knowledge in Local Disaster Risk Reduction Strategies

Dr Aaron Opdyke (The University of Sydney)

12:55 PM - 1:10 PM

Flash Talk Presentation

#### Water, Sanitation, and Hygiene (WASH) assessments

#### two years after Nepal 2015 earthquake

Sital Uprety

1:15 PM - 1:30 PM Flash Talk Presentation 1 (Meeting Room 6)

#### [MP3-04] Water, Sanitation, and Hygiene (WASH)

assessments two years after Nepal 2015 earthquake

Sital Uprety (Department of Civil and Environmental Engineering, University of Illinois and Department of Frontier Science for Advanced Environment, Tohoku University)

1:15 PM - 1:30 PM

Flash Talk Presentation

#### The state-of-the-art review of vulnerability indices: with a special focus on urban flood

Tanaya Sarmah

3:05 PM - 3:20 PM Flash Talk Presentation 1 (Meeting Room 6)

#### [MP3-05] The state-of-the-art review of vulnerability

indices: with a special focus on urban flood

Tanaya Sarmah (Indian Institute of Technology Kharagpur)

3:05 PM - 3:20 PM

Flash Talk Presentation

#### Damage Distribution of Typhoon No. 21 in 2018 on Osaka and Wakayama Prefecture based on Questionnaire Surveys

Haris Rahadiano

5:05 PM - 5:20 PM Flash Talk Presentation 1 (Meeting Room 6)

#### [MP3-06] Damage Distribution of Typhoon No. 21 in 2018 on Osaka and Wakayama Prefecture based on Questionnaire Surveys

Haris Rahadiano (Kyoto University)

5:05 PM - 5:20 PM

### Flash Talk Presentation 2

Flash Talk Presentation

#### Exploring the DRRM Landscape of the University of the Philippines Diliman: How prepared are university students in case of a disaster?

Danielle Marie Alcoriza Parreno

12:15 PM - 12:30 PM Flash Talk Presentation 2 (Meeting Room 7)

#### [MP3-07] Exploring the DRRM Landscape of the University of the Philippines Diliman: How prepared are

university students in case of a disaster?  
Danielle Marie Alcoriza Parreno, Yra Marie Limos  
Calamiong (University of the Philippines Diliman,  
University of the Philippines Diliman)  
12:15 PM - 12:30 PM

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Flash Talk Presentation

**Fragility curves for economic losses in industrial  
sectors after strong wind disaster: A case  
of 2018 Typhoon Jebi**

Hasi  
12:35 PM - 12:50 PM Flash Talk Presentation 2 (Meeting Room  
7)

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[MP3-08] Fragility curves for economic losses in industrial  
sectors after strong wind disaster: A case of  
2018 Typhoon Jebi

Hasi (Kyoto University)  
12:35 PM - 12:50 PM

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Flash Talk Presentation

**Recent Activity for DRR in Turkey**

Mr. Ozmen Ozgu Tuna  
12:55 PM - 1:10 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP3-09] Recent Activity for DRR in Turkey

Mr. Ozmen Ozgu Tuna (Disaster and Emergency  
Management Presidency (AFAD))  
12:55 PM - 1:10 PM

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Flash Talk Presentation

**How to save people from  
earthquakes**

Kazuo Sasaki  
1:15 PM - 1:30 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP3-10] How to save people from  
earthquakes

Kazuo Sasaki (Challenge Co.,Ltd)  
1:15 PM - 1:30 PM

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Flash Talk Presentation

**Saglam KOBİ Project**

Ruya Kaya  
3:05 PM - 3:20 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP3-11] Saglam KOBİ Project

Ruya Kaya (IDEMA)  
3:05 PM - 3:20 PM

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Flash Talk Presentation

**Understanding child and youth resilience in the  
aftermath of disasters: The case of the 2016 Alberta  
wildfires in Canada**

Dr. Julie Drolet  
5:05 PM - 5:20 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP3-12] Understanding child and youth resilience in the  
aftermath of disasters: The case of the 2016  
Alberta wildfires in Canada

Dr. Julie Drolet (Professor, University of Calgary)  
5:05 PM - 5:20 PM

Tue. Nov 12, 2019

Room 1

Keynote Speech

[K02]

Keynote Speech

Gretchen Kalonji, Denise Konan, Jihyeon Park

8:00 AM - 8:20 AM Room 1 (Main Hall)

[K02]

Gretchen Kalonji (Sichuan University)

[K02]

Denise Konan (University of Hawaii)

[K02]

Jihyeon Park (JHSUSTAIN)

Tue. Nov 12, 2019

Room 2

Closing

Closing

5:30 PM - 6:00 PM Room 2 (Tachibana)

[CL-01] Closing

5:30 PM - 6:00 PM

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Oral Sessions | Open Session

[O1-1]

## Great East Japan Earthquake Memorial Symposium: Passing Down Disaster Experience - Its True Meaning and Reality

Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 1 (Main Hall)

Disaster-Resilient and Environmentally-Friendly City Promotion Office, City Planning Policy Bureau, City of Sendai

Simultaneous Interpretation is available. (同時通訳有り)

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### [O1-1-01] Great East Japan Earthquake Memorial Symposium: Passing Down Disaster Experience - Its True Meaning and Reality

Noriyuki Kurosaka<sup>1</sup>, \*Chihiro Minato<sup>2</sup>, \*Natsuki Ikezawa<sup>3</sup>, \*Hiroyasu Yamauchi<sup>4</sup>, \*Kenji Shiga<sup>5</sup>,  
\*Masashige Motoe<sup>6</sup> (1. Disaster-Resilient and Environmentally-Friendly City Promotion  
Office, City Planning Policy Bureau, City of Sendai, 2. Department of Information Design, Faculty  
of Art and Design, Tama Art University, 3. Author / Poet, 4. Rias Ark Museum, 5. Hiroshima  
Peace Memorial Park, 6. Graduate School of Engineering, Tohoku University / Central  
Memorial Site Consideration Commission)

11:00 AM - 12:30 PM

11:00 AM - 12:30 PM (Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 1)

## [O1-1-01] Great East Japan Earthquake Memorial Symposium: Passing Down Disaster Experience - Its True Meaning and Reality

Noriyuki Kurosaka<sup>1</sup>, \*Chihiro Minato<sup>2</sup>, \*Natsuki Ikezawa<sup>3</sup>, \*Hiroyasu Yamauchi<sup>4</sup>, \*Kenji Shiga<sup>5</sup>, \*Masashige Motoe<sup>6</sup> (1. Disaster-Resilient and Environmentally-Friendly City Promotion Office, City Planning Policy Bureau, City of Sendai, 2. Department of Information Design, Faculty of Art and Design, Tama Art University, 3. Author / Poet, 4. Rias Ark Museum, 5. Hiroshima Peace Memorial Park, 6. Graduate School of Engineering, Tohoku University / Central Memorial Site Consideration Commission)

Keywords: Great East Japan Earthquake, memory, experience, memorial, memorial site

Passing down the memories and experiences of the Great East Japan Earthquake, the City of Sendai has been working on projects for preserving the memory of the Great East Japan Earthquake. As a part of these projects, we are currently discussing development of the Disaster Memorial Site in the central area of Sendai. In this session, the City's current efforts will be introduced while deliberating over the fundamental meaning of the memorial and what aspects of the City will be influenced by the memorial site, while asking questions such as "what exactly is a memorial?", "how should we pass down this historic event to the future?" and "how will this memorial influence the future?"

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Oral Sessions | Open Session

[O1-2]

## The past and present role of national universities experienced the 2011 Tohoku Earthquake and tsunami for discussion on the future BOSAI

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 1 (Main Hall)

Tohoku University- IRIDeS

Simultaneous Interpretation is available. (同時通訳有り)

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### [O1-2-01] The past and present role of national universities experienced the 2011 Tohoku Earthquake and tsunami for discussion on the future BOSAI

\*Fumihiko Imamura<sup>1</sup>, Akira Iwabuchi<sup>2</sup>, Hideo Ohno<sup>1</sup>, Katsumi Nakai<sup>3</sup>, Kiyoshi Murakami<sup>2</sup> (1. Tohoku University, 2. Iwate University,, 3. Fukushima University)

2:00 PM - 3:30 PM



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2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 1)

## [O1-2-01] The past and present role of national universities experienced the 2011 Tohoku Earthquake and tsunami for discussion on the future BOSAI

\*Fumihiko Imamura<sup>1</sup>, Akira Iwabuchi<sup>2</sup>, Hideo Ohno<sup>1</sup>, Katsumi Nakai<sup>3</sup>, Kiyoshi Murakami<sup>2</sup> (1. Tohoku University, 2. Iwate University,, 3. Fukushima University)

Keywords: National universities, Science and technology, Human resources, education

The 2011 Tohoku earthquake tsunami caused massive damage over a wide area, leaving great shocks and scars in communities. It is still in the process of reconstruction, and new development at the affected areas is being explored while utilizing regional resources. Among these, the role of the university is large, the situation and issues of scientific and technological correspondence and dispatch at that time, human resource development necessary for reconstruction and rebirth, and further, leading the region, and one role in future disaster prevention and mitigation, there is a mission to In this symposium, keynote speeches will be given to the Presidents of Iwate University, Tohoku University, and of Fukushima University, who will report on the response from that time to the current efforts. On that basis, the existence and role of the university toward the future will be discussed by Prof.Kiyoshi Murakami, the coordinator at Iwate University's special assistant director', and information exchange will be conducted on the initiatives for the 10 years of the earthquake and the direction thereafter.

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Oral Sessions | Session

[O1-3]

Accelerating formulation of local DRR plans toward the next 10 years of their implementation - How to achieve Global Target (e) of the Sendai Framework?-

Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 1 (Main Hall)

Japan International Cooperation Agency

Simultaneous Interpretation is available. (同時通訳有り)

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[O1-3-01] Accelerating formulation of local DRR plans toward the next 10 years of their implementation - How to achieve Global Target (e) of the Sendai Framework?-

\*Moderator Prof. Kimio Takeya<sup>1</sup>, \*Four (4) Speakers<sup>2</sup>, Wataru Ono<sup>1</sup> (1. Japan International Cooperation Agency (JICA), 2. National and/or local authority related to DRR, Planning and Finance)

4:00 PM - 5:30 PM

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4:00 PM - 5:30 PM (Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 1)

## [O1-3-01] Accelerating formulation of local DRR plans toward the next 10 years of their implementation - How to achieve Global Target (e) of the Sendai Framework?-

\*Moderator Prof. Kimio Takeya<sup>1</sup>, \*Four (4) Speakers<sup>2</sup>, Wataru Ono<sup>1</sup> (1. Japan International Cooperation Agency (JICA), 2. National and/or local authority related to DRR, Planning and Finance)

Keywords: Sendai Framework for Disaster Risk Reduction 2015-2030, Global Target (e), Local DRR plans, JICA, International cooperation

This session will provide an opportunity to discuss and identify practical solutions for achieving Global Target (e) of the Sendai Framework for Disaster Risk Reduction 2015-2030, especially in developing local DRR strategies/plans, and accelerating their implementation. We are now facing two (2) key challenges of 1) how to develop and spread “practical” local DRR plans toward 2020 and 2) how to promote implementation based on plans by allocating appropriate resources including human, finance and techniques next 10 years. JICA has been continuously tackling these issues through leading discussions in international arenas and working with counterparts of developing countries. 8 STEPS – Practical Method for Developing Local DRR Strategies/Plans – is one of the remarkable outcomes, which is utilized in JICA’s knowledge co-creation programs and capacity development projects. The session will invite some practitioners from national and local governments of counterparts’ countries as panelist and discuss some key issues along with following questions.

1. What is the key component to be included in the local DRR plans for promoting pre-disaster investment?
2. What are the challenges for developing local DRR plans?
3. Do you have any good practices and lessons learned to develop local DRR plans?
4. What is a key factor to achieve actual implementation of local DRR plans?
5. How can we accelerate implementation of local DRR plans?

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Oral Sessions | Open Session

[O1-4]

### 3.11 DENSHO ROAD to Hand down the Lessons of the Great East Japan Earthquake ~Activities of Memorializing the Earthquake in Industry-academia-government-citizen Collaborations ~

Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 1 (Main Hall)

Disaster Memorial Network Council (Tohoku Regional Bureau MLIT, Aomori Prefecture, Iwate Prefecture, Miyagi Prefecture, Fukushima Prefecture, Sendai City)

Simultaneous Interpretation is available. (同時通訳有り)

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#### [O1-4-01] 3.11 DENSHO ROAD to Hand down the Lessons of the Great East Japan Earthquake~Activities of Memorializing the Earthquake in Industry-academia-government-citizen Collaborations ~

\*Akira Matsumoto<sup>1</sup> (1. Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism)

6:00 PM - 7:30 PM

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6:00 PM - 7:30 PM (Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 1)

## [O1-4-01] 3.11 DENSHO ROAD to Hand down the Lessons of the Great East Japan Earthquake~Activities of Memorializing the Earthquake in Industry-academia-government-citizen Collaborations ~

\*Akira Matsumoto<sup>1</sup> (1. Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism)

Keywords: The Great East Japan Earthquake , The 3.11 DENSHO ROAD, Memorializing the Earthquake

It has been 8 years since the Great East Japan Earthquake occurred and fading memories over time is a deep concern. It has been said that damage might be reduced if the lessons of past disasters are passed down.

We have launched “ the Disaster Memorial Network Council” through the collaboration of industry, academia, government and citizen sectors, and have started activities for handing down the lessons of the earthquake across the sectors in the Tohoku Region. We are setting up the project of the 3.11 DENSHO ROAD to transmit the lessons by connecting memorial facilities in the four disaster affected prefectures. This project includes making maps utilizing a standard set of pictogram and building its website, both will be multilingual, to guide memorial facilities on-site.

In our session, we will introduce the 3.11 DENSHO ROAD, which aims to enhance disaster management capacities in Japan and overseas by passing on the lessons, and also to cheer up the affected area by increasing the flow of people.

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Oral Sessions | Open Session

[O1-6]

## "Moving Hearts" With Experiences and Lessons ~ Connecting Stories to Specific Disaster Prevention Measures

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 2 (Tachibana)

Simultaneous Interpretation is available. (同時通訳有り)

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### [O1-6-01] “Moving Hearts” With Experiences and Lessons ~ Connecting Stories to Specific Disaster Prevention Measures

\*Emiko Kuriyagawa<sup>1</sup> (1. Miyagi Prefectural Government)

2:00 PM - 3:30 PM

2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 2)

## **[O1-6-01] “Moving Hearts” With Experiences and Lessons ~**

### **Connecting Stories to Specific Disaster Prevention Measures**

\*Emiko Kuriyagawa<sup>1</sup> (1. Miyagi Prefectural Government)

Keywords: “Moving Hearts”

How did people who previously experienced natural disasters pass on their stories and lessons they learned as well as prepare others for later disasters?

Using remaining records and conveying the scene of the disaster at that time to people who did not experience the calamity first-hand allows them to relive the situation as if they were there. This session discusses the initiatives needed to increase the number of people able to properly react and take action in emergency situations as a result of storytelling.

Additionally, experts and the regional community members involved share opinions regarding initiatives aimed at achieving regional revitalization by creating networks between different disaster memorial facilities, where they pass on memories and lessons concerning disasters to the world and future generations.

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Oral Sessions | Session

[O1-7]

## Cross-cutting the Disaster-Related Sciences: Challenges of a Multidisciplinary Team in Tohoku University

Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 2 (Tachibana)

The Core Research Cluster of Disaster Science

Simultaneous Interpretation is available. (同時通訳有り)

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### [O1-7-01] Cross-cutting the Disaster-Related Sciences: Challenges of a Multidisciplinary Team in Tohoku University

\*Junko Okuyama<sup>1</sup>, \*Fumihiko Imamura<sup>1</sup>, \*Shuji Seto<sup>1</sup>, \*Toru Matsuzawa<sup>1</sup>, \*Toshiki Iwasaki<sup>1</sup>,  
\*Hiroki Takakura<sup>1</sup>, \*Yu Fukuda<sup>1</sup>, \*Kiyoshi Ito<sup>1</sup> (1. Core Research Cluster of Disaster Science,  
Tohoku University)

4:00 PM - 5:30 PM



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4:00 PM - 5:30 PM (Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 2)

## [O1-7-01] Cross-cutting the Disaster-Related Sciences: Challenges of a Multidisciplinary Team in Tohoku University

\*Junko Okuyama<sup>1</sup>, \*Fumihiko Imamura<sup>1</sup>, \*Shuji Seto<sup>1</sup>, \*Toru Matsuzawa<sup>1</sup>, \*Toshiki Iwasaki<sup>1</sup>, \*Hiroki Takakura<sup>1</sup>, \*Yu Fukuda<sup>1</sup>, \*Kiyoshi Ito<sup>1</sup> (1. Core Research Cluster of Disaster Science, Tohoku University)

Keywords: Core Research Cluster of Disaster Science, cross-cutting the disaster-related sciences, collaboration of citizens and researchers, the town of Shichigahama

This study presents the research activities, results, and progress of the Core Research Cluster of Disaster Science at Tohoku University. Our cluster adopts a multidisciplinary approach to disaster studies, linking natural science, engineering, medical science, and the social sciences and humanities. The town of Shichigahama in Miyagi, on Japan's northeastern coast, was severely inundated by the tsunami following the Great East Japan Earthquake in 2011. We will report the results of the town's two-year disaster-related activities as well as the prospects drawn from a recent workshop in September 2019. We begin with an overview of our project followed by presentations from the disaster medicine research group and the disaster social sciences and humanities research group, which are based on the field studies in Shichigahama and consider the relation between local culture and health. The natural hazard science research group and the applied disaster risk reduction research group will discuss both past and future regional risk environment evaluation efforts and which factors caused actual damages in society in the context of the 2011 disaster. After the presentations, we intend to gather feedback from our overseas collaborative partners from the Association of Pacific Rim Universities (APRU) network, Indonesia, and the United Kingdom regarding further investigations that would enhance disaster preparedness. Such endeavors will guide cross-cutting research on climate change, natural disasters, survival, health, and culture.

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Oral Sessions | Open Session

[O1-8]

## Thinking about Disaster Storytelling: How to Use Oral Narratives to Prevent Future Fatalities

Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 2 (Tachibana)

The Kahoku Shimpō

Simultaneous Interpretation is available. (同時通訳有り)

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### [O1-8-01] Thinking about Disaster Storytelling: How to Use Oral Narratives to Prevent Future Fatalities

\*Jun Suzuki<sup>1</sup>, \*Mana Abe<sup>4</sup>, \*Tatsuya Kishimoto<sup>5</sup>, \*Muzailin Affan<sup>2</sup>, \*Sushil Gyewali<sup>3</sup> (1. The Kahoku Shimpō, 2. Syiah Kuala University, 3. Government of Nepal, 4. TV-U FUKUSHIMA, 5. THE KOBE SHIMBUN DAIRY NEWSPAPER)

6:00 PM - 7:30 PM

6:00 PM - 7:30 PM (Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 2)

## [O1-8-01] Thinking about Disaster Storytelling: How to Use Oral Narratives to Prevent Future Fatalities

\*Jun Suzuki<sup>1</sup>, \*Mana Abe<sup>4</sup>, \*Tatsuya Kishimoto<sup>5</sup>, \*Muzailin Affan<sup>2</sup>, \*Sushil Gyewali<sup>3</sup> (1. The Kahoku Shimpō, 2. Syiah Kuala University, 3. Government of Nepal, 4. TV-U FUKUSHIMA, 5. THE KOBE SHIMBUN DAIRY NEWSPAPER)

Keywords: Disaster Storytelling

Our goal is to create a space where general audiences can listen to domestic and foreign reporters, journalists, broadcasters, research scientists, and administrators of past disaster sites as they present examples of their research investigations and participate in panel discussions. We aim to convey the importance of survivors of natural disasters sharing their stories as a long-term method of preventing future large-scale loss of life.

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Oral Sessions | Session

[O1-9]

## Media and Bosai: A Crucial Combination for Saving Lives

Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 3 (Hagi)

NHK World-Japan

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### [O1-9-01] Media and Bosai: A Crucial Combination for Saving Lives

\*Takaaki Takai<sup>1</sup>, \*Minori Takao<sup>1</sup> (1. NHK World-Japan)

11:00 AM - 12:30 PM

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11:00 AM - 12:30 PM (Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 3)

## [O1-9-01] Media and Bosai: A Crucial Combination for Saving Lives

\*Takaaki Takai<sup>1</sup>, \*Minori Takao<sup>1</sup> (1. NHK World-Japan)

Keywords: The Role of Public Broadcast

Speakers: Minori Takao(Ms.) and producers(TBD) NHK, Japan' s sole public broadcaster, is addressing disaster preparedness and DRR through TV, radio and the Internet. Using its multi-language and cross media platform, NHK World Japan delivers “ information that saves lives” from every angle, including emergency broadcasting, disaster resilience and public awareness activities.Minori Takao, news anchor at NHK World - Japan will present the team' s role in issuing multi-language emergency warnings to help foreign language speakers in Japan. The team will also present its role in preparing wide audiences around the world for the next disaster through its educational programs and web contents.They include a TV series “ Bosai: An Educational Journey” , featuring disaster preparedness education in Japan and other parts of Asia, Bosai radio programs aired in 17 languages and BOSAI homepage launched last year. This session will look into the role of media in “ Bosai” , and what more can be done to mitigate disaster through media outlets.

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Oral Sessions | Open Session

[O1-10]

## Disaster Risk Reduction and Women's Leadership

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 3 (Hagi)

Simultaneous Interpretation is available. (同時通訳有り)

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### [O1-10-01] Disaster Risk Reduction and Women's Leadership

Taga Enomoto<sup>1</sup>, \*Asako Osaki<sup>2</sup>, \*Naomi Sato<sup>3</sup>, \*Naomi Yatsu<sup>4</sup>, \*Yaeko Kisu<sup>5</sup>, \*Midori Shigeno<sup>6</sup>, \*Isao Yamauchi<sup>7</sup> (1. Sendai Gender Equal Opportunity Foundation, Citizen Cooperation and City Planning Department, Community Affairs Bureau, 2. Kansei Gakuin University / NPO Gender Action Platform, 3. We Are One Kitakami, 4. Approved NPO After School Paruke, 5. NPO The National Council of Women's Centers, Sendai Gender Equal Opportunity Foundation, 6. Nishitaga-kita Neighborhood Association / Women Bosai Leaders Network, 7. Yama-no-dera United Neighborhood Association )  
2:00 PM - 3:30 PM

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2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 3)

## [O1-10-01] Disaster Risk Reduction and Women's Leadership

Taga Enomoto<sup>1</sup>, \*Asako Osaki<sup>2</sup>, \*Naomi Sato<sup>3</sup>, \*Naomi Yatsu<sup>4</sup>, \*Yaeko Kisu<sup>5</sup>, \*Midori Shigeno<sup>6</sup>, \*Isao Yamauchi<sup>7</sup>

(1. Sendai Gender Equal Opportunity Foundation, Citizen Cooperation and City Planning Department, Community Affairs Bureau, 2. Kansei Gakuin University / NPO Gender Action Platform, 3. We Are One Kitakami, 4. Approved NPO After School Paruke, 5. NPO The National Council of Women's Centers, Sendai Gender Equal Opportunity Foundation, 6. Nishitaga-kita Neighborhood Association / Women Bosai Leaders Network, 7. Yama-no-dera United Neighborhood Association )

Keywords: Women, Leadership, Diversity, Great East Japan Earthquake, Sendai Framework for Disaster Risk Reduction 2015-2030

Women play an important role in Disaster Risk Reduction. In order to build a disaster-resilient community, it is essential for women to participate in opportunities for making decisions in ordinary times. Based on the experiences from the Great East Japan Earthquake and other disasters, issues and future perspectives will be discussed, focusing on the diverse power of women who actively engage in Disaster Risk Reduction and recovery, as well as our nations' efforts towards promotion of women's leadership.

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Oral Sessions | Open Session

[O1-11]

## Creating new disaster prevention industry based on the lessons learned from the Great East Japan Earthquake

Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 3 (Hagi)

City of Sendai

Simultaneous Interpretation is available. (同時通訳有り)

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### [O1-11-01] Creating new disaster prevention industry based on the lessons learned from the Great East Japan Earthquake

Nobuhiro Sato<sup>1</sup>, \*Yoshihiro Okami<sup>2</sup>, \*Barbara Noonan<sup>3</sup>, \*Shohei Sakoda<sup>4</sup> (1. Industry

Promotion Section, Industrial Policy Department, Economic Bureau, City of Sendai, 2.

Industrial Policy Department, City of Sendai, 3. Public Sector Sales APAC, Nokia Solutions & Networks, Singapore, 4. Industry Creation Policy Division, Ministry of Economy, Trade and Industry)

4:00 PM - 5:30 PM



4:00 PM - 5:30 PM (Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 3)

## [O1-11-01] Creating new disaster prevention industry based on the lessons learned from the Great East Japan Earthquake

Nobuhiro Sato<sup>1</sup>, \*Yoshihiro Okami<sup>2</sup>, \*Barbara Noonan<sup>3</sup>, \*Shohei Sakoda<sup>4</sup> (1. Industry Promotion Section, Industrial Policy Department, Economic Bureau, City of Sendai, 2. Industrial Policy Department, City of Sendai, 3. Public Sector Sales APAC, Nokia Solutions & Networks, Singapore, 4. Industry Creation Policy Division, Ministry of Economy, Trade and Industry)

Keywords: Fully autonomous drone, Private LTE

Sendai City aims to create new disaster prevention industry based on the lessons learned from the Great East Japan Earthquake by utilizing ICT and conducting demonstration experiments on drones.

In this session, we introduce the latest initiatives and future directions for the creation of disaster prevention industry by Sendai City, the national government, and private companies.

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Oral Sessions | Open Session

[O1-12]

## Teachers' Capacity Development for Enhancing Disaster Risk Reduction at School

Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 3 (Hagi)

Miyagi University of Education

Simultaneous Interpretation is available. (同時通訳有り)

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### [O1-12-01] Teachers' Capacity Development for Enhancing Disaster Risk Reduction at School

\*Takashi Oda<sup>1</sup>, \*Shinichi Takeda<sup>1</sup>, \*Takeshi Sato<sup>2</sup>, \*Shinya Morimoto<sup>3</sup>, \*Masaaki Oka<sup>1</sup>, \*Takashi Muramatsu<sup>1</sup>, \*Tuba Gokmenoglu Karakaya<sup>4</sup> (1. Miyagi University of Education, 2. Tohoku University, 3. Ministry of Education, Culture, Sports, Science and Technology, 4. Republic of Turkey Ministry of National Education)

6:00 PM - 7:30 PM

6:00 PM - 7:30 PM (Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 3)

## [O1-12-01] Teachers' Capacity Development for Enhancing Disaster Risk Reduction at School

\*Takashi Oda<sup>1</sup>, \*Shinichi Takeda<sup>1</sup>, \*Takeshi Sato<sup>2</sup>, \*Shinya Morimoto<sup>3</sup>, \*Masaaki Oka<sup>1</sup>, \*Takashi Muramatsu<sup>1</sup>, \*Tuba Gokmenoglu Karakaya<sup>4</sup> (1. Miyagi University of Education, 2. Tohoku University, 3. Ministry of Education, Culture, Sports, Science and Technology, 4. Republic of Turkey Ministry of National Education)  
Keywords: DRR education, teacher training, in-service, pre-service, curriculum

During this session, experts from Japan and abroad on DRR education and teacher training discuss the states and challenges on the teachers' capacity building for DRR teaching and school safety. Some invited presenters include ministerial officials in charge of school DRR and some master teachers. The session is organized by 311 Disaster Risk Reduction Learning Institute for Educators (DRR-LIFE) established at Miyagi University of Education, Sendai, Japan in April, 2019 and will be co-sponsored by the Japan Association of National Universities, and International Research Institute of Disaster Science, Tohoku University.

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Oral Sessions | Session

[O1-13]

## State-of-the-art research on wind related disaster risk reduction

Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 4 (Shirakashi 1)

International Group on Wind-Related Disaster Risk Reduction

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### [O1-13-01] State-of-the-art research on wind related disaster risk reduction

\*Kazuyoshi Nishijima<sup>1</sup>, \*David O. Prevatt<sup>2</sup>, \*Frank Lombardo<sup>3</sup>, \*Tetsuya Takemi<sup>1</sup>, \*Murray Morrison<sup>4</sup>, \*Shuyang Cao<sup>5</sup>, Yukio Tamura<sup>7</sup>, Yuichi Ono<sup>6</sup> (1. Kyoto University, 2. University of Florida, 3. The University of Illinois at Urbana-Champaign, 4. Insurance Institute for Business & Home Safety, 5. Tongji University, 6. Tohoku University, 7. Chongqing university)

11:00 AM - 12:30 PM

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11:00 AM - 12:30 PM (Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 4)

## [O1-13-01] State-of-the-art research on wind related disaster risk reduction

\*Kazuyoshi Nishijima<sup>1</sup>, \*David O. Prevatt<sup>2</sup>, \*Frank Lombardo<sup>3</sup>, \*Tetsuya Takemi<sup>1</sup>, \*Murray Morrison<sup>4</sup>, \*Shuyang Cao<sup>5</sup>, Yukio Tamura<sup>7</sup>, Yuichi Ono<sup>6</sup> (1. Kyoto University, 2. University of Florida, 3. The University of Illinois at Urbana-Champaign, 4. Insurance Institute for Business & Home Safety, 5. Tongji University, 6. Tohoku University, 7. Chongqing university)

Keywords: Observation, Damage survey, Full-scale experiment, Numerical simulation, Climate change

Wind-related disaster is the most devastating disaster around the world, causing enormous severe injury and fatality as well as economic losses. Climate change can increase the risk of damages to our built and surrounding environments, subjected to intensified tropical cyclones and other meteorological phenomena.

Over the last decades, wind engineering and related research communities have made efforts to reduce wind-related disaster risk reduction. These include diagnosis of damage process through post disaster surveys, better understanding of aerodynamic characteristics of building structures and their surrounding wind flows through wind tunnel experiments and numerical simulations, and evaluation of wind-resistant performance of building elements by experiments with partial or scaled models. These efforts were partially successful in reducing wind-induced damages. However, significant damages and losses caused by wind have yet been reported around the world. This has necessitated the research communities to direct new research agenda.

This session organizes a series of presentations on the state-of-the-art research facilitating to wind-related disaster risk reduction. The topics covered by this session range from meteorological observation technology, disaster survey, performance evaluation of infrastructure, super-high-resolution numerical simulation and future climate projection with climate models. Through the presentations and discussion that follows, the session expects to deepen the understanding of the current situation and future prediction on wind-related disasters, and to share with audience the frontier of the research on wind-related disaster risk reduction.

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Oral Sessions | Session

[O1-14]

## Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 4 (Shirakashi 1)

United Nations University-Institute for the Advanced Study of Sustainability

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### [O1-14-01] Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements

\*Riyanti Djalante<sup>1</sup>, \*MIZAN BUSTANUL FUADY BISRI<sup>1</sup>, Giulia Roder<sup>1</sup>, \*Giles Sioen<sup>2,3</sup>, \*Sachi Suzuki<sup>4</sup> (1. United Nations University-Institute for the Advanced Study of Sustainability, 2. FutureEarth, 3. The University of Tokyo, 4. UNESCO)

2:00 PM - 3:30 PM

2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 4)

## [O1-14-01] Knitting Networks of Science-Policy-Actions for Accelerating Achievement of SFDRR Targets and Ensuring Coherence of Post-2015 Global Agreements

\*Riyanti Djalante<sup>1</sup>, \*MIZAN BUSTANUL FUADY BISRI<sup>1</sup>, Giulia Roder<sup>1</sup>, \*Giles Sioen<sup>2,3</sup>, \*Sachi Suzuki<sup>4</sup> (1. United Nations University-Institute for the Advanced Study of Sustainability, 2. FutureEarth, 3. The University of Tokyo, 4. UNESCO)

Keywords: coherence, SFDRR, networks, science-policy-actions, sustainable development goals

Sustainable development endeavor is at risk in the face of hazards and disasters perpetuated by climate change. Thus, countries continuously pledging and committing to various international and regional agreements/frameworks on disaster risk reduction (DRR) and climate change adaptation (CCA). However, despite efforts in science, technology, grass-roots initiatives, and actions, it seems risk governance of various levels have not been able to become an enabling factor for a genuine resilience building. Despite the current rate of ratification/adoption of various post-2015 international frameworks to country-level legislation and science/technology-driven risk assessments, the number of disasters, affected people, economic damage and losses continuously increased.

This session will deliberate and review comprehensively the political and public administration aspect of risk governance across geographical regions to expedite implementation of post-2015 global agreements, its monitoring, and outlook towards 2030. It investigates, stock takes, and confirm whether political architecture and processes in those regions and its member states enable DRR/CCA advancement to enrich and informed policy discourse and actions, or instead it becomes a hindrance. By leveraging on machine learning and various network analyses techniques (social, network, citation, and discourse networks), this session will discuss whether it is possible to predict subsequent dynamic and state of coherence/divergence between science-policy interactions of DRR/CCA across levels. It is deliberating whether a complementary function exists in the implementation of various international and regional agreements/frameworks through national policy and global/regional resource mobilizations.

At a practical level, this session is providing an independent review on the status of science adoption into SFDRR Target E report by Member States of United Nations as well as outlining opportunity and pathway for increasing Target F on international cooperation for achieving global DRR targets. The session will also release the concept of “vertical and horizontal coherence” of post-2015 global agreements for guiding and monitoring of global governance implementation in the period of 2020-2030 surrounding the implementation of SFDRR, Paris Agreement, New Urban Agenda, Agenda for Humanity, Addis Ababa Action Agenda, and Sustainable Development Goals.

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Oral Sessions | Session

[O1-15]

Research, Development, and Utilization of Beppu Model Disability-  
inclusive Disaster Risk Reduction: Towards Seamless Connections  
between Normal and Disaster Times

Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 4 (Shirakashi 1)

Doshisha University

Simultaneous Interpretation is available. (同時通訳有り)

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[O1-15-01] Research, Development, and Utilization of Beppu Model Disability-  
inclusive Disaster Risk Reduction: Towards Seamless Connections  
between Normal and Disaster Times

\*Shigeo Tatsuki<sup>1</sup>, \*Junko Murano<sup>2</sup>, \*Kazuhiko Abe<sup>3</sup>, \*Anna Matsukawa<sup>6</sup>, \*Bill Ho<sup>4</sup>, \*Taku Sugano<sup>5</sup>, \*Aya Tsujioka<sup>1</sup> (1. Doshisha University, 2. Beppu City, 3. Tohoku Fukushi University, 4. Asian Disaster Preparedness Center, 5. Osaka City University, 6. Disaster Reduction and Human Renovation Institution)

4:00 PM - 5:30 PM



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4:00 PM - 5:30 PM (Sun. Nov 10, 2019 4:00 PM - 5:30 PM Room 4)

## [O1-15-01] Research, Development, and Utilization of Beppu Model

### Disability-inclusive Disaster Risk Reduction: Towards

### Seamless Connections between Normal and Disaster Times

\*Shigeo Tatsuki<sup>1</sup>, \*Junko Murano<sup>2</sup>, \*Kazuhiko Abe<sup>3</sup>, \*Anna Matsukawa<sup>6</sup>, \*Bill Ho<sup>4</sup>, \*Taku Sugano<sup>5</sup>, \*Aya Tsujioka

<sup>1</sup> (1. Doshisha University, 2. Beppu City, 3. Tohoku Fukushi University, 4. Asian Disaster Preparedness Center, 5. Osaka City University, 6. Disaster Reduction and Human Renovation Institution)

Keywords: Disability-inclusive Disaster Risk Reduction, Leave no one behind during disaster times, seamless connection between social services and disaster response

Older and/or disabled people have been known to suffer more serious damages in disasters. After the Great East Japan Earthquake, Tatsuki (2013) pointed out that the root cause of the proportionately heavier damages is due to the siloed approaches taken by everyday social service and crisis time disaster management organizations and to the lack of coordination between normal and disaster time responses. One solution is to involve social workers who make care plans for everyday living needs during normal time and to ask them to simultaneously prepare disaster care plans. This session shares a Research, Development and Utilization project that interlinks normal time social services and disaster time local responses to persons with disabilities (PWD). A three-year project was launched in Beppu City in 2016 that led to the standard operation procedure (SOP) for assessment, informal human resources matching, and inclusive disaster response simulation during disaster drills. At the end of the project, a quasi-experimental, inverse propensity score weighted impact evaluation demonstrated a significant increase of DRR literacy scores only among the experimental group PWDs. In 2018, Hyogo prefecture initiated the Beppu-model SOP utilization grant program. Based on the preliminary results in Harima township, one of the two initial municipalities, Hyogo prefecture decided to expand the grant program to all Hyogo municipalities. As a result, 37 out of 41 local governments applied for the project as of April, 2019. The similar Beppu model SOP utilization have been spreading to other areas of Japan such as Sendai, Kyoto, Ibaraki and Suginami cities. Overseas applications of Beppu Model is also currently being planned. This session concludes with future research/practice directions such as integrating pre-disaster care planning to post-disaster case management practices.

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Oral Sessions | Session

[O1-16]

## Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases

Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 4 (Shirakashi 1)

Tohoku University- IRIDeS

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### [O1-16-01] Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases

\*Takako Izumi<sup>1</sup>, \*Rajib Shaw<sup>2</sup>, \*Jessica Alexander<sup>3</sup>, \*Sangita Das<sup>4</sup>, \*Akilesh Surjan<sup>6</sup>, \*Miwa Abe<sup>5</sup>, \*Takeshi Komino<sup>7</sup> (1. Tohoku University, 2. Keio University, 3. Sophia University/UNICEF Geneva, 4. CWS Japan, 5. Kumamoto University, 6. Charles Darwin University, Australia, 7. Asian Disaster Response and Reduction Network (ADRRN))

6:00 PM - 7:30 PM

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6:00 PM - 7:30 PM (Sun. Nov 10, 2019 6:00 PM - 7:30 PM Room 4)

## [O1-16-01] Role of NPOs and volunteer organizations in disaster recovery: International and Japan cases

\*Takako Izumi<sup>1</sup>, \*Rajib Shaw<sup>2</sup>, \*Jessica Alexander<sup>3</sup>, \*Sangita Das<sup>4</sup>, \*Akilesh Surjan<sup>6</sup>, \*Miwa Abe<sup>5</sup>, \*Takeshi Komino<sup>7</sup> (1. Tohoku University, 2. Keio University, 3. Sophia University/UNICEF Geneva, 4. CWS Japan, 5. Kumamoto University, 6. Charles Darwin University, Australia, 7. Asian Disaster Response and Reduction Network (ADRRN))

Keywords: Non-profit Organization, Recovery, Coordination

Local non-profit organizations and volunteer networks can play a critical role in preparing for and responding to disasters, often filling in gaps not provided for by the government or international responders. As they are usually closer to the communities being served, their efforts have often been found to be more flexible, relevant and efficient than other stakeholders. Leveraging these inputs and connecting them to other recovery efforts can contribute to a more coherent, sustainable and effective response. Yet experience has shown that if these efforts are not well-coordinated, or done with insufficient capacity, they run the risk of creating duplication, frustration and potentially doing more harm than good.

Using both international case studies - including from Australia, Haiti, and regional networks such as ADDRN - as well as those from inside Japan - including the Great East Japan Earthquake of 2011, Kumamoto earthquake of 2016, and West Japan floods of 2018 - this session will focus on 1) the contributions of NPOs and volunteer networks in disaster recovery, 2) challenges in coordination and capacity building and the implications of these, and 3) best practices with regards to their engagement and involvement in preparing for and responding to disasters.

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Oral Sessions | Session

[O1-17]

## Creating a disaster-resilient society through industry-academia collaboration

Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 5 (Shirakashi 2)

Tohoku University-IRIDeS

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### [O1-17-01] Creating a disaster-resilient society through industry-academia collaboration

\*Fumihiko Imamura<sup>1</sup>, \*Hiroo Shimada<sup>2</sup>, \*Akihiro Hayashi<sup>3</sup>, \*Anawat Suppasri<sup>1</sup>, \*Ryu Miyamoto<sup>1</sup>

(1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Tokio Marine & Nichido Fire Insurance Co., Ltd., 3. Tokio Marine & Nichido Risk Consulting Co., Ltd.)

11:00 AM - 12:30 PM

11:00 AM - 12:30 PM (Sun. Nov 10, 2019 11:00 AM - 12:30 PM Room 5)

## [O1-17-01] Creating a disaster-resilient society through industry-academia collaboration

\*Fumihiko Imamura<sup>1</sup>, \*Hiroo Shimada<sup>2</sup>, \*Akihiro Hayashi<sup>3</sup>, \*Anawat Suppasri<sup>1</sup>, \*Ryu Miyamoto<sup>1</sup> (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Tokio Marine & Nichido Fire Insurance Co., Ltd., 3. Tokio Marine & Nichido Risk Consulting Co., Ltd.)

Keywords: Eco-DRR, Mangrove Planting Project, Coastal Disaster Prevention Forest, Global Tsunami Risk, Disaster Risk Quantification

1. Fumihiko Imamura;

Greetings and introductions from Representative

2. Hiroo Shimada;

Creating Value through Mangrove Planting Project as 'Insurance for the Future of the Earth'

3. Akihiro Hayashi;

Tsunami disaster risk prevention/mitigation effect by coastal forest

4. Anawat Suppasri;

Global tsunami hazard and risk assessment: Suitable countermeasures and impact on container vessels network

5. Ryu Miyamoto;

Advancement of tsunami risk assessment

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Oral Sessions | Session

[O1-18]

## NATECH Risk in Asia Pacific

Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 5 (Shirakashi 2)

Keio University

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### [O1-18-01] NATECH Risk in Asia Pacific

\*Rajib Shaw<sup>1</sup>, \*Ana Maria Cruz<sup>2</sup>, \*Fatma Lestari<sup>3</sup>, \*Kampanart Silva<sup>3,4</sup>, \*Devendra Narayan Singh<sup>5</sup>, \*Antonia Loyzaga<sup>6</sup>, \*Emily Chang<sup>7</sup>, \*Takako Izumi<sup>8</sup> (1. Keio University, 2. Kyoto University, 3. University of Indonesia, 4. Thailand Institute of Nuclear Technology, 5. IIT Bombay, 6.

Manila Observatory and Philippines National Resilience Council (PNRC), 7. Chinese University of Hong Kong, 8. Tohoku University)

2:00 PM - 3:30 PM

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2:00 PM - 3:30 PM (Sun. Nov 10, 2019 2:00 PM - 3:30 PM Room 5)

## [O1-18-01] NATECH Risk in Asia Pacific

\*Rajib Shaw<sup>1</sup>, \*Ana Maria Cruz<sup>2</sup>, \*Fatma Lestari<sup>3</sup>, \*Kampanart Silva<sup>3,4</sup>, \*Devendra Narayan Singh<sup>5</sup>, \*Antonia Loyzaga<sup>6</sup>, \*Emily Chang<sup>7</sup>, \*Takako Izumi<sup>8</sup> (1. Keio University, 2. Kyoto University, 3. University of Indonesia, 4. Thailand Institute of Nuclear Technology, 5. IIT Bombay, 6. Manila Observatory and Philippines National Resilience Council (PNRC), 7. Chinese University of Hong Kong, 8. Tohoku University)

Keywords: NATECH Risk, Asia-Pacific, Science policy dialogue, private sector, citizen perspectives

The Sendai Framework for Disaster Risk Reduction 2015-2030 highlights the need to better understand different hazards, including technological and so-called Natech (conjoint natural and technological) hazards. There is growing evidence, for example from the Great East Japan earthquake, tsunami and consequent incident at the Fukushima-Daichii nuclear power plant, that natural hazards can trigger technological accidents, leading to natural hazard triggered technological (Natech) disasters. These complex hazard events may have catastrophic consequences, in particular in countries that are not prepared for them. They require extended and specific risk management strategies that need to be based on a deeper understanding of their causes and cascading consequences. they run the risk of creating duplication, frustration and potentially doing more harm than good.

Natech risk management needs a holistic approach of government regulations, private sector management, and community's awareness. As the first phase, this work proposes to engage science technology academic community for collecting evidences on Natech risk in the region, followed by policy dialogue with governments for co-designing Natech Risk Management framework. At certain point, there needs to have a dialogue with private sector, through ARISE network in certain countries. Finally, citizen awareness will be enhanced through citizen science approach as well as through civil society networks.

The session aims at presenting initial findings of the NATECH science policy dialogue in Asia Pacific. This session is considered as one of the series of events leading to the Asia Pacific Science Technology Conference on DRR in Malaysia in March 2020, and Asia Pacific Ministerial Conference on DRR in Australia in June 2020.

Flash Talk Presentation

## Disaster Heritage to Promote Dark Tourism for Resilient Community

Nurjanah Jane

Sun. Nov 10, 2019 3:35 PM - 3:50 PM Flash Talk Presentation 1 (Meeting Room 6)

Tokyo Metropolitan University

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### [MP1-E] Disaster Heritage to Promote Dark Tourism for Resilient Community

Nurjanah Jane (Tokyo Metropolitan University)

3:35 PM - 3:50 PM



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3:35 PM - 3:50 PM (Sun. Nov 10, 2019 3:35 PM - 3:50 PM Flash Talk Presentation 1)

## [MP1-E] Disaster Heritage to Promote Dark Tourism for Resilient Community

Nurjanah Jane (Tokyo Metropolitan University)

Any major catastrophe will leave many relics. Messages of disaster survivor's testimonies and the relics are important to preserve disaster risk reduction. By using disaster heritage seems to be important to community resilient in disaster affected areas. To accomplish this purpose, we try to formulate the connection between keeping disasters heritage with economics creative post disaster. To shows the other benefit of disaster heritage, we conducted survey in the disaster site in Aceh Indonesia, the heritage of disaster does not only include sorrow and it serve as a dark tourism attraction. It can be tools for sustainability of disaster education for the next generation and increasing economics of communities surrounding historical sites. It is serve as a lesson for other disaster areas such as Japan, where many disaster relics have been destroyed.

Flash Talk Presentation

## Recent Activity for DRR in Republic of Korea

Dr./Mr. Kang Chang Hyun

Sun. Nov 10, 2019 5:35 PM - 5:50 PM Flash Talk Presentation 1 (Meeting Room 6)

Dankook University

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### [MP1-F] Recent Activity for DRR in Republic of Korea

Dr./Mr. Kang Chang Hyun (Dankook University)

5:35 PM - 5:50 PM

5:35 PM - 5:50 PM (Sun. Nov 10, 2019 5:35 PM - 5:50 PM Flash Talk Presentation 1)

## [MP1-F] Recent Activity for DRR in Republic of Korea

Dr./Mr. Kang Chang Hyun (Dankook University)

Typhoon sometimes triggers torrential rains and subsequent floods in Republic of Korea (ROK).

And tragic forest fire was occurred in the norther part of Korea in April 2019. Forest fire is one of major disasters in recent year. For strengthen disaster management, a lot of research institution and universities in ROK have been conducting multi DRR projects and studies such as capacity building, education program, etc.

In this presentation, Professor Kang of Dankook University would like to share an information about recent activity for DRR including good practices.

Flash Talk Presentation

## Current state of SFDRR related research and education by universities and institutions

Mikio ISHIWATARI

Sun. Nov 10, 2019 12:45 PM - 1:00 PM Flash Talk Presentation 2 (Meeting Room 7)

Japan International Cooperation Agency/ University of Tokyo

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### [MP1-01] Current state of SFDRR related research and education by universities and institutions

Mikio ISHIWATARI (Japan International Cooperation Agency/ University of Tokyo)

12:45 PM - 1:00 PM

12:45 PM - 1:00 PM (Sun. Nov 10, 2019 12:45 PM - 1:00 PM Flash Talk Presentation 2)

## **[MP1-01] Current state of SFDRR related research and education by universities and institutions**

Mikio ISHIWATARI (Japan International Cooperation Agency/ University of Tokyo)

A lot of research and educational organizations have a big interest on SFDRR. It is however, still not clear how SFDRR are addressed for research and education. By the literature review, this study examined the current state of SFDRR research and education by universities and institutions in the world. The study clarifies their current research themes and education policy. In addition, the study raises the further task of research and education for facilitating SFDRR.

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Flash Talk Presentation

## Proposition of a New Ground-based Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto

Sun. Nov 10, 2019 1:05 PM - 1:20 PM Flash Talk Presentation 2 (Meeting Room 7)

Kochi University of Technology

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### [MP1-02] Proposition of a New Ground-based Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto (Kochi University of Technology)

1:05 PM - 1:20 PM

1:05 PM - 1:20 PM (Sun. Nov 10, 2019 1:05 PM - 1:20 PM Flash Talk Presentation 2)

## [MP1-02] Proposition of a New Ground-based Observation Network of Infrasound for Tsunami Disaster Mitigation

Masa-yuki Yamamoto (Kochi University of Technology)

In order to mitigate tsunami disaster, we propose a new ground-based observation network of infrasound, human inaudible low-frequency sound, in the seashore region of marine nations. We have developed infrasound sensors with applying our own technologies and verified them with deploying a dense IoT sensor network in Kochi, Japan. Infrasound has an advantage of remote-sensing for many kinds of geophysical phenomena not only tsunami but also earthquake, typhoon, heavy rain, thunder, landslide, etc. Recent activities at Infrasound research laboratory, Kochi University of Technology will be introduced so as to expand our ideas to maritime regions in near future.

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Flash Talk Presentation

## Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hideaki Murai.

Ikuo Oikawa

Sun. Nov 10, 2019 1:25 PM - 1:40 PM Flash Talk Presentation 2 (Meeting Room 7)

All Japan Council Company

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### [MP1-03] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hideaki Murai. Ikuo Oikawa (All Japan Council Company )

1:25 PM - 1:40 PM



1:25 PM - 1:40 PM (Sun. Nov 10, 2019 1:25 PM - 1:40 PM Flash Talk Presentation 2)

## [MP1-03] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hideaki Murai. Ikuo Oikawa (All Japan Council Company )

Activity content ・ We worked on business incubation facility "container Oami" which was not used for making of local bustling before earthquake disaster, but warehouse suffered from Great East Japan Earthquake before completion. The facility was unfinished but staff were employed, so the staff started a cell phone charging service. ・ RQ Citizen's Disaster Relief Center starts supporting activities. So we decided to make an original design "Eco Brush" In order to look for areas that can be tackled by the village's friends, we will hold a knitting class by visiting 40 or more temporary houses and residents' associations. Develops and sells "Eco-Brush" as a community business.

Flash Talk Presentation

## Recovery Institutions to Build Back Better

Paul Rosenberg

Sun. Nov 10, 2019 1:45 PM - 2:00 PM Flash Talk Presentation 2 (Meeting Room 7)

UNDRR/International Recovery Platform

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### [MP1-04] Recovery Institutions to Build Back Better

Paul Rosenberg (UNDRR/International Recovery Platform)

1:45 PM - 2:00 PM

1:45 PM - 2:00 PM (Sun. Nov 10, 2019 1:45 PM - 2:00 PM Flash Talk Presentation 2)

## **[MP1-04] Recovery Institutions to Build Back Better**

Paul Rosenberg (UNDRR/International Recovery Platform)

In the aftermath of disasters, such as the Gujarat Earthquake 2001, Indian Ocean Tsunami 2004, Kashmir Earthquake 2005, Canterbury Earthquakes 2010 and 2011, and Typhoon Haiyan 2013, governments often create ad-hoc institutions for recovery to ensure leadership, coordination, and to build back better. Is it cost-effective and efficient to create ad-hoc institutions after every large-scale disaster or is it time to strengthen the existing disaster risk management (DRM) institutions to handle recovery? Using evidence from case studies collected by the International Recovery Platform (IRP), this presentation compares the advantages and disadvantages between ad-hoc and permanent institutions for disaster recovery governance.

Flash Talk Presentation

## Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR

Eric Ariel Gonzales Rocha

Sun. Nov 10, 2019 3:35 PM - 3:50 PM Flash Talk Presentation 2 (Meeting Room 7)

United Nations Office for Disaster Risk Reduction

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### [MP1-05] Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR

Eric Ariel Gonzales Rocha (United Nations Office for Disaster Risk Reduction)

3:35 PM - 3:50 PM

3:35 PM - 3:50 PM (Sun. Nov 10, 2019 3:35 PM - 3:50 PM Flash Talk Presentation 2)

## [MP1-05] Sendai Framework Voluntary Commitments: An online platform where all stakeholders can showcase their work on DRR

Eric Ariel Gonzales Rocha (United Nations Office for Disaster Risk Reduction)

The Sendai Framework Voluntary Commitments (SFVC) online platform allows stakeholders to inform the public about their work on DRR. The platform is a useful tool to know who is doing what and where for the implementation of the Sendai Framework, which could foster potential collaboration among stakeholders. All stakeholders (private sector, civil society organizations, academia, media, local governments, etc.) working on DRR can submit their commitments and report on their progress and deliverables. In addition, good practices and achievements are highlighted through the online platform.

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Flash Talk Presentation

## You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!

KAZUYUKI TOHYAMA

Sun. Nov 10, 2019 5:35 PM - 5:50 PM Flash Talk Presentation 2 (Meeting Room 7)

TRUSTIA CORPORATION

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### [MP1-06] You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!

KAZUYUKI TOHYAMA (TRUSTIA CORPORATION)

5:35 PM - 5:50 PM

5:35 PM - 5:50 PM (Sun. Nov 10, 2019 5:35 PM - 5:50 PM Flash Talk Presentation 2)

## [MP1-06] You can Get High-quality Japanese Products for Disaster Preparedness from anywhere in the world!!

KAZUYUKI TOHYAMA (TRUSTIA CORPORATION)

Japan is famous for its frequent & powerful earthquakes and its advanced technology for disaster preparedness. To the world, our site will introduce and sell high-quality products for disaster preparedness originated from our serious experience and those advanced technologies.

We hope, Various products active in Japan will be able to help people around the world.

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Reception

## Reception

Sun. Nov 10, 2019 8:00 PM - 9:40 PM Reception (Hotel Metropolitan Sendai)

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[RC-01] Reception

8:00 PM - 9:40 PM



8:00 PM - 9:40 PM (Sun. Nov 10, 2019 8:00 PM - 9:40 PM Reception)

## [RC-01] Reception

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WBF Pre-Opening

## WBF Pre-Opening

Sun. Nov 10, 2019 9:00 AM - 10:00 AM Room 1 (Main Hall)

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[PO-01] WBF Pre-Opening

9:00 AM - 10:00 AM

9:00 AM - 10:00 AM (Sun. Nov 10, 2019 9:00 AM - 10:00 AM Room 1)

## [PO-01] WBF Pre-Opening

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WBF Opening

## WBF Opening

Sun. Nov 10, 2019 10:00 AM - 10:45 AM Room 1 (Main Hall)

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[OP-01] WBF Opening

10:00 AM - 10:45 AM

10:00 AM - 10:45 AM (Sun. Nov 10, 2019 10:00 AM - 10:45 AM Room 1)

## [OP-01] WBF Opening

Keynote Speech

## A Changing Risk Paradigm

Andrew Maskrey

Sun. Nov 10, 2019 9:41 AM - 9:53 AM Room 1 (Main Hall)

Risk Nexus

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### [K00] A Changing Risk Paradigm

Andrew Maskrey (Risk Nexus)

9:41 AM - 9:53 AM

# RISK NEXUS INITIATIVE

Metrics, Indicators and Knowledge  
for sustainability and resilience.

## TRANSFORMING A WORLD ON FIRE:

from exotic to quotidian approaches to risk management

San Jose, Costa Rica, April 2019



**FLACSO**  
Secretaría General

Based on a conversation convened by the Risk Nexus Initiative  
in the Latin American Social Science Faculty (FLACSO)  
on January 23 and 24, 2019

Written and edited by Andrew Maskrey and Allan Lavell with help  
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Ono, Jose Riera-Cezane, Roberto Rudari, Katharina Schaaf, David  
Smith Wiltshire, Atle Solberg and Emily Wilkinson.

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support that made this conversation possible.



## EXECUTIVE SUMMARY

Over two hundred years ago Hegel reflected: *"It is said that there are no sudden changes in nature, and the common view has it that when we speak of a growth or a destruction, we always imagine a gradual growth or disappearance. Yet we have seen cases in which the alteration of existence involves not only a transition from one proportion to another, but also a transition, by a sudden leap, into a ... qualitatively different thing; an interruption of a gradual process, differing qualitatively from the preceding, the former state"*.

Risk and uncertainty, generated where and when physical and social systems interface, now pervades and dominates the contemporary global landscape. A complex ecosystem of interdependent risk drivers including climate change but also environmental degradation, badly planned and managed urban development, displacement and migration, water and food stress, poverty and inequality translate into increasingly unpredictable outcomes for social and economic development and for the environment.

Wildfires around the world in recent years have become an icon of a rapid, global, qualitative transformation of risks generated at the human-nature interface that eerily echo the insights of Hegel. The world is now moving beyond an equilibrium state, be it in social, economic, political or environmental terms. Models of the future are characterized by increasing uncertainty, as outliers beyond the boundaries of what can be expected are becoming the new normal.

Unfortunately, the public policies pursued by most governments seem ineffective in the face of this qualitative transformation of risk. Risk management has become conceptually and institutionally separated from development, while exotic disciplines such as disaster risk reduction and climate change adaptation are ill equipped to manage the complexity of interdependent risk drivers and radical qualitative change.

The dominant meta-narrative of risk as the impact of extreme, unexpected and exogenous events on *normal* development has meant that such approaches literally *miss the point*, veiling and obscuring the pathways of risk causality. Ultimately, the objectives of these *exotic* approaches to managing risk are fundamentally contradictory: to protect the same development paradigm that generates the risk in the first place.

This paper, building on a two-day conversation held in Costa Rica in January 2019 seeks to conceptualise and unpack the qualitative transformation occurring in global risk, examine why current approaches to risk management are failing and to consolidate an emerging new meta-narrative of managing risks within sustainable and resilient development. The paper argues that a two-fold paradigm shift is required: to integrate existing fragmented approaches to risk management into an integrated and holistic framework, while at the same time transforming the focus from the *exotic* to the *quotidian*, from the corrective and reactive to the prospective and from protecting development against exogenous threats to managing risk as an internality inside sustainable and resilient development.

# TRANSFORMING A WORLD ON FIRE:

## from exotic to quotidian approaches to risk management

### Prelude

Following a period of unseasonal warm and dry weather, on Tuesday February 26th the mercury reached 21.2 C. at Kew Gardens, London, the hottest winter temperature on record in the United Kingdom. Later that night and two hundred miles further north, a normally damp and cold area of upland Britain, called Saddleworth Moor, burst into flames. Local residents were reported saying: “it looks like the end of the world, like the apocalypse is happening.”<sup>1</sup>

The Saddleworth Moor blaze is no more than a manifestation of extensive risk, one of thousands of localised, frequently occurring events that occur around the world every day. While natural capital went up in smoke, there were no lives lost, nor buildings destroyed. In contrast, the wildfire that destroyed the town of Paradise in California in November 2018 killed 88 people, destroyed over 18,000 structures and led to direct losses valued at USD16.5 billion.

The destruction of Paradise, together with a sequence of heavily reported events in other regions<sup>2</sup> over the last few years, from Canada, Norway and Sweden to Greece, South Africa and Australia, seem to suggest that the world is already on fire. The subject of this paper, however, is not wildfires per se. The term world on fire is employed as an icon for the rapid, global, qualitative transformation of risks generated at the human-nature interface, as a result of extreme risk accumulation.

The evidence<sup>3</sup> that anthropic climate change along with naturally induced change is forcing radical shifts in climate averages is now unquestionable. And as the averages change, what were previously extreme events become increasingly frequent and may tend to normality and regularity. And much of what have been described as manifestations of extensive risk (regular and recurrent smaller scale events and levels of impact) could now be considered as a normal characteristic of a new climate.

However, anthropic climate change is only one manifestation of how contemporary development configures and then locks risk<sup>4</sup> into the social, economic and physical landscape. The Paradise disaster was driven not only by climate change but by other factors, including unbridled urban growth, the vulnerability to fire of building structures of mainly low and middle-income households and forest management techniques that create conditions for large wildfires. Throughout the world, while still reported as unusual or *extreme* events wildfires are only one visible manifestation of *extreme* risk accumulation in regional economies and their urban centres around the world.

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1 The Independent, February 27th, 2019

2 There is no up to date published record of wildfires which allows a trend to be established. The Global Fire Monitoring Centre states: “A preliminary multi-year global database of vegetation fires for use in climate modelling has been established by the GFMC by the support of the German Federal Ministry for Education and Research in the frame of the German Climate Research Programme DEKLIM (BMBF 01 LD 0105). This dataset is not yet published. A complementary statistical enquiry is the GFMC Global Wildland Fire Assessment which currently is in a premature and developing stage.( <http://gfmcc.online/inventory/statistic.html>)”

3 IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

4 In the context of this paper the term risk covers what are currently described as climate, disaster and environmental risks, as well as associated drivers and outcomes such as displacement, migration, conflict, impoverishment, insolvency and other social and economic stresses. Other risks including those associated with cybercrime, terrorism, financial mismanagement, technological and industrial accidents will not be discussed here, except in the case of cascading and synchronic risks (for example droughts affecting power generation).

Risk and uncertainty, generated where and when physical and social systems interface, now pervades and dominates the contemporary global landscape. A complex ecosystem of interdependent risk drivers including climate change but also environmental degradation, badly planned and managed urban development, displacement and migration, water and food stress, poverty and inequality translate into increasingly unpredictable outcomes for social and economic development and for the environment. The world is now moving beyond an equilibrium state, be it in social, economic, political or environmental terms. Models of the future are characterized by increasing uncertainty, as outliers beyond the boundaries of what can be expected are becoming the new normal.

Over two hundred years ago Hegel<sup>5</sup> reflected: *“It is said that there are no sudden changes in nature, and the common view has it that when we speak of a growth or a destruction, we always imagine a gradual growth or disappearance. Yet we have seen cases in which the alteration of existence involves not only a transition from one proportion to another, but also a transition, by a sudden leap, into a ... qualitatively different thing; an interruption of a gradual process, differing qualitatively from the preceding, the former state”*.

Interdependent global risks such as multiple breadbasket failure and concatenated and cascading systems collapse are now increasingly possible, indicating that such a radical qualitative transformation in global risk is indeed already taking place. At the same time, *extreme* risk accumulation in many countries, and not only in so-called fragile states, is challenging already limited capacities to provide adequate basic services and infrastructure, manage risks and achieve the 2030 Agenda for Sustainable Development.<sup>6</sup>

Unfortunately, if the *world is on fire*, the public policies pursued by most governments seem ineffective in the face of the qualitative transformation of risk now taking place. Research, policy and practice all exhibit the classic problem of *fragmented science*<sup>7</sup> while institutional action seems trapped in impermeable silos. Risk management has become conceptually and institutionally separated from development, while *exotic*<sup>8</sup> disciplines such as disaster risk reduction and climate change adaptation are ill equipped to manage the complexity of interdependent risk drivers and radical qualitative change. The dominant meta-narrative of risk as the impact of extreme, unexpected and exogenous events on normal development has meant that such approaches literally miss the point, veiling and obscuring the pathways of risk causality.

This paper, building on a two-day conversation held in Costa Rica in January 2019 seeks to conceptualise and unpack the qualitative transformation occurring in global risk, examine why current approaches to risk management are failing and to consolidate an emerging new meta-narrative of managing risks within sustainable and resilient development based on concepts such as inter-dependence and endogeneity.

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5 Hegel, Friedrich, 2015, *The Science of Logic*, Cambridge University Press

6 including the Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction: 2015-2030, as well as the Paris Agreement on Climate Change, the Agenda for Humanity, and the New Urban Agenda.

7 Bohm and Peat, 1986, *Science, Order and Creativity*, Routledge

8 We use the adjective exotic here in that these approaches address problems that are conceptualised as exogenous threats to development. These exotic approaches therefore end-up as being exogenous to mainstream development planning and investment.

## FROM EXTREME RISK ACCUMULATION TO THE RISK NEXUS

### When the veneer of development starts to fade

Increasing levels of loss and damage in the context of disasters and conflict, including those associated with displacement, slow-onset impacts and climate change, provide indicators of *extreme* risk accumulation and of the qualitative transformation in global risk posed by Hegel.

The accumulated value of all finished goods and services produced globally, commonly known as GDP, is currently estimated at around USD 80 trillion per year. Global GDP growth is expected to be 2.9% in 2019, representing, therefore, approximately USD 2.4 trillion<sup>9</sup>.

Unfortunately, the development paradigm that generates global GDP growth is now generating both manifest and future risks the costs of which greatly exceeds the value generated.

The value of lost or damaged natural capital is now estimated at around USD 4.7 trillion per year<sup>10</sup> and the cost of wildfires in the USA alone is estimated at between USD 71 – 348 billion per year. Thus, the cost of environmental destruction alone is already equivalent to around double the expected annual growth in GDP

The direct financial costs associated with armed conflict and interpersonal violence, including capital destruction and costs associated with security systems and medical care, were estimated at approximately USD 1 trillion<sup>11</sup> in 2016. Indirect costs are generated by productivity loss, lost life-time, economic output of victims and reduced economic growth resulting from a prolonged war or conflict. For example, Afghanistan's per capita income has remained at its 1970s level due to the continued war, and Somalia's per capita income has dropped by more than 40 percent over the same period<sup>12</sup>.

In terms of disaster risk, an extrapolation from global probabilistic estimates<sup>13</sup> from 2017<sup>14</sup> implies future direct disaster losses of approximately USD 700 billion per year and indirect disaster losses<sup>15</sup> of approximately USD 1 trillion. To the risks associated with conflict and disaster, it would be necessary to add the cost of both disaster and conflict driven displacement as well as the costs of other risks associated with air and water pollution, crime, lack of sanitation and other hazards.

Conflict, disaster and economic and political crisis, often magnified by other risk drivers, are leading to unprecedented levels of migration and displacement, if refugees and those internally and externally displaced are considered<sup>16</sup>. For example, in 2018, approximately 700,000 Rohingya

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9 [www.worldbank.org/en/publication/global-economic-prospects](http://www.worldbank.org/en/publication/global-economic-prospects)

10 <https://www.naturalcapitalcoalition.org/wp-content/uploads/2016/07/Trucost-Nat-Cap-at-Risk-Final-Report-web.pdf>

11 <http://visionofhumanity.org/app/uploads/2018/11/Economic-Value-of-Peace-2018.pdf>

12 <https://openknowledge.worldbank.org/bitstream/handle/10986/28337/211162ov.pdf?sequence=6&isAllowed=y>

13 The Average Annual Loss (AAL) in the built environment associated with physical hazards such as earthquakes, tsunamis, tropical cyclones and riverine floods has been estimated at USD 293,000 million. Assuming extensive risk adds an additional 30% to the AAL and that the agricultural drought AAL represents 10% of global agricultural GDP the total AAL would be around USD 700,000 million. Given that indirect disaster losses average at approximately 1.5 times direct losses, global indirect losses could be of an order of magnitude of USD 1 trillion-

14 United Nations, 2017, GAR Atlas, Geneva.

15 Reference UN terminology

16 IDMC, 2019, Global Report on Internal Displacement (forthcoming)

were forced to leave Myanmar to live in highly-vulnerable and hazard exposed conditions in Bangladesh, generating new risks. Around 3 million Venezuelans have abandoned their country due to deteriorating economic conditions, poverty and malnutrition. At the end of 2018, more people than ever were living in internal displacement; 41.3 million or around two-thirds of people displaced worldwide.

Displacement incurs additional direct and indirect financial costs that are currently not appearing on the balance sheets of national budgets. The direct cost of internal displacement is estimated to be USD 13 billion globally<sup>17</sup> In the Central African Republic, for example, the direct economic impacts of internal displacement associated with conflict were around USD230 million every year, the equivalent of 11 per cent of the country's pre-crisis GDP. In Somalia, recent drought-related displacement resulted in direct costs of USD315 million per year or 4.7 per cent of pre-2017 GDP. When assessing the financing gaps that countries will face when experiencing disaster-displacement, many will not be able to absorb the associated costs. For example, Bangladesh would not be able to absorb the economic impacts of displacement associated with a 1 in 10 years disaster event<sup>18</sup>

These different global totals cannot be simply added together, given that some are estimates of what is currently being lost while others are probabilistic estimates of future risk. It is beyond the scope of this paper to try and reconcile the methodologies used. However, what is clear is that as an order of magnitude, the total risk associated with disasters, conflict, displacement and natural capital loss would now seem to be several times greater than the value of global GDP growth. This implies that development is increasingly fragile as the costs incurred and risks generated now greatly exceed the value created.

Short term gains and capital accumulation in specific social and territorial geographies continue to provide an illusion of development. However, in much of the world the smoke-screen is now rapidly dissipating, revealing contemporary development pathways as a thin veneer covering broad-based economic, social and ecological collapse.

This has very serious implications for the 2030 Agenda for Sustainable Development. Ultimately, risk is a contingent liability for future development. This implies that in any given country, when risk starts to represent a significant percentage of the value generated by development, governments will not be able to increase or even maintain the capital investments or social expenditure they need to achieve the Sustainable Development Goals (SDG).

For example, in Syria, Afghanistan and Iraq the economic cost of violence is estimated to be 68%, 63% and 51 %per cent of the value of their GDP respectively<sup>19</sup>. In Guatemala, Honduras and El Salvador the economic costs of crime and violence were already estimated to account for between 8 and 11 percent of GDP in 2011<sup>20</sup>. Subsequently they may have increased. In countries like Philippines and Myanmar, estimates of average annual disaster risk in the built environment now exceed 100% of their social budgets<sup>21</sup>

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17 IDMC 2019: Unveiling the cost of internal displacement. Thematic series The Ripple Effect. February 2019.

18 IDMC and IIASA 2019: Points of no return. Estimating governments' fiscal resilience to internal displacement. IDMC Thematic series: The Ripple Effect: economic impacts of internal displacement. March 2019.

19 <http://visionofhumanity.org/app/uploads/2018/11/Economic-Value-of-Peace-2018.pdf>

20 World Bank, 2011, Crime and Violence in Central America: A Development Challenge.

21 United Nations, 2017 op.cit.

In all these different contexts, the risks generated by development now heavily compromise progress towards the achievement of the SDG. At the same time, neither the benefits nor the risks generated through development are accumulated or distributed equally in territorial or social terms. The geography of risk inequality occurs at all scales, between regions and countries, within countries and even within cities and localities.

## THE HIDDEN VEINS OF RISK ACCUMULATION

The fact that risk itself is now reaching extreme levels, highlights the operation of underlying risk drivers which articulate contemporary development to the configuration and accumulation of risk. Many of these drivers are at the same time risk outcomes. Forced displacement, for example, occurs after both disaster and conflict. Displaced populations are often forced to occupy hazard exposed areas in extremely vulnerable living conditions, therefore increasing disaster risk. Displacement and migration can also create new conflict risks. For example, many of the countries that absorb displacement and migration, for example Lebanon in the case of Syria, Colombia in the case of Venezuela or Bangladesh in the case of Myanmar, are themselves countries with high-levels of risk, associated with conflict, physical hazards or both. Risk, therefore, is increasingly fluid, flowing and spilling over from crisis in neighbouring countries, and permeating and exacerbating existing situations.

Contemporary development, with its single-minded pursuit of economic growth above all other considerations, seems to reward risk accumulation. Opportunities for short-term capital accumulation continue to outweigh concerns about future sustainability, resulting in a massive discounting of all future risk. This leads to large flows of capital into hazard-exposed areas, where hidden contingent liabilities come bundled together with the comparative advantages offered to investors. The level of risk in many such locations is rarely explicit to investors and is often disregarded in the public investment that creates the necessary infrastructure or in the private investment that follows, as became brutally manifest in the flooding of industrial estates on the outskirts of Bangkok in 2011. With regional and global impacts in sectors such as semiconductors and automobiles, this disaster revealed how risk is locked into much new capital investment in hazard-exposed regions<sup>22</sup>.

At the same time, instead of being liable for the risk that private and public actors generate, risk is actively and often openly transferred to and borne by others, citizens, local governments and vulnerable populations. For the 2 billion people on the world living on less than USD 3.2 per day and the 800 million living on less than USD 1.9 per day, even small increases in income can lead to major gains in social welfare. However, the material gains from development are concentrated in a very small percentage of the global population, while the risks are transferred to the majority or to the global commons.

Poverty and inequality are both underlying risk drivers as well as risk outcomes. Sectors and territories without comparative advantages for capital accumulation are left behind. In those areas, risk is associated with an absence of development characterized by low levels of investment in infrastructure, weak or non-existent social and environmental protection, and rural and urban

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22 United Nations, 2013, Global Assessment Report on Disaster Risk Reduction: The Business Case for Disaster Risk Reduction, Geneva.



poverty. This drastically reduces the space for managing risks in livelihoods, settlement or health for the vast majority, with the result that both every-day and extensive risk become embedded as attributes of multi-dimensional poverty.

Economic poverty, together with other poverty factors such as powerlessness, exclusion, low literacy and discrimination, translates into conditions of everyday risk, associated with poor health, crime, drug addiction, domestic violence and homelessness, which in turn reinforce poverty and generate patterns of extensive and intensive risk. Damage to housing, local infrastructure, livestock and crops then feeds back into a range of outcomes that include further impoverishment, displacement and increased conflict risk.

With opportunities constrained, political instability becomes another risk outcome, which in turn further erodes the consensus required to address risk.

Urban growth is also generally characterized by unequal access to urban space, infrastructure, services and security. This generates new patterns of both extensive and intensive disaster risk, particularly in informal settlements with deficient or non-existent infrastructure and social protection, and high levels of environmental degradation. At the same time, social and spatial segregation of risk in cities, contributes to the proliferation of other shocks and stresses, such as crime, high youth unemployment and political instability, all of which exacerbate vulnerabilities and social tensions and generate a vicious cycle of risk generation. Rapidly expanding city regions also generate new risks, as landscapes and ecosystems are degraded through mechanisms such as a low-density urban expansion, exhausting resources such as water in the surrounding regions, generating unsustainability. With exposure and vulnerability increasingly concentrated in urban areas, more people and assets are put at risk. Today, more than 80% of the global population at risk of being displaced by floods live in urban and peri-urban areas<sup>23</sup>

Meanwhile, contemporary development is characterised by an increasing and unsustainable over-consumption of energy, fresh water, forests and marine habitats, clean air and rich soil. The loss of critical regulatory ecosystem services, including forests, mangroves, wetlands, coral reefs and aquifers, means that many ecosystems are now approaching tipping points beyond which recovery is difficult or impossible, with unpredictable but potentially dangerous implications for future risk. Water stress and land degradation have particularly dangerous implication for food security.

Global climate change is now fundamentally changing the risk landscape, magnifying the number and kind of hazards, through changing temperatures, precipitation and sea levels, among other factors. While ongoing changes in climate averages, sea level rise and ice cover constitute the principal stress to production, livelihood and settlement patterns, for example, reduced agricultural production due to declining water availability, climate change is still considered synonymous with extreme events, thus confusing changing climate variability with the underlying problem of a changing climate.

Climate change transfers risk as many of the territories most affected are those which have contributed least to greenhouse gas emissions. But at the same time, climate change is a meta-risk

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23 IDMC, 2019: Global Report on Internal Displacement. An urban perspective, Geneva.

driver, as both its causes and consequences are global. In certain contexts, climate change-related effects may exacerbate existing tensions and influence other factors in a way that increases the risk of conflict, often linked to the control over natural resources at times of scarcity. In East Africa, for example, climate-conflict pathways include worsening livelihood conditions, increasing migration and changing pastoral mobility patterns<sup>24</sup>. Fluctuations in agricultural production and food prices are other climate-related risk drivers<sup>25</sup>.

## INTERDEPENDENCE AND NON-LINEARITY

These risk drivers are closely interrelated and concatenated, and they are increasingly shaping local realities. Interactions between the different risk drivers create increasingly unpredictable risk outcomes, where risk drivers in physical systems translate into drivers in other systems and vice versa through feedback loops. Given the multiple feedback loops between the different drivers and their non-linearity and given that change seems to be occurring at a faster rate than expected, even slight changes in the evolution of any one driver can generate unexpected and radical changes in another, while at the same time magnifying and increasing interdependent global risk. The world seems now increasingly characterised by unknown things changing rapidly.

Examples of interdependence and feedback abound. The East Japan earthquake of 2011 triggered a tsunami, which damaged a nuclear power plant, in turn leading to cascading effects on energy production, food systems and water supplies. Concatenated drivers such as climate change, the growth of city regions and environmental degradation can lead to low levels of water recharge which are generating catastrophic water stress in major metropolitan areas such as Sao Paulo, Brazil and regions such as the South Western Cape in South Africa. Excessive extraction of groundwater is causing cities like Jakarta and Bangkok to sink, further exposing them to rising sea levels and flooding.

Many countries and communities in conflict, for example, in the Middle East and North Africa are also in regions severely affected by climate change, water stress and land degradation. Their capacity to deal with these risks is reduced by conflict, while risk outcomes, such as displacement at the same time magnify conflict risk. In Syria, almost all people displaced by heavy floods in 2018 had previously fled the conflict, resulting in cyclical and protracted displacement that humanitarian actors and government agencies alike were not equipped to deal with. In Greece, the capacity of government to respond to devastating wildfires in recent years was severely constrained by underinvestment in fire and emergency services following an ongoing and decadal financial crisis.

The risk nexus, therefore is characterised by a range of increasingly concatenated and interdependent risk drivers, outcomes such as disasters, migration, displacement, conflict and political instability, ongoing welfare, livelihood and life style impacts and unsustainable levels of risk. Extreme risk accumulation is also undermining the already weak and fraying political consensus that underpins the contemporary development paradigm. The risk nexus, would now seem to be the salient characteristic of our *world on fire*.

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24 Van Balen, S. & Mobjörk, M. 2016. A Coming Anarchy? Pathways from climate change to violent conflict in East Africa. Stockholm University, SIPRI.

25 Busby, J. 2018. Climate and Security: Bridging the Policy-Academic Gap. PRIO blog, 15 May, 2018.



## THE LIMITS OF RISK MANAGEMENT

### From fragmented science to a communication breakdown

Because disasters, conflicts and crises are not recognised for what they are, as the manifest consequences of our development choices, the way the international community as well as most countries are currently addressing the risk nexus can be characterised more as another underlying risk driver than as an effective approach to risk management.

Disaster risk, conflict risk, displacement risk and risks associated with climate change and declining biodiversity continue to be examined analytically as separate categories, even though the increasing degree of interdependence between these risk categories, the underlying risk drivers and the range of risk outcomes has already eroded their value as compartmentalised fields<sup>26</sup>.

In general, research, policy and practice in risk management exhibit the classic problem of *fragmented science*. Specialised research communities have developed in disaster risk management, climate change adaptation, displacement and migration and conflict prevention, with only weak channels of communication between them. For example, climate change and disaster risk reduction discourse are largely absent from the global conflict agenda. While attention has been given to elucidating the links between climate change impacts and the risk of violent conflict, much less focus has been given to analysing how conflict undermines the capacity to address other kinds of emerging threats and risks.

Academic journals have sprung up to service each research community, which normally only quote literature from within that community. Even within the disaster risk management and climate change adaptation research communities, which are addressing risks with a very large degree of commonality, few researchers in one community read or quote literature produced by the other, despite sporadic efforts to encourage convergence<sup>27</sup>. The distance between these research communities and those working on conflict and displacement are greater still. Within each community there is further fragmentation as researchers focus in on specific analytical areas.

Research communities thrive by fabricating interpretative paradigms that distinguish them from other communities, for example between climate change adaptation and disaster risk reduction. But these paradigms often serve more to veil than to reveal the underlying commonality. As a consequence, dialogue on the risk nexus between different communities is hampered by differences in concepts, terminology and epistemology.

Fragmented science is associated with highly-specialized approaches that may work well within their particular (often narrowly defined) context but which are ill-equipped to address the interdependence and concatenation between different risk drivers. For example, wetland conservation could be seen as a disaster risk management issue, as it reduces flood risk, as a climate change adaptation issue, as well as a water availability, biodiversity and livelihood issue. The fragmentation of policies, budgets and bureaucracies conspires against addressing such issues in ways that could potentially produce multiple benefits and co-benefits.

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<sup>26</sup> An issue already highlighted by Von Humboldt two hundred years ago.

<sup>27</sup> Reference IPCC SREX report

The 2030 Agenda consists of a number of distinct international policy frameworks<sup>28</sup> for sustainable development, climate change, disaster risk reduction and urban development, each supported by their own international bureaucracies. In 2018, the two Global Compacts to address and manage international migration and refugee flows respectively resulted from and reinforced separate institutional agendas. Each of the main agreements comes with its own structures and systems of monitoring and reporting that not only creates burdens on governments but which tend to reinforce separation and fragmentation.

For example, the Sendai Framework has no reference to conflict and displacement, while making progress towards one SDG may negatively affect progress towards another. For example, large investments in the infrastructure of hazard-exposed coastal cities may be necessary to achieve SDG9 but may result in forced resettlement of low-income households negatively affecting the achievement of SDG1 and SDG11, as well as leading to increasing future disaster loss, contrary to Sendai Global Targets A – D.

In the New Urban Agenda disaster risk is still viewed as an independent and discrete problem, referred to in 17 of the 180 paragraphs of the agenda. But the nexus between disaster risk and its drivers in bad urban planning, resource depletion, land ownership patterns and others are never made explicit.

At the national level, most governments have also developed separate and competing policy frameworks and bureaucracies for addressing disaster risk and climate change, and in some cases issues such as migration or displacement, inhibiting a more holistic vision of the risk nexus. This fragmentation is further reinforced in the budgeting processes where separate budget lines are approved for each policy area or sector. The result is often competition for resources between competing bureaucracies which address overlapping issues and challenges. This is often further aggravated by financial mechanisms, such as under the Green Climate Fund for climate adaption and mitigation or the World Bank's IDA for refugee response, which each tend to foster off-budget funding streams and project-based approaches.

And despite calls for flexibility in order to manage risk in complex environments, and agreed DAC<sup>29</sup> policy, many donors have great difficulty to relinquish ear-marking and control, further reinforcing fragmentation. The entrenchment of fragmentation in many bilateral and multilateral institutions has itself become a major barrier to implementation of the 2030 Agenda and the need for a more holistic approach to managing risk.

Humanitarian action<sup>30</sup> to address the needs of those displaced by conflict, disaster or collapsing ecosystems, does not have means nor the mandate to deal with underlying risk. For example, between 2011 and 2018 the number of operations to deal with increasingly complex and prolonged emergencies by organisations such as the World Food Programme (WFP) has increased enormously while appeals for financial support rarely achieve more than 60 percent of their targets. The call by both the former and current Secretary Generals of the United Nations to transfer the

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28 The Sendai Framework for Disaster Risk Reduction: 2015 – 2030, the Sustainable Development Goals, the Paris Climate Change Agreement the New Urban Agenda

29 OECD Development Assistance Committee

30 ALNAP's State of the Humanitarian System 2018, p 227, the chapter on Connectedness <https://www.alnap.org/help-library/the-state-of-the-humanitarian-system-2018-full-report>

focus of action from one dominated by ex post humanitarian assistance to a nexus approach where greater investment is made in sustainable livelihoods and prevention has yet to achieve traction.

For states with limited governance and institutional capacity, this makes a holistic and integrated approach to risk management difficult if not impossible. In the Caribbean, for example, governments are pursuing the different international agendas along separate institutional tracks despite the fact that they are all expected to deliver resilient and sustainable societies. Furthermore, decentralisation of responsibility for managing crises and risk more often than not does not come with the commensurate devolvement of resources to local levels. Limitations to resource flows from national to local governments and initiatives are a major gap, exacerbated by an almost complete absence of meaningful international multilateral or bilateral funding mechanisms to support capacity and investment directly to the local level.

## EXOTIC APPROACHES TO MANAGING RISK

These fragmented and competing frameworks for addressing risk, however, do have an underlying commonality. The dominant narrative in contemporary development continues to be one of conceptualising risk as an exogenous variable or an external threat. Despite the evidence that risk is endogenous to development, the narrative remains one of protecting development against disasters or of adapting development to climate change. Conflict, displacement, disasters and the effects of climate change are still seen as externalities which affect normal development, rather than as indicators of “failed or skewed development, of unsustainable economic and social processes, and of ill-adapted societies”<sup>31</sup>.

Given this dominant narrative, approaches such as climate change adaptation and disaster risk reduction, should more properly be considered as *exotic*<sup>32</sup> approaches, which partially address specific compartmentalised manifestations of risk, rather than the underlying drivers that configure the risk nexus. As such they only nibble around the edges of the growing and *extreme* accumulation of interdependent risk. These *exotic* approaches continue to be understood and practised as sets of instrumental and administrative mechanisms to protect development against tangible external threats. Logically, if risk is conceptualized as an exogenous threat, then instruments can be designed to protect against it. By definition, interpreting risk in this way weakens responsibility and accountability for risk generation.

The emergence and widespread adoption of resilience as a concept and goal may be making the transition to an integrated approach even more difficult. Countries are expected to be able to absorb the impact and *bounce* back from a growing number of *intractable* risks. This unfortunately can be understood as reinforcing the status quo rather than recognising the need for transformation of the conditions of underlying risk. Climate change adaptation is similarly a recognition and acceptance of the status quo.

To compound the situation, responsibilities for risk management and reduction have often been vested in organisations set up to respond to disasters, conflict, displacement and other crisis

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31 Lavell, Maskrey, 2011, The Future of Disaster Risk Management, Environmental Hazards, Vol 10.

32 These disciplines are exotic not only in the sense that they view risk as exogenous to development but also in that they are themselves exogenous to mainstream development planning and investment and public administration.

rather than to address the underlying risks. These responsibilities were added on in syncretic fashion to the governance arrangements for emergency management. These organisations rarely have either the political authority or the technical capacity to engage with mainstream development sectors in government, such as planning and finance ministries. The concepts that guide the work of these organisations, is a major barrier to change and the emergence of more effective and modern frameworks for risk management.

In the Caribbean, for example, despite seventeen years of promoting Comprehensive Disaster Management, there has been little systematic investment in addressing the underlying risk drivers in the region, creating conditions that manifested in the impact Hurricanes Irma and Maria in 2017. While the post event political discourse acknowledged the devastating nature of the outcome, it did so in terms of the unprecedented nature of the events and expressed little understanding or appreciation of the fact that the risk drivers could have been at least partially addressed.

Many countries in the region have hinged their economic development on tourism seeking to maximize the revenues the sector is able to generate at all costs. However, investments in tourism infrastructure has potentially breached the carrying capacities of vital regulatory ecosystems thus contributing to increasing risk, ultimately to economic development itself. In Central America, despite the clear lessons from Hurricane Mitch, 20 years-ago, and the political statements on the social construction of risk and the need for transformation, risk continues to grow rapidly and losses also.

These contradictions can be seen when examining the increasingly accepted distinction between corrective, prospective and reactive disaster risk and climate change management<sup>33</sup>. Corrective risk management, searching to reduce existing risk, can easily be incorporated by the disaster risk management sector, given that the risk already exists, likewise, reactive management, given that it addresses unresolved risk that will and does convert into disaster. Prospective risk management, however, is an uncomfortable bed-partner for the disaster risk management sector. Given that its objective is to avoid future risk construction, in other words to avoid disaster by avoiding risk, it should be an integral part of mainstream development planning and investment. The fact that an *exotic* sector like disaster risk management is expected to ensure prospective risk management, which is and should be part of quotidian development is therefore a guarantee more of failure than of success.

Ultimately, the objectives of these exotic approaches to managing risk are fundamentally contradictory: to protect the same development paradigm that generates the risk in the first place. If increased investments are made to protect development without addressing the underlying risk drivers, more and more effort leads to diminishing returns. Given the evidence of a qualitative transformation of the risk nexus and of a world on fire, there is now a very real possibility that unless risk management is transformed, a tipping point will be reached in which the debate will not be about the achievement of the SDG or the Sendai Framework targets, but rather about survival itself.

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33 See United Nations General Assembly, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, December 2016 for official definitions of these concepts.

## *FIT TO SURVIVE:*

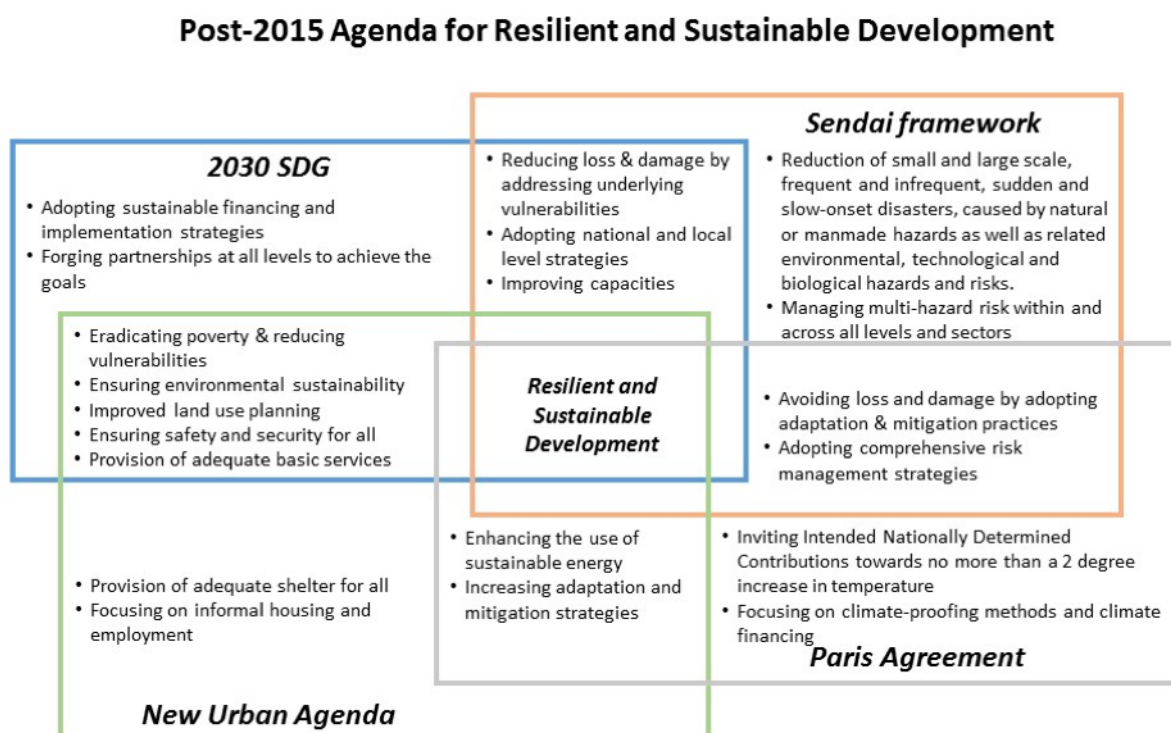
From exotic risk management to a quotidian approach to sustainable and resilient development

### Bringing risk management home

Given that these *exotic* approaches have proven ineffective to manage escalating global risk it is clear that if our *world on fire* is to be transformed into a world fit to survive then a new approach to risk management is required. If risk is an endogenous indicator of a flawed development paradigm, then the management of risks depends on the transformation of that paradigm.

Firstly, prospective risk management should now be considered as a quotidian mechanism for sustainable and resilient development, rather than a component of disaster risk reduction. Seen in such a light, it then becomes an agenda for development sectors rather than for the entrenched crisis and disaster management sector. Addressing risk within the broader framework of sustainable and resilient development can also help to bring coherence to 2030 Agenda.

Figure 1, highlights the existence of a common space around resilient and sustainable development where Agenda 2030, the Sendai Framework, the New Urban Agenda and the Paris Agreement converge and where the perspectives on risk and risk management in each framework can come together.



If that common space can be strengthened and reinforced, discussions on the mainstreaming of disaster risk reduction or climate change adaptation into sustainable development or into the new urban agenda become irrelevant. Mainstreaming, by definition, is still derived from the conception that disasters and climate change are external threats rather than endogenous or internal

characteristics of development and that exotic approaches need to be mainstreamed into the quotidian. Planning for extremes must now be closely integrated into planning for a new normality. The extreme levels of inequality, instability, environmental degradation, climate change, disaster, displacement and conflict that now characterise global development cannot be reduced to the status of an externality.

Managing risk as an internality inside development requires a very different approach to mainstreaming risk management into development to protect against externalities. It implies that risk management and resilience should become a normal and quotidian characteristic of sustainable development. Managing risks now has to become endogenous to the DNA of sustainable development, in the same way as gender or environment, instead of an *exotic* add-on that needs to be mainstreamed.

If risk management is allowed to weave and flow through normal, day-to-day development planning and decision-making across sectors and territories, then the differentiation between risk governance and development governance also becomes unnecessary. Instead of assigning responsibilities for disaster risk management or climate change adaptation to specialized sectors, these responsibilities would be vested in the sectors and territorial governments that plan, invest in and regulate development.

The paradigm shift required therefore is two-fold: to integrate existing fragmented approaches to managing risk into an integrated and holistic framework, while at the same time transforming the focus from the exotic to the quotidian, from the corrective and reactive to the prospective and from protecting development against exogenous threats to managing risk as an internality inside sustainable and resilient development.

The approach therefore becomes one of advancing sustainable and resilient development through a risk management lens, addressing the underlying risk drivers and draining energy out of risk accumulation processes. This includes the urgent need to start addressing displacement and conflict as endogenous risks rather than as an exclusively humanitarian issue. At the same time, shifting the paradigm will not happen overnight. As risk creation has deep historical roots, so managing risk creation in the future is a long-term societal process.

## OPPORTUNITIES FOR TRANSFORMATION

All development decisions, whether they are related to capital investment, social expenditure or environmental protection, have the potential to either reduce or increase risks. As a first step, therefore, risk metrics need to be developed to inform such decisions and to ensure that the associated costs and benefits are fully encoded into public and private investment at all levels, into the financial system and integrated as a normal part of government, business planning and decision-making processes, including processes of joint planning with the international community<sup>34</sup>

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34 For example, the United Nations Common Country Assessments (CCA) and Development Assistance Frameworks (UNDAF)



Probabilistic global assessments of disaster risk already exist<sup>35</sup> but further work is required to fully integrate slow-onset hazards, such as drought, water stress and the effects of climate change and to address the non-stationarity of hazard, exposure and vulnerability. At the same time, it will be necessary to address displacement, conflict, food insecurity, environmental degradation both as underlying drivers and aggravating factors but also as risk outcomes and to model the effects that investments and policies can produce on each risk component.

While expanding existing global models in this way is a significant technical challenge, it is a necessary bedrock for underpinning the paradigm shift towards sustainable and resilient development. The identification and assessment of risk, including the inter-linkages and knock-on effects facilitates a better understanding of risk and allow for better budgeting and resource allocation that can be measured, monitored, evaluated and adjusted as required.

Once such metrics are developed, they will become a critical tool to inform national planning processes, for example, revealing risks to sustainability and to the achievement of the SDG, that are currently not being taken into account and enabling an appropriate layering of risk.

Such expanded and country-specific risk metrics can be used by and with governments to examine the risk implications of different future development pathways, for example, through periodic risk audits, the agreement of national resilience targets, and the measurement of how different development pathways impact on the achievement of each SDG. This can lead to an improved understanding of how different drivers contribute to multidimensional risk and to the planning of investments in key development sectors such as infrastructure, education or employment in a way that they contribute to resilience and sustainability. In the same way they can also be used to address risk in UN system planning instruments such as the Common Country Assessment (CCA) and the United Nations Development Assistance Framework (UNDAF). Currently risk is not systematically considered in these instruments.

Future infrastructure development can be seen both as a challenge as well as an opportunity. By 2030, an estimated US\$25 trillion to US\$30 trillion will be invested globally in new infrastructure, including urban road construction, water and sanitation, energy and transport systems, and buildings. Most of this investment will occur in regions with weak capacities for territorial planning and governance. Whether or not this investment is sustainable and resilient will have a determining influence on the future of risk. Risk metrics therefore are also vital to develop appropriate standards and to create tangible incentives to both governments and the private sector to invest in sustainable and resilient infrastructure.

Similarly, risk metrics can and should also be fully encoded into the financial system and available to institutional investors, including pension and sovereign wealth funds. Currently, capital flows are managed and regulated largely by considerations of profitable returns rather than by the risk they may be accumulating. Financial managers and regulators have to move from measuring the potential risks inherent in portfolios of assets, which can represent a risk to those investing in these instruments, to considering the broader risks posed by the investments.

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35 See for example, United Nations, 2017, GAR Atlas, UNISDR, Geneva

Direct, indirect and downstream risks generated by increased exposure and vulnerability have to become a key parameter of credit and debt ratings, and in indices that measure the attractiveness of sectors and countries for investment in performance forecasts and in statutory reporting. Encoding risk metrics into broader investment metrics is critical to changing investor behaviour in a way that encourages investment to flow into asset classes such as resilient infrastructure, that contribute to taking the energy out of risk accumulation.

A key challenge to addressing the risk nexus remains the configuration of appropriate governance arrangements at the national and local levels. In many of those countries with the highest risks, limited institutional capacity remains fragmented in silos and with little space to engage new and unforeseen risks. Available human and financial resources are thinly spread across multiple agendas. And even when cross-ministerial councils and similar mechanisms have been created to address risk, budgets are often still locked into sector-based silos. The burden of responsibility currently vested in specialised disaster management and climate change adaptation offices needs to be shifted to mainstream government sectors. To get traction and action, the same actors currently involved risk configuration and accumulation should be those that take a lead role in risk management. The incentives for rewarding those institutions that engage in cross-cutting, inter-sectoral prospective planning also need to be aligned.

Paradoxically, disasters and crisis often create opportunities for reviewing governance mechanisms and, through increasing media attention, offer opportunities to identify accountability and responsibility for past failures to regulate development. But such windows of opportunity are transient, pointing to the need for the legislation, staffing and budgeting plans, implementing procedures and identified champions to be pre-positioned to take advantage of propitious circumstances when they arise.

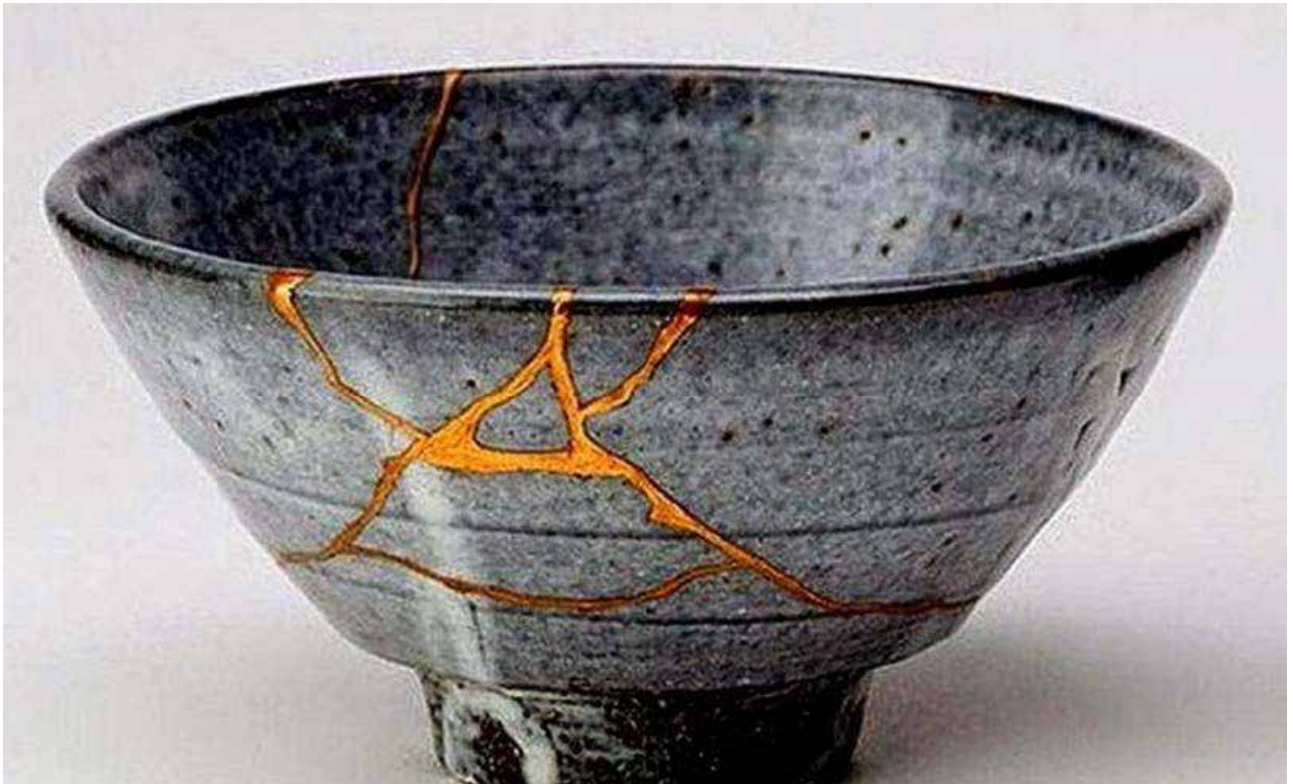
In particular, territorial governance needs to be strengthened. Territories, at different scales, internalize all the risks, drivers and outcomes in a holistic manner. National policies, strategies, plans and budgets in different sectors need to be integrated at the local level, which is where the different risk drivers literally come to ground and where localities need to manage risks in a way that is appropriate to their own needs and challenges. Currently, even those countries that have adopted innovative national level policy frameworks, for example risk-informed public investment, experienced problems in implementation due to weak or ineffective territorial planning and governance. Along with risk-informed territorial planning and investment, mechanisms for compliance also need to be strengthened, whether through risk ombudsman, periodic risk audits or incorporating risk into the remit of national controller or audit offices.



## CODA

If a *world on fire* is iconic of a qualitative transformation in global risk, a concept that is iconic of the paradigm shift required in risk management is that of *kintsukuroi* a Japanese word that refers to repairing broken ceramics with seams of gold.

The underlying philosophy of *kintsukuroi* is an understanding that the new piece of ceramic is more beautiful for having been broken. The relevance of *kintsukuroi* to contemporary development is that in crisis lies an opportunity if the future of the planet and society can be made more sustainable precisely for having once been broken.



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Oral Sessions | Session

[O2-1]

## Local production for local protection (*Chisan Chibo*) - Proposing standardized local-level bosai operations from Toho

Mon. Nov 11, 2019 8:30 AM - 10:00 AM Room 1 (Main Hall)

Tohoku University- IRIDeS

Simultaneous Interpretation is available. (同時通訳有り)

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### [O2-1-01] Local production for local protection (*Chisan Chibo*) – Proposing standardized local-level *bosai* operations from Tohoku

\*Shohei Sakota<sup>1</sup>, \*Fumihiko Imamura<sup>2</sup>, \*Satoru Nishikawa<sup>3</sup>, \*Haruo Hamachi<sup>4</sup>, \*Tomohisa Sashida<sup>5</sup>, \*Kanao Iuchi<sup>2</sup> (1. Ministry of Economy, Trade and Industry, 2. Tohoku University, 3. Nagoya University, 4. National Research Institute for Earth Science and Disaster Resilience, 5. Tokio Marine & Nichido Fire Insurance)

8:30 AM - 10:00 AM

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8:30 AM - 10:00 AM (Mon. Nov 11, 2019 8:30 AM - 10:00 AM Room 1)

## [O2-1-01] Local production for local protection (*Chisan Chibo*) – Proposing standardized local-level *bosai* operations from Tohoku

\*Shohei Sakota<sup>1</sup>, \*Fumihiko Imamura<sup>2</sup>, \*Satoru Nishikawa<sup>3</sup>, \*Haruo Hamachi<sup>4</sup>, \*Tomohisa Sashida<sup>5</sup>, \*Kanao Iuchi<sup>2</sup> (1. Ministry of Economy, Trade and Industry, 2. Tohoku University, 3. Nagoya University, 4. National Research Institute for Earth Science and Disaster Resilience, 5. Tokio Marine & Nichido Fire Insurance)

Keywords: Standardized bosai operations, Sendai Framework for Disaster Risk Reduction, Local production for local protection, Chisan Chibo

Local operations are critical to reducing disaster risk. With this understanding, Japan has developed various strategies, policies, and instruments for disaster management operations. One of the recent examples, after the 2011 Great East Japan Earthquake and tsunami, is the System on Community Disaster Management Plan (*Chiku Bosai Keikaku Seido*) approved for implementation in 2014. It urges local communities to make their *bosai* plan to prepare their actions during the time of disasters. Meanwhile, the 2015 Sendai Framework for Disaster Risk Reduction internationally shares the goal of reducing risk and adapting climate change by increasing the number of nations taking actions towards disaster risk reduction. Sharing a standardized operation on bosai operations for the interested states are an important step forward.

This session shares the concept of Chisan Chibo – local production for local protection – by sharing ideas on the followings:

What does it mean to have an international standard on local-*bosai* operations? In which way could the standard benefit disaster reduction? What are the possible approaches and tools and how could it stimulate industry? What is the value of standardizing this concept from Sendai/Tohoku?

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Oral Sessions | Session

[O2-2]

## Public Understanding on Typhoon and Related Disaster (Lessons Learned from the Past Disaster)

Mon. Nov 11, 2019 10:30 AM - 12:00 PM Room 1 (Main Hall)

UNESCAP/WMO Typhoon Committee

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### [O2-2-01] Public Understanding on Typhoon and Related Disaster (Lessons Learned from the Past Disaster)

\*Chihun Lee<sup>1</sup>, \*Meteorology Expert<sup>1</sup>, \*Hydrology Expert<sup>1</sup>, \*DRR Expert<sup>1</sup>, \*Typhoon Committee Secretary<sup>1</sup> (1. UNESCAP/WMO Typhoon Committee)

10:30 AM - 12:00 PM

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10:30 AM - 12:00 PM (Mon. Nov 11, 2019 10:30 AM - 12:00 PM Room 1)

## [O2-2-01] Public Understanding on Typhoon and Related Disaster (Lessons Learned from the Past Disaster)

\*Chihun Lee<sup>1</sup>, \*Meteorology Expert<sup>1</sup>, \*Hydrology Expert<sup>1</sup>, \*DRR Expert<sup>1</sup>, \*Typhoon Committee Secretary<sup>1</sup> (1. UNESCAP/WMO Typhoon Committee)

Keywords: Typhoon, UNESCAP/WMO Typhoon Committee, Disaster Risk Reduction, International Cooperation on DRR, Community Based Resilience

Typhoon is one of the serious natural hazards in the Asia-Pacific area and causes tremendous damages over very large geographical areas every year. Therefore, any effective response to them calls for regional cooperation among the affected countries. A key element in such a response is an efficient typhoon warning system which involves the rapid and frequent exchanges of information between countries and areas based on close observation and monitoring of the storms' development and movements. The Typhoon Committee (TC) is an inter-governmental body organized under the joint auspices of the Economic and Social Commission for Asia and the Pacific (ESCAP) and the World Meteorological Organization (WMO) in 1968 in order to promote and coordinate the planning and implementation of measures required for minimizing both loss of lives and properties caused by typhoons in Asia and the Pacific. In carrying out these functions, the TC maintains and implements action programs under the three Working Groups: namely the Working Group on Meteorological (WGM), the Working Group on Hydrological (WGH), the Working Group on Disaster Risk Reduction (WGDRR); with supported by the Typhoon Committee Secretary (TCS), the Advisory Working Group (AWG), the Training and Research Coordination Group (TRCG), and also with contributions by its 14 Members including China, Hong Kong, China, Japan, the Republic of Korea, Lao PDR, the Republic of Philippines, Thailand, Cambodia, Malaysia, Viet Nam, Macao, China, the People's Democratic Republic of Korea, Singapore, and the United States of America.

The main objective of this session is providing an introduction on the Typhoon Committee including TCS, WGM, WGH, WGDRR, and TRCG and also presenting the main activities of TC including developing technologies and policies related to Typhoon Disaster Risk Reduction. In panel discussion, there will be knowledge sharing on disaster related to Typhoon and lessons learned from it.

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Oral Sessions | Session

[O2-3]

## How to deal with intensifying cyclone disasters -lessons from the Built Back Better process-

Mon. Nov 11, 2019 1:30 PM - 3:00 PM Room 1 (Main Hall)

Pacific Consultants Co.,Ltd.

Simultaneous Interpretation is available. (同時通訳有り)

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### [O2-3-01] Lessons from the Built Back Better process - How we will deal with intensifying meteorological disasters -

\*Ronnan Christian M. Reposar<sup>2</sup>, \*Francisco Pereira<sup>3</sup>, Augusta Maita<sup>4</sup>, \*Ahmad Dading Gunadi<sup>5</sup>, Masaaki Chida<sup>1</sup>, Hiroyuki Takamatsu<sup>1</sup>, Takuya Ito<sup>1</sup> (1. Pacific Consultants Co., Ltd., 2. Palo Municipality, Republic of the Phillipines, 3. Reconstruction Cabinet, Republic of Mozambique, 4. National Disasters Management Institute, Republic of Mozambique, 5. SMEs and Cooperatives Development, BAPPENAS, Republic of Indonesia)

1:30 PM - 3:00 PM

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1:30 PM - 3:00 PM (Mon. Nov 11, 2019 1:30 PM - 3:00 PM Room 1)

## [O2-3-01] Lessons from the Built Back Better process - How we will deal with intensifying meteorological disasters -

\*Ronnan Christian M. Reposar<sup>2</sup>, \*Francisco Pereira<sup>3</sup>, Augusta Maita<sup>4</sup>, \*Ahmad Dading Gunadi<sup>5</sup>, Masaaki Chida<sup>1</sup>, Hiroyuki Takamatsu<sup>1</sup>, Takuya Ito<sup>1</sup> (1. Pacific Consultants Co., Ltd., 2. Palo Municipality, Republic of the Philippines, 3. Reconstruction Cabinet, Republic of Mozambique, 4. National Disasters Management Institute, Republic of Mozambique, 5. SMEs and Cooperatives Development, BAPPENAS, Republic of Indonesia)

Keywords: Built Back Better, Climate Change, Cyclone, Typhoon, Hurricane

The session will focus on the lessons learnt from disaster and its recovery process including the realization of BBB (build back better) which is indicated in the Sendai Framework for Disaster Risk Reduction. As a background we will take a look into the experience of Japan in dealing with many disasters and understand about the concept of BBB and the importance of activities to act proactively against disaster. In addition, to grasp the future trend we might face in the future, we will also discuss about how climate change might affect the trends in disaster related to meteorological events such as the trend of intensifying cyclone, typhoon or hurricane.

Challenges and lessons learnt will be shared by three countries, Mozambique, Japan and the Philippines.

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Oral Sessions | Session

[O2-4]

## Contribution from meteorology, hydrology and DRR for the Platform on Water Resilience and Disasters

Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 1 (Main Hall)

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### [O2-4-01] Contribution from meteorology, hydrology and DRR for the Platform on Water Resilience and Disasters

\*Tetsuya Ikeda<sup>1</sup> (1. ICHARM)

3:30 PM - 5:00 PM



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3:30 PM - 5:00 PM (Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 1)

## [O2-4-01] Contribution from meteorology, hydrology and DRR for the Platform on Water Resilience and Disasters

\*Tetsuya Ikeda<sup>1</sup> (1. ICHARM)

Keywords: Water-related disasters, Meteorology, Hydrology, Disaster Risk Reduction, International Flood Initiative

Water related disasters including flood and typhoon-induced disasters are the key challenges to overcome for the achievement of sustainable development on the society and economy. Water related disasters will also be aggravated by climate change and the societal change such as urbanization, over exploitation and population growth. Enhancing disaster preparedness for effective response has been prioritized in the Sendai Framework for Disaster Risk Reduction 2015-2030, which was adopted at the Third UN World Conference on Disaster Risk Reduction in 2015. Such efforts require effective hydro-meteorological monitoring and forecasting, and its utilization to mitigate the damages through early warning, smooth evacuation, and promotion of preparedness and preventive activities.

In this perspective, consecutive efforts are important: meteorological monitoring and prediction, hydrological simulation and forecasting, and preparedness and preventive actions for disaster risk reduction on water-related disasters. Furthermore, building the collaborative scheme are essential among these responsible governmental sectors. In collaboration with UN agencies and the other international organizations, International Flood Initiative (IFI) is now being promoted, and ICHARM is working as its secretariat. Under the IFI, the efforts are being made to establish the Platform on Water Resilience and Disasters where the departments of meteorology, hydrology and DRR of each country meet together. In this Platform, each department provides data, it is planned to develop more effective flood management through flood forecasting and socio-economic assessment by accumulating and analyzing these data.

With an aim at promoting more effective flood management by utilizing the Platform, this session highlights the key roles of the governmental sectors of meteorology, hydrology and DRR in Japan and the Asian countries, and discuss how to build more effective collaborative scheme among them.

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Oral Sessions | Session

[O2-5]

## GADRI Activities and Contributions to the Science and Technology Roadmap for the implementation of SFDRR Agenda 2015-2030

Mon. Nov 11, 2019 5:30 PM - 7:00 PM Room 1 (Main Hall)

Kyoto University; GADRI

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### [O2-5-01] GADRI Activities and Contributions to the Science and Technology Roadmap for the implementation of SFDRR Agenda 2015-2030

Wilma James James<sup>1,2</sup>, \*Hirokazu Tatano<sup>1,2</sup>, \*Tetsuya Takemi<sup>1,2</sup>, \*Kazuyoshi Nishijima<sup>1,2</sup>,  
\*Subhajyoti Samaddar<sup>1,2</sup>, \*Ana Maria Cruze<sup>1,2</sup>, Ayuna Matthews<sup>1,2</sup>, \*Andrew Collins<sup>2,3</sup>, \*Paul  
Kovacs<sup>2,4</sup> (1. Kyoto University, Japan, 2. GADRI, Japan, 3. Northumbria University, UK, 4.  
Western University, Canada)

5:30 PM - 7:00 PM

5:30 PM - 7:00 PM (Mon. Nov 11, 2019 5:30 PM - 7:00 PM Room 1)

## [O2-5-01] GADRI Activities and Contributions to the Science and Technology Roadmap for the implementation of SFDRR Agenda 2015-2030

Wilma James James<sup>1,2</sup>, \*Hirokazu Tatano<sup>1,2</sup>, \*Tetsuya Takemi<sup>1,2</sup>, \*Kazuyoshi Nishijima<sup>1,2</sup>, \*Subhajyoti Samaddar<sup>1,2</sup>, \*Ana Maria Cruze<sup>1,2</sup>, Ayuna Matthews<sup>1,2</sup>, \*Andrew Collins<sup>2,3</sup>, \*Paul Kovacs<sup>2,4</sup> (1. Kyoto University, Japan, 2. GADRI, Japan, 3. Northumbria University, UK, 4. Western University, Canada)

Keywords: GADRI, SFDRR, S&T Roadmap, Disaster risk reduction, Network

The session will highlight GADRI activities and contributions by its members to targets of the Science and Technology Roadmap for the implementation of the Sendai Framework for Disaster Risk Reduction Agenda 2015-2030. It will capture current and planned research activities, outcomes and expected achievements. GADRI community is requested to conduct self-evaluation of their respective institutes research activities geared towards the S&T Roadmap and report their outcomes and achievements at the biennial GADRI Global Summits.

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Oral Sessions | Session

[O2-6]

## New Horizon of IRIDeS-NTT Innovative Research

Mon. Nov 11, 2019 8:30 AM - 10:00 AM Room 2 (Tachibana)

NTT

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### [O2-6-01] New Horizon of IRIDeS-NTT Innovative Research

\*Naoko Kosaka<sup>1</sup>, \*Kenjiro Terada<sup>2</sup>, \*Shunichi Koshimura<sup>2</sup>, \*Masashige Motoe<sup>2</sup>, \*Masayuki Ihara<sup>1</sup>,  
\*Satoshi Kubota<sup>1</sup>, \*Tomohiro Kokogawa<sup>1</sup> (1. NTT, 2. Tohoku University)

8:30 AM - 10:00 AM

8:30 AM - 10:00 AM (Mon. Nov 11, 2019 8:30 AM - 10:00 AM Room 2)

## [O2-6-01] New Horizon of IRIDeS-NTT Innovative Research

\*Naoko Kosaka<sup>1</sup>, \*Kenjiro Terada<sup>2</sup>, \*Shunichi Koshimura<sup>2</sup>, \*Masashige Motoe<sup>2</sup>, \*Masayuki Ihara<sup>1</sup>, \*Satoshi Kubota<sup>1</sup>, \*Tomohiro Kokogawa<sup>1</sup> (1. NTT, 2. Tohoku University)

Keywords: shared-vision-type collaborative research, living lab, real-time tsunami flood-damage prediction, decision-making

Tohoku University and NTT have started collaborative research using their combined strengths based on the shared vision of “ Fundamental technology to support safety for living” . In the field of disaster prevention, mitigation, response and recovery/reconstruction, we aim to contribute to the creation of new values on disaster research and recovery from the 2011 Great East Japan Earthquake.

Instead of establishing bottom-up research themes based on current technologies, we held workshops with the participation of researchers from universities and companies to define collaborative research projects linked to our vision.

The research projects to be addressed from this fiscal year are as follows.

### [Project 1]

Research on decision-making support using real-time tsunami inundation and damage forecast

### [Project 2]

Research on a social-problem-solving service-design method using earthquake archives

In this session, we will introduce our preliminary achievements and encourage innovation to create new values of our shared-vision research.

### <Program>

1. Introduction of purpose
2. Vision sharing process
3. Project 1: Research on decision-making support using real-time tsunami inundation and damage forecast
4. Project 2: Research on a social-problem-solving service-design method using earthquake archives

## [O2-7]

### Practical use of recovery experiences from the Great East Japan

#### Earthquake for support to Central Sulawesi in Indonesia

Mon. Nov 11, 2019 10:30 AM - 12:00 PM Room 2 (Tachibana)

Japan International Cooperation Agency (JICA)

Simultaneous Interpretation is available. (同時通訳有り)

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### [O2-7-01] Practical use of recovery experiences from the Great East Japan

#### Earthquake for support to Central Sulawesi in Indonesia

Atsutoshi Hirabayashi<sup>1</sup>, \*Sumedi Andono Mulyo<sup>4</sup>, \*Samuel Pongi<sup>5</sup>, \*Takafumi Kawaguchi<sup>2</sup>,  
\*Hisashi Konno<sup>3</sup>, \*Masatsugu Komiya<sup>7</sup>, \*Hitoshi Ara<sup>1</sup>, Ahmad Dading Gunadi<sup>4</sup>, Hasanuddin Atjo<sup>6</sup>  
(1. Japan International Cooperation Agency (JICA), 2. Higashimatsushima city, 3. Kamaishi  
city, 4. The Ministry of National Development Planning (BAPPENAS), Indonesia, 5. Department  
of Cooperatives & MSME, Sigi, Central Sulawesi Province, Indonesia, 6. BAPPEDA, Central  
Sulawesi Province, Indonesia, 7. Yachiyo Engineering Co., Ltd)

10:30 AM - 12:00 PM

10:30 AM - 12:00 PM (Mon. Nov 11, 2019 10:30 AM - 12:00 PM Room 2)

## [O2-7-01] Practical use of recovery experiences from the Great East

### Japan Earthquake for support to Central Sulawesi in Indonesia

Atsutoshi Hirabayashi<sup>1</sup>, \*Sumedi Andono Mulyo<sup>4</sup>, \*Samuel Pongi<sup>5</sup>, \*Takafumi Kawaguchi<sup>2</sup>, \*Hisashi Konno<sup>3</sup>, \*Masatsugu Komiya<sup>7</sup>, \*Hitoshi Ara<sup>1</sup>, Ahmad Dading Gunadi<sup>4</sup>, Hasanuddin Atjo<sup>6</sup> (1. Japan International Cooperation Agency (JICA), 2. Higashimatsushima city, 3. Kamaishi city, 4. The Ministry of National Development Planning (BAPPENAS), Indonesia, 5. Department of Cooperatives & MSME, Sigi, Central Sulawesi Province, Indonesia, 6. BAPPEDA, Central Sulawesi Province, Indonesia, 7. Yachiyo Engineering Co., Ltd)

Keywords: Japan's recovery experiences from the Great East Japan Earthquake, Central Sulawesi in Indonesia, Local Government, Community Restoration, Livelihood Recovery

What are key roles and approaches of local government to disaster-affected people?

This session aims at discussing the above-mentioned theme by sharing recovery experiences such as formulation of recovery plan, livelihood recovery and community restoration, and its lessons learned in the Central Sulawesi in Indonesia with a reference to lessons learned of Higashimatsushima city and Kamaishi city from the Great East Japan Earthquake.

[O2-8]

## Transdisciplinary Approach(TDA) for Building Societal Resilience to Disasters -Efforts towards Achieving the Goals of Sendai Framework -

Mon. Nov 11, 2019 1:30 PM - 3:00 PM Room 2 (Tachibana)

Japan Society of Civil Engineers

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### [O2-8-01] Transdisciplinary Approach (TDA) for Building Societal Resilience to Disasters - Efforts towards Achieving the Goals of Sendai Framework -

\*Mikio Ishiwatari<sup>1</sup>, \*Romeo S. Momo<sup>2</sup>, \*Kenichi Tsukahara<sup>3</sup>, \*Senro Kuraoka<sup>4</sup>, \*Youb Raj Paudyal<sup>5</sup>, \*Khamarrul Azahari Razak<sup>6</sup>, \*Takako Izumi<sup>7</sup> (1. the University of Tokyo / Japan International Cooperation Agency (JICA), 2. Construction Workers Solidarity, the Philippines, 3. Kyushu University, Japan, 4. Nippon Koei Co., Ltd., Japan, 5. National Reconstruction Authority, Nepal, 6. Universiti Teknologi Malaysia (UTM), Malaysia, 7. International Research Institute of Disaster Science (IRIDeS), Tohoku University, Japan)

1:30 PM - 3:00 PM



1:30 PM - 3:00 PM (Mon. Nov 11, 2019 1:30 PM - 3:00 PM Room 2)

## [O2-8-01] Transdisciplinary Approach (TDA) for Building Societal Resilience to Disasters - Efforts towards Achieving the Goals of Sendai Framework -

\*Mikio Ishiwatari<sup>1</sup>, \*Romeo S. Momo<sup>2</sup>, \*Kenichi Tsukahara<sup>3</sup>, \*Senro Kuraoka<sup>4</sup>, \*Youb Raj Paudyal<sup>5</sup>, \*Khamarrul Azahari Razak<sup>6</sup>, \*Takako Izumi<sup>7</sup> (1. the University of Tokyo / Japan International Cooperation Agency (JICA), 2. Construction Workers Solidarity, the Philippines, 3. Kyushu University, Japan, 4. Nippon Koei Co., Ltd., Japan, 5. National Reconstruction Authority, Nepal, 6. Universiti Teknologi Malaysia (UTM), Malaysia, 7. International Research Institute of Disaster Science (IRIDeS), Tohoku University, Japan)

Keywords: Transdisciplinary approach, Scientific knowledge-based decision-making, Resilience, Sendai Framework for Disaster Risk Reduction

Resilience building against damaging effects of natural hazards is the indispensable step towards sustainable development in any nation. It is obvious that in contemporary society resilience building needs the best available scientific knowledge as the basis of decision-making. Yet regardless of continuous accumulation of scientific knowledge on hazards and vulnerability, it has not been well put to practice in real societal decision-making in disaster management.

While we note that important causative factors to disasters are related to the population growth with urbanization and economic development, we believe that the societal policy and decision-making process in disaster management is the decisive factor to be improved to solve the increasingly serious disaster issues. Society should take a new approach that makes a holistic and transformative approach possible. That is a transdisciplinary approach (TDA) where scientists of all disciplines and stakeholders of all sectors work together for a common objective.

Based on the background, the 21st Technical Committee (TC21) of the Asian Civil Engineering Coordinating Council (ACECC) was established in 2016 to encourage the ACECC members to further develop its capacity to enhance scientific knowledge-based decision-making through TDA. Since its establishment, TC21 has conducted symposiums, special sessions and technical surveys in the Philippines, Nepal, Vietnam, and Japan to deepen and share the understandings on TDA.

This session presents the actual cases and key points of DRR as well as the past and current activities of TC21, where emphasis will be placed on transdisciplinary approach; the institutional scheme to establish efficient processes of scientific knowledge-based decision-making to implement DRR. Takeaway of the session will be the remarks that are reached through discussing the factors and mechanisms of actual DRR cases in light of the Sendai Framework.

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Oral Sessions | Session

[O2-9]

## Preparation for "SUPER-ISE-BAY Typhoon", 60-Years After Ise Bay Typhoon

Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 2 (Tachibana)

Chubu Regional Development Bureau of the Ministry of Land,Infrastructure,Transport and Tourism

Simultaneous Interpretation is available. (同時通訳有り)

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### [O2-9-01] Preparation for "SUPER-ISE-BAY Typhoon", 60-Years After Ise Bay Typhoon

\*Tetsuro Tsujimoto<sup>2</sup>, \*Norimitsu Koike<sup>3</sup>, \*Makoto Takeda<sup>4</sup>, \*Takashi Tashiro<sup>2</sup>, \*Yuji Toda<sup>2</sup>,  
\*Atsuko Mizoguchi<sup>5</sup>, \*Osamu Matsuo<sup>1</sup>, Yoshihumi Kodama<sup>1</sup>, Michio Toya<sup>1</sup>, Hirokazu Kawashima<sup>1</sup>  
, Yoshinobu Mizutani<sup>1</sup> (1. Chubu Regional Development Bureau of the Ministry of  
Land,Infrastructure,Transport and Tourism, 2. Nagoya University, 3. Aichi Institute of  
Technology, 4. Chubu University, 5. Meijo University)

3:30 PM - 5:00 PM

3:30 PM - 5:00 PM (Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 2)

## [O2-9-01] Preparation for "SUPER-ISE-BAY Typhoon", 60-Years After Ise Bay Typhoon

\*Tetsuro Tsujimoto<sup>2</sup>, \*Norimitsu Koike<sup>3</sup>, \*Makoto Takeda<sup>4</sup>, \*Takashi Tashiro<sup>2</sup>, \*Yuji Toda<sup>2</sup>, \*Atsuko Mizoguchi<sup>5</sup>, \*Osamu Matsuo<sup>1</sup>, Yoshihumi Kodama<sup>1</sup>, Michio Toya<sup>1</sup>, Hirokazu Kawashima<sup>1</sup>, Yoshinobu Mizutani<sup>1</sup> (1. Chubu Regional Development Bureau of the Ministry of Land, Infrastructure, Transport and Tourism, 2. Nagoya University, 3. Aichi Institute of Technology, 4. Chubu University, 5. Meijo University)

Keywords: Ise-Bay-Typhoon, Super-Typhoon, Evacuation on pre-disaster stage, cross-municipalities Evacuation, Storm Surge

In 1959, ISE-BAY Typhoon hit Nobi Plain, causing serious damage with more than 5,000 dead and missing. In 2019, just 60 years have passed.

Under the climate change in future, it is feared that Chubu region would be stricken by "SUPER-ISE-BAY Typhoon", that exceeds the ISE-BAY Typhoon.

After the storm surges disaster by Hurricane Katrina in New Orleans in 2005, the "Study Group on Storm Surge Countermeasures in "Below-Sea-Level Areas" was established to consider the best way to deal with storm surges in below-sea-level areas in Japan.

The way how Japan should deal with storm surges was discussed and, summarized in recommendations in 2006.

Therefore, the Chubu Regional Bureau of the MLIT established the "Tokai Nederland Storm Surge and Flood Area Council (hereinafter referred to as TNT)" for the purpose of minimizing the damage by the cooperation of the related organizations.

In the case of

- the large-scale and wide-area inundation damage by the storm surge
- the flood which exceeds the planned scale

in the below-sea-level zone of Tokai region, and the examination is being carried out centering on the operation of information sharing, transmission and evacuation in the stage before the disaster.

TNT consists of 53 organizations concerned and academic experts as facilitators.

Currently, the TNT is considering a system to encourage residents to evacuate from a wide area from an early stage; before the typhoon hits.

In this session, the discussion and exchange views on issues in the previous session would be expected.

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Oral Sessions | Session

[O2-10]

## Enhancing Resilience of Coastal Communities through Reduction of Ocean Risks

Mon. Nov 11, 2019 5:30 PM - 7:00 PM Room 2 (Tachibana)

The Ocean Policy Research Institute, Sasakawa Peace Foundation

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### [O2-10-01] Enhancing Resilience of Coastal Communities through Reduction of Ocean Risks

\*Nagisa YOSHIOKA<sup>1</sup>, Atsushi WATANABE<sup>1</sup>, Hajime TANAKA<sup>1</sup>, Osamu MATSUDA<sup>2</sup>, Hiroshi TAKAGI<sup>3</sup>, Marlon de Luna ERA<sup>4</sup>, Riyanti DJALANTE<sup>5</sup> (1. The Ocean Policy Research Institute, Sasakawa Peace Foundation, 2. Hiroshima University, 3. Tokyo Institute of Technology, 4. De La Salle University, 5. United Nations University )

5:30 PM - 7:00 PM

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5:30 PM - 7:00 PM (Mon. Nov 11, 2019 5:30 PM - 7:00 PM Room 2)

## [O2-10-01] Enhancing Resilience of Coastal Communities through Reduction of Ocean Risks

\*Nagisa YOSHIOKA<sup>1</sup>, Atsushi WATANABE<sup>1</sup>, Hajime TANAKA<sup>1</sup>, Osamu MATSUDA<sup>2</sup>, Hiroshi TAKAGI<sup>3</sup>, Marlon de Luna ERA<sup>4</sup>, Riyanti DJALANTE<sup>5</sup> (1. The Ocean Policy Research Institute, Sasakawa Peace Foundation, 2. Hiroshima University, 3. Tokyo Institute of Technology, 4. De La Salle University, 5. United Nations University )

Keywords: Ocean Risks, Coastal Community Resilience, Southeast Asia

Coastal communities are threatened by various ocean-related disaster risks such as tsunamis, storm surges, rising sea-levels, etc. To combat or adapt to these ocean risks, it is an urgent task to consider policy or research priorities to reduce these damages and enhance resilience of the communities. Japan and Southeast Asian countries such as Indonesia and the Philippines are particularly susceptible or vulnerable to the ocean risks, and thus can share the experiences in common and discuss the way towards the resilient coastal areas in the region. We will invite researchers working in these areas from various disciplines such as marine science, engineering, economics, and international development fields to discuss topics including ecosystem-base disaster risk reduction (Eco-DRR), mixture of green and gray infrastructures, and blue financing for reducing ocean risks in transdisciplinary ways.

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Oral Sessions | Session

[O2-11]

## Recent Progress of the Global Centre for Disaster Statistics(GCDS)

Mon. Nov 11, 2019 8:30 AM - 10:00 AM Room 3 (Hagi)

Tohoku University- IRIDeS

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### [O2-11-01] Recent Progress of the Global Centre for Disaster Statistics (GCDS)

\*Daisuke Sasaki<sup>1</sup>, \*Yuichi Ono<sup>1</sup>, \*Makoto Okumura<sup>1</sup>, \*Rajesh Sharma<sup>2</sup>, \*Sogo Fujisaki<sup>3</sup>, \*Hidemi Tanaka<sup>3</sup>, \*Hiroaki Ishiwata<sup>4</sup> (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. United Nations Development Programme (UNDP), 3. Fujitsu Limited, 4. Pacific Consultants Co., Ltd.)

8:30 AM - 10:00 AM

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8:30 AM - 10:00 AM (Mon. Nov 11, 2019 8:30 AM - 10:00 AM Room 3)

## [O2-11-01] Recent Progress of the Global Centre for Disaster Statistics (GCDS)

\*Daisuke Sasaki<sup>1</sup>, \*Yuichi Ono<sup>1</sup>, \*Makoto Okumura<sup>1</sup>, \*Rajesh Sharma<sup>2</sup>, \*Sogo Fujisaki<sup>3</sup>, \*Hidemi Tanaka<sup>3</sup>, \*Hiroaki Ishiwata<sup>4</sup> (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. United Nations Development Programme (UNDP), 3. Fujitsu Limited, 4. Pacific Consultants Co., Ltd.)  
Keywords: Global Centre for Disaster Statistics (GCDS), Sendai Framework, Disaster Loss Database (GDB), Evidence-Based Policy Making (EBPM), Disaster Science

Four years have passed since the Global Centre for Disaster Statistics (GCDS) was established jointly by Tohoku University, the United Nations Development Programme (UNDP), and Fujitsu Limited. The GCDS aims at supporting the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) in the monitoring and evaluation of progress by providing support at country level for capacity building in developing national statistics on disaster damage and by establishing an improved global database (GDB). Furthermore, the GCDS is supposed to contribute to the evidence-based policy making by national and/or local governments. Under these circumstances, our session spotlights the following progress recently achieved at the GCDS. Firstly, a detailed presentation regarding the GDB newly developed at the GCDS will be given by Fujitsu Limited. It is considered that all of the following requirements: (i) including small-scale disasters, (ii) being officially authorized by the governments, (iii) applying standardized criteria to all countries, and (iv) holding sufficient cross sectional and time series data, need to be satisfied to meet the request for monitoring the progress in achieving the SFDRR global targets. Secondly, a couple of presentations concerning the achievement of statistical analysis will be conducted. The special issues on the development of disaster statistics already published in the Journal of Disaster Research are also supposed to be introduced in terms of application to the evidence-based policy making. At the end of the session, some of the pilot countries at the GCDS will state their comprehensive views on the recent progress achieved at the GCDS so far.

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Oral Sessions | Session

[O2-13]

## Variation of Build-Back-Better: Asian Perspectives

Mon. Nov 11, 2019 1:30 PM - 3:00 PM Room 3 (Hagi)

Kobe University

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### [O2-13-01] Variation of Build-Back-Better: Asian Perspectives

\*Toshihisa Toyoda<sup>1</sup>, Teuku Alvisyahrin<sup>2</sup>, Linsheng Gu<sup>3</sup>, Win Ohnmar<sup>4</sup>, Katsumi Matsuoka<sup>5</sup>,  
Tara Nidhi Lohani<sup>1</sup>, Shinya Horie<sup>1</sup> (1. Kobe University, 2. Syia Kuala University, 3. Sichuan  
Institute of Administration, 4. Department of Disaster Management of Myanmar Government,  
5. Iwate University)

1:30 PM - 3:00 PM



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1:30 PM - 3:00 PM (Mon. Nov 11, 2019 1:30 PM - 3:00 PM Room 3)

## [O2-13-01] Variation of Build-Back-Better: Asian Perspectives

\*Toshihisa Toyoda<sup>1</sup>, Teuku Alvisyahrin<sup>2</sup>, Linsheng Gu<sup>3</sup>, Win Ohnmar<sup>4</sup>, Katsumi Matsuoka<sup>5</sup>, Tara Nidhi Lohani<sup>1</sup>, Shinya Horie<sup>1</sup> (1. Kobe University, 2. Syia Kuala University, 3. Sichuan Institute of Administration, 4. Department of Disaster Management of Myanmar Government, 5. Iwate University)

Keywords: Build Back Better, Sendai Framework, Asian views, hard and soft measures, Japan's characteristics of BBB

### Panel Discussion

**Outline:** Although the Sendai Framework on Disaster Risk Reduction explicitly mentioned to the issues of disaster recovery under the slogan (Article 4) of “Build Back Better,” varieties of interpretation have been given to articulate this concept into each domestic context. For the purpose of identifying the common social phenomena and challenges in the phase of post-disaster recovery across Asia, we will explore the issues of institutions and policies in the post-disaster recovery phases of major disasters in Asia. Following the keynote speech by Prof. T. Toyoda, 6 international panelists will discuss on varieties of the BBB notion peculiar to each country. The nationalities of the panelists include China, Indonesia, Nepal, Myanmar in addition to Japan. Prof. Y. Kaneko will serve as coordinator.

**Cordinator:** Yuka Kaneko (Kobe University)

**Organizer:** Center for Social Systems Innovation, Kobe University

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Oral Sessions | Session

[O2-14]

## Technology and disaster management education for "adult"

Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 3 (Hagi)

Institute of Industrial Science, The University of Tokyo

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[O2-14-01] Technology and disaster management education for “adult”

\*Muneyoshi Numada<sup>1</sup> (1. Institute of Industrial Science, The University of Tokyo)

3:30 PM - 5:00 PM

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3:30 PM - 5:00 PM (Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 3)

## [O2-14-01] Technology and disaster management education for “adult”

\*Muneyoshi Numada<sup>1</sup> (1. Institute of Industrial Science, The University of Tokyo)

Keywords: Disaster management education, technology, Virtual Reality (VR), Disaster Management Training Center (DMTC)

In this session, we would like to discuss disaster management education for adults in the future. There are various initiatives for disaster management education for children, but as technology and digital content with experiences such as VR are developing, we would like to reconsider how disaster management education should be for adults in the point of a long-term perspective.

Eight years have passed since the 2011 Great East Japan Earthquake disaster, but inefficient responses have been carried out in recent disaster fields due to the lack of basic knowledge on disaster management and no-experience/ no- physical training in basic operations. According to the percentage of entrants to short-term higher education institutions over 25 years old (OECD, 2014), the average of OECD is 37.4%, while Japan is only 4.6%. Although there are factors such as difficulty in making study time and insufficient educational environment for adults, normally “general adults” will stop studying after starting their business.

Currently, various educational methods such as active learning, STEM education, and recurrent education are starting, and advanced technologies and rich digital contents such as VR and e-learning have been developed. In this situation, we want to discuss what kinds of the educational system are suitable for adults to enhance creativity, judgment, problem-solving, and execution capacities.

[O2-15]

## Fostering U-Inspire alliance- Youth and young professionals in Science, Engineering, Technology, and Innovation for DRR in Asia and the Pacific

Mon. Nov 11, 2019 5:30 PM - 7:00 PM Room 3 (Hagi)

UNESCO

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### [O2-15-01] Fostering U-INSPIRE Alliance - Asia and the Pacific youth and young professionals in Science, Engineering, Technology, and Innovation for DRR

Sachi Suzuki<sup>1</sup>, \*Mizan Bustanul Fuady Bisri<sup>5,7,9</sup>, \*Ranit Chatterjee<sup>4,6,9</sup>, \*Reza Abedi<sup>10,11</sup>, \*Glenn Fernandez<sup>3,8,9</sup>, \*Li Fan<sup>3</sup>, \*Anna Shinka<sup>2</sup>, \*Yu Watanabe<sup>2</sup> (1. UNESCO, 2. International Research Institute for Disaster Science (IRIDeS), Tohoku University, 3. Sichuan University-Hong Kong Polytechnic University Institute for Disaster Management and Reconstruction, 4. CRRP (U-INSPIRE India), 5. UNU-IAS, 6. Kyoto University, 7. U-INSPIRE Indonesia, 8. U-INSPIRE Philippines, 9. IRDR Young Scientist, 10. U-INSPIRE Malaysia, 11. Malaysian Youth Delegation)

5:30 PM - 7:00 PM

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5:30 PM - 7:00 PM (Mon. Nov 11, 2019 5:30 PM - 7:00 PM Room 3)

## **[O2-15-01] Fostering U-INSPIRE Alliance - Asia and the Pacific youth and young professionals in Science, Engineering, Technology, and Innovation for DRR**

Sachi Suzuki<sup>1</sup>, \*Mizan Bustanul Fuady Bisri<sup>5,7,9</sup>, \*Ranit Chatterjee<sup>4,6,9</sup>, \*Reza Abedi<sup>10,11</sup>, \*Glenn Fernandez<sup>3,8,9</sup>, \*Li Fan<sup>3</sup>, \*Anna Shinka<sup>2</sup>, \*Yu Watanabe<sup>2</sup> (1. UNESCO, 2. International Research Institute for Disaster Science (IRIDeS), Tohoku University, 3. Sichuan University-Hong Kong Polytechnic University Institute for Disaster Management and Reconstruction, 4. CRRP (U-INSPIRE India), 5. UNU-IAS, 6. Kyoto University, 7. U-INSPIRE Indonesia, 8. U-INSPIRE Philippines, 9. IRDR Young Scientist, 10. U-INSPIRE Malaysia, 11. Malaysian Youth Delegation)

Keywords: youth and young professionals, Science, Engineering, Technology, and Innovation (SETI)

U-INSPIRE is a platform to enable practical engagement of youth and young professionals in applying their Science, Engineering, Technology, and Innovation to support Disaster Risk Reduction (DRR). Originally started in 2018 from Indonesia with support from UNESCO, the platform is currently expanding its chapters in Pakistan, Nepal, Kazakhstan, Malaysia, India, and Philippines. The session consists of reports of DRR initiatives around U-INSPIRE and a focus group discussion. Reports include key practices from U-INSPIRE Indonesia, India, Malaysia and the Philippines, and information sharing from youth and young professionals from China and Japan, as well as a report of the latest toolkit development workshop held on 20-21 September 2019 in Jakarta. In the following focus discussion, all the participants and presenters will be divided into groups to discuss potential area of work in the countries where U-INSPIRE chapter is not yet established, opportunity and potential collaboration for U-INSPIRE Alliance, U-INSPIRE's link and contribution to SFDRR.

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Oral Sessions | Session

[O2-16]

## The tale of the two 2018 tsunamis in Indonesia from a health perspective.

Mon. Nov 11, 2019 8:30 AM - 10:00 AM Room 4 (Shirakashi 1)

The City University of Hong Kong

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### [O2-16-01] The tale of the two 2018 tsunamis in Indonesia from a health perspective.

\*Masdalina Pane<sup>2,3,4</sup>, \*Fiona Yin Mei Kong<sup>1</sup>, \*Tri Bayu<sup>5,3</sup>, \*Mugi Wahidin<sup>2,3</sup> (1. The Center for Applied One Health Research and Policy Advice, City University of Hong Kong, 2. The National Institute of Health Research and Development, Ministry of Health, Republic of Indonesia, 3. Perhimpunan Ahli Epidemiologi Indonesia (PAEI), 4. Sari Mutiara Indonesia University, 5. Sumatera Utara Islamic State University)

8:30 AM - 10:00 AM

8:30 AM - 10:00 AM (Mon. Nov 11, 2019 8:30 AM - 10:00 AM Room 4)

## [O2-16-01] The tale of the two 2018 tsunamis in Indonesia from a health perspective.

\*Masdalina Pane<sup>2,3,4</sup>, \*Fiona Yin Mei Kong<sup>1</sup>, \*Tri Bayu<sup>5,3</sup>, \*Mugi Wahidin<sup>2,3</sup> (1. The Center for Applied One Health Research and Policy Advice, City University of Hong Kong, 2. The National Institute of Health Research and Development, Ministry of Health, Republic of Indonesia, 3. Perhimpunan Ahli Epidemiologi Indonesia (PAEI), 4. Sari Mutiara Indonesia University, 5. Sumatera Utara Islamic State University)

Keywords: tsunami , health capacities, disaster preparedness and mitigation, local health system

In 2018, there were two main destructive tsunamis in Indonesia. The first occurred in the Donggala Regency (Central Sulawesi province) in September and the second along the Sunda Strait (coastal regions of Banten and Lampung provinces) in December. In Donggala regency, the landslides, liquefaction and tsunami caused a total of 2,830 fatalities, 701 missing, 2,537 seriously injured and an estimated 1,016 victims buried in liquefaction. In Sunda Strait, there were 437 fatalities, 16 missing, 14,059 injured and 33,719 internally displaced persons (IDPs) due to the holiday peak season and festivities on the beaches. Due to the large numbers of IDPs, there was a high risk of both epidemic-prone and vaccine-preventable diseases (VPDs) as most areas had WASH issues, endemic vector-borne diseases, and less than 90% immunization coverage. The disaster preparedness and mitigation plans were limited to none in the affected districts and sub-districts which was further exacerbated by the manpower issues, lack of surge capacity in the local health system, and infrastructure damages. The aim is to detail the coping mechanisms and challenges for the health system and its capacities in a lower-middle-income country (LMIC) during a disaster based on the field assessments. The proposed session will be divided into four 20-25 minute components which will focus on: (1) the initial disaster assessments and how the assessments were further refined in the second tsunami; (2) an in-depth analysis of the impact on the local health systems and capacities in both areas (from the acute phase to a month); (3) the contribution of the NGOs to the acute phase of the disasters and the challenges which need to be further explored; (3) the comparison of health projections with ongoing issues in the recovery process; and conclude with (4) the lessons learnt to inform disaster risk reduction for similar high risk areas.

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Oral Sessions | Session

[O2-17]

## Health System Disruption at Primary Health Center Level Affected by Earthquake, Tsunami, and Liquefaction in Three Districts of Central Sulawesi, Indonesia

Mon. Nov 11, 2019 10:30 AM - 12:00 PM Room 4 (Shirakashi 1)

Ministry of Health

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### [O2-17-01] Health System Disruption at Primary Health Center Level Affected by Earthquake, Tsunami, and Liquefaction in Three Districts of Central Sulawesi, Indonesia

\*Mugi Wahidin<sup>1,2,3</sup>, Masdalina Pane<sup>1,4,3</sup>, Tri Bayu Purnama<sup>5</sup>, Siti Maemun<sup>6</sup> (1. NIHRD, Ministry of Health, Indonesia, 2. University of Esa Unggul, Jakarta, Indonesia, 3. Indonesia Epidemiological Association, 4. Sari Mutiara Indonesia University, Medan, Indonesia, 5. Islamic State University, North Sumatera, Indonesia, 6. Sulianti Saroso Center of Infectious Disease Hospital, Jakarta, Indonesia)

10:30 AM - 12:00 PM



10:30 AM - 12:00 PM (Mon. Nov 11, 2019 10:30 AM - 12:00 PM Room 4)

## [O2-17-01] Health System Disruption at Primary Health Center Level Affected by Earthquake, Tsunami, and Liquefaction in Three Districts of Central Sulawesi, Indonesia

\*Mugi Wahidin<sup>1,2,3</sup>, Masdalina Pane<sup>1,4,3</sup>, Tri Bayu Purnama<sup>5</sup>, Siti Maemun<sup>6</sup> (1. NIHRD, Ministry of Health, Indonesia, 2. University of Esa Unggul, Jakarta, Indonesia, 3. Indonesia Epidemiological Association, 4. Sari Mutiara Indonesia University, Medan, Indonesia, 5. Islamic State University, North Sumatera, Indonesia, 6. Suliarti Saroso Center of Infectious Disease Hospital, Jakarta, Indonesia)

Keywords: health system disruption, earthquake, tsunami, liquefaction, primary health center

Indonesia is the country which has many natural disasters lately. One of the biggest disasters occurred on 28 September 2018, an earthquake followed by tsunami and liquefaction. These disasters caused serious damage, including health system and facilities, especially primary health centers (PHC). This study aimed to know health disruption at primary health center level due to the disaster. This was a qualitative study conducted in March 2019 involving 36 PHCs of three districts (Palu, Sigi, Donggala) in Central Sulawesi province. Data collected through interview to PHC officers using questionnaire adopted from Public Health Situation Analysis, WHO. Variables to be analyzed were disruption on management, budget, human resources, drug supply, Early Warning Alert and Response System (EWARS) of epidemic prone disease (EPD), human resource migration, health facility damage, and health facility access. These variables categorized to red, orange, yellow, and green related to functionality and access to health care. Red means it was majority non functional and non accessible, orange means minor substantial non functional and non accessible, yellow means small non functional, and green means majority functional and accessible. The disruption was also projected for 1 upcoming year after disaster. Result of the study showed that the health system disruption occurred in Palu District was management, budget, human resources, EPD EWARS, health facility damage, and health access. These occurred within 1-2 months and projected become better after 6 months. Problems in Sigi District were management, human resources, drug supply, and EPD EWARS for 1 month after disaster and projected to be better after 2 months. Meanwhile, the problem in Donggala District were health services access, management, human resources for 1 month after disaster, and projected to be normal after 2 months.

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Oral Sessions | Session

[O2-18]

## Participatory Monitoring of Health Security by Nurses for Disaster Risk Reduction

Mon. Nov 11, 2019 1:30 PM - 3:00 PM Room 4 (Shirakashi 1)

University of Kochi, Japan

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### [O2-18-01] Participatory Monitoring of Health Security by Nurses for Disaster Risk Reduction

Sushila Paudel<sup>4</sup>, \*Sakiko Kanbara<sup>1</sup>, Ma. Regina E. Estuar<sup>2</sup>, Shoko Miyagawa<sup>3</sup>, Hyeon Ju Lee<sup>1</sup>, Ngatu Rogers<sup>5</sup> (1. Univ. of Kochi, Japan, 2. Ateneo de Manila Univ., Philippines, 3. Keio Univ., Japan, 4. Nursing Association of Nepal, 5. Congo Heiwa Mura, Congo)

1:30 PM - 3:00 PM

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1:30 PM - 3:00 PM (Mon. Nov 11, 2019 1:30 PM - 3:00 PM Room 4)

## [O2-18-01] Participatory Monitoring of Health Security by Nurses for Disaster Risk Reduction

Sushila Paudel<sup>4</sup>, \*Sakiko Kanbara<sup>1</sup>, Ma. Regina E. Estuar<sup>2</sup>, Shoko Miyagawa<sup>3</sup>, Hyeon Ju Lee<sup>1</sup>, Ngatu Rogers<sup>5</sup>  
(1. Univ. of Kochi, Japan, 2. Ateneo de Manila Univ., Philippines, 3. Keio Univ., Japan, 4. Nursing Association of Nepal, 5. Congo Heiwa Mura, Congo)

Keywords: Participatory monitoring, Health Security, Nursing, GIS

In this session, 6 presenters from RC Congo, the Philippines, Nepal, and Japan will present the conceptual framework, theoretical approaches, and health security related practices toward disaster risk reduction through a case project called EpiNurse Nepal. Based on concepts from epidemiology and nursing, EpiNurse was established among local nurses who act as the main informants of health monitoring. They function as health security keepers in communities where health services are scarce. Local nurses understand the language, culture, and needs and resources of their community; they can assess the living environment, identify high risk populations and needs, help restore public health in post-disaster conditions, and communicate information with concerned authorities at the local and national level, “leaving no one behind”. In Nepal, EpiNurse was launched immediately after the 2015 earthquake. Geospatial information technology for community nursing was incorporated. This is an innovative approach to an early health risk case findings. Monitoring was conducted by trained local nurses using the toolkit for 4 months at 24 camps in 10 affected districts. This local participatory approach helps in visualizing disaster health risks to monitoring in line with Sendai Framework for disaster risk reduction, sustainable development goals and promote sustainable human security. This initiative was endowed with funding from Munich Re Foundation as the winner of “Risk Award 2017”. To sustain globally, the toolkits and manuals are revised taking considerations into global standards such as WHO Minimum data set; ICN disaster nursing competencies; sphere standard, and setting them as an open source.

[O2-19]

Immediate capacity assessment of infectious disease surveillance officer after disaster in Central Sulawesi Province earthquake and tsunami, Indonesia

Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 4 (Shirakashi 1)

Islamic State University of North Sumatera, Medan, Indonesia

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[O2-19-01] Immediate capacity assessment of infectious disease surveillance officer after disaster in Central Sulawesi Province earthquake and tsunami, Indonesia

\*Tri Bayu Purnama<sup>1,2</sup>, \*Masdalina Pane<sup>3,2</sup>, Siti Maemun<sup>4,2</sup> (1. Islamic State University of North Sumatera, Medan, Indonesia, 2. Indonesian Epidemiological Association, 3. National Institute of Health Research and Development, Ministry of Health, Indonesia, 4. Prof Sulianti Saroso Infectious Disease Hospital, Indonesia)

3:30 PM - 5:00 PM

3:30 PM - 5:00 PM (Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 4)

## [O2-19-01] Immediate capacity assessment of infectious disease surveillance officer after disaster in Central Sulawesi Province earthquake and tsunami, Indonesia

\*Tri Bayu Purnama<sup>1,2</sup>, \*Masdalina Pane<sup>3,2</sup>, Siti Maemun<sup>4,2</sup> (1. Islamic State University of North Sumatera, Medan, Indonesia, 2. Indonesian Epidemiological Association, 3. National Institute of Health Research and Development, Ministry of Health, Indonesia, 4. Prof Sulianti Saroso Infectious Disease Hospital, Indonesia)  
Keywords: Infectious disease, Surveillance, Disease related disaster prevention

Infectious disease spreading among internal displaced person (IDPs) remains serious problem in post disaster event. Increasing number of infectious diseases and death cases due to lack of surveillance monitoring and surveillance officer capacities negatively associated with daily surveillance monitoring at affected public health center area. This study aimed to assess infectious diseases capacities and to identify issues emerged among surveillance officer at post disaster event. In this study, we obtained the data from all surveillance officer (50 subject) in affected areas that located in Palu, Sigi and Donggala, Province of Central Sulawesi, Indonesia after 60 days sudden of disaster. Short message service was applied in this study due to lack of internet connection and unconnected road after disaster hit these areas. Almost 50% of total surveillance officer in Palu affected the tsunami and earthquake and it caused the shut down of infectious disease surveillance in Palu for 2 weeks after sudden of disaster. Of 90% surveillance officers had taken responsibility to giving assistance to other department in public health center. There was no supporting surveillance equipment available in Sigi and Palu in order to report surveillance data. Approximately 10% of total surveillance officers was trained for surveillance in general setting and no information available about number of surveillance officer had trained with post disaster surveillance. During the disaster, loss of internet connection and unconnected networks accented low reporting of completeness and timeliness of infectious disease surveillance system. Post disaster training and manual guideline for reporting system is needed to monitor infectious disease circulating in shelter and temporary housing. To extend the reporting system while there was no internet connection and transportation available is essential part to improve the post disaster surveillance system.

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Oral Sessions | Session

[O2-22]

## Innovative remote sensing technologies for enhancing disaster management

Mon. Nov 11, 2019 10:30 AM - 12:00 PM Room 5 (Shirakashi 2)

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### [O2-22-01] Innovative remote sensing technologies for enhancing disaster management

\*Shunichi Koshimura<sup>1</sup>, \*Naoto Yokoya<sup>2</sup>, \*Christian Geiß<sup>3</sup>, \*Marc Wieland<sup>3</sup>, \*Fumio Yamazaki<sup>4</sup>, \*Hiroyuki Miura<sup>5</sup>, Günter Strunz<sup>3</sup>, Erick Mas<sup>1</sup> (1. International Research Institute of Disaster Science, Tohoku University, Japan, 2. RIKEN AIP Center, Japan, 3. German Aerospace Center, Germany, 4. National Research Institute for Earth Science and Disaster Resilience, Japan, 5. Graduate School of Engineering, Hiroshima University, Japan)

10:30 AM - 12:00 PM

10:30 AM - 12:00 PM (Mon. Nov 11, 2019 10:30 AM - 12:00 PM Room 5)

## [O2-22-01] Innovative remote sensing technologies for enhancing disaster management

\*Shunichi Koshimura<sup>1</sup>, \*Naoto Yokoya<sup>2</sup>, \*Christian Geiß<sup>3</sup>, \*Marc Wieland<sup>3</sup>, \*Fumio Yamazaki<sup>4</sup>, \*Hiroyuki Miura<sup>5</sup>, Günter Strunz<sup>3</sup>, Erick Mas<sup>1</sup> (1. International Research Institute of Disaster Science, Tohoku University, Japan, 2. RIKEN AIP Center, Japan, 3. German Aerospace Center, Germany, 4. National Research Institute for Earth Science and Disaster Resilience, Japan, 5. Graduate School of Engineering, Hiroshima University, Japan)

Keywords: Remote Sensing, Geoscience, Data Fusion

Thanks to recent advances and improvements in satellite sensors, data accessibility, applications and services, many space agencies support data-sharing policies that facilitate access to remotely-sensed data for more efficient use in disaster management. Tremendous progress has been made with sophisticated methods to analyze imageries and geospatial data in near real-time via geo-web-services and crowd-sourcing, and those can be used in disaster management and emergency response. Satellite earth observations achieved consistent and repeated coverage of the world, and that makes it possible to understand and share disaster impacts among the countries, regardless of time and weather conditions.

This session aims to provide state-of-the-art technologies and recommended practices on how the integration of Earth Observation and satellite-based technologies into enhancing disaster management. Part of this session's outcomes will be considered to be published in the Special Issue "Advances in Remote Sensing for Disaster Research: Methodologies and Applications" in Remote Sensing (ISSN 2072-4292), a peer-reviewed open access journal of MDPI, one of the media partners of WBF2019.

Keynote and invited presentations are as follows;

### Keynote Presentation

Naoto Yokoya (RIKEN), "Geospatial AI for Disaster Damage Assessment"

### Invited Presentations

Marc Wieland (German Aerospace Center), "Towards Operational Flood Monitoring based on Multi-Sensor Satellite Data "

Christian Geiss (German Aerospace Center), "Collective Sensing Techniques for Exposure Estimation"

Fumio Yamazaki (National Research Institute for Earth Science and Disaster Resilience), "Value of on Site and Airborne Sensing for Ground Truth"

Hiroyuki Miura (Hiroshima Univ.), "Remote Sensing and DEM-based Approach for Debris Flow Assessment"

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Oral Sessions | Session

[O2-24]

## Is relocation an effective solution to increased coastal community resilience? Sharing international perspectives

Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 5 (Shirakashi 2)

Tohoku University- IRIDeS

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### [O2-24-01] Is relocation an effective solution to increased coastal community resilience? Sharing international perspectives

\*Kanako Iuchi<sup>1,2</sup>, \*Robert Olshansky<sup>5</sup>, \*Michio Ubaura<sup>3,1</sup>, \*Wiriya Puntub<sup>4</sup>, \*Margaret Arnold<sup>6</sup>, \*Paivi Koskinen-Lewis<sup>6</sup> (1. International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster Science, Tohoku University, 3. Department of Architecture and Building Science, Tohoku University, 4. Technical University of Dortmund, 5. University of Illinois at Urbana-Champaign, 6. World Bank)

3:30 PM - 5:00 PM



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3:30 PM - 5:00 PM (Mon. Nov 11, 2019 3:30 PM - 5:00 PM Room 5)

## [O2-24-01] Is relocation an effective solution to increased coastal community resilience? Sharing international perspectives

\*Kanao Iuchi<sup>1,2</sup>, \*Robert Olshansky<sup>5</sup>, \*Michio Ubaura<sup>3,1</sup>, \*Wiriya Puntub<sup>4</sup>, \*Margaret Arnold<sup>6</sup>, \*Paivi Koskinen-Lewis<sup>6</sup> (1. International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster Science, Tohoku University, 3. Department of Architecture and Building Science, Tohoku University, 4. Technical University of Dortmund, 5. University of Illinois at Urbana-Champaign, 6. World Bank)

Keywords: Relocation, Coastal resilience, Sustainable community

Coastal regions are home to a large and growing population around the world. According to the United Nations (2017), about ten percent (or more than 600 million people) of the world's population now live in low-lying areas, or land less than 10 meters above sea level. Coastal zones are increasingly occupied by the poor, who settle there seeking access to food, urban infrastructure, and economic systems. Climate change is adding another layer of complexity to coastal communities. Meteorological, geological, and hydrological phenomenon such as hurricanes and tropical cyclones, flood events, earthquakes, and El Nino and La Nina cause hazards such as storm surges, heavy rain, flooding, tsunamis, landslides, and erosion. Together with the growth of disadvantaged coastal populations, various hazards increase coastal vulnerability.

To counter this risk, relocation is considered a critical method for increasing resiliency. However, relocation is known to be disruptive, especially for a community's social network and economic well-being. Drawing from lessons learned from various efforts, there is an ongoing discussion on how to best implement relocation both pre- and post-disaster with the hope of mitigating future devastation. This session shares lessons learned, on various policies and its diverse impacts on communities. Presenters will share key findings that are critical when considering community relocation, focusing on cases from Puerto Rico (Caribbean), Leyte (the Philippines), and Tohoku (Japan) as well as policy findings from a cross-country analysis targeting different regions of the Americas, Africa, Asia, Oceania, and Europe.

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Oral Sessions | Session

[O2-25]

## Planning for resettlement after disaster: Lessons from the case of Dar es Salaam, Tanzania

Mon. Nov 11, 2019 5:30 PM - 7:00 PM Room 5 (Shirakashi 2)

University of Grenoble Alpes & Technical University of Darmstadt

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### [O2-25-01] Planning for resettlement after disaster: Lessons from the case of Dar es Salaam, Tanzania

\*Venkata Narayanan AEKBOTE LAKSHMINARAYANAN<sup>1</sup> (1. University of Grenoble Alpes  
& Technical University of Darmstadt)

5:30 PM - 7:00 PM

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5:30 PM - 7:00 PM (Mon. Nov 11, 2019 5:30 PM - 7:00 PM Room 5)

## [O2-25-01] Planning for resettlement after disaster: Lessons from the case of Dar es Salaam, Tanzania

\*Venkata Narayanan AEKBOTE LAKSHMINARAYANAN<sup>1</sup> (1. University of Grenoble Alpes & Technical University of Darmstadt)

Keywords: Post-disaster resettlement, Resettlement challenges, Dar es Salaam, Tanzania

Post-disaster resettlement issues are becoming more important world-wide with the increasing number of disasters. The presentation is based on the doctoral research carried out by the author in Dar es Salaam (Tanzania), one of the fastest urbanising cities in Sub-Saharan Africa. It presents the challenges faced by the government authorities in the post-disaster resettlement process following the floods of 2011 and the experiences of the population since resettlement. On 20 December 2011, Dar es Salaam was subjected to massive flooding following unprecedented rains. The official death toll was 43 and over 50,000 persons were affected, among which about 10,000 people were displaced. As part of disaster recovery, the flood victims were accommodated in temporary camps and subsequently provided plots and resettled in Mabwepande, about 40 Kilometres from the Central Business District (CBD). However, this affected the livelihood opportunities of the flood victims, besides resulting in various other socio-economic challenges, leading to questions on the rationality of the resettlement measure. On the other hand, the local government that managed the process with limited financial resources, considers the measure favourably, despite the challenges in the process. The qualitative study brings out the reasons behind such diverse perceptions and the challenges involved in the resettlement process. Consequently, the presentation will throw light on the factors that need to be considered in planning towards resettlement after disaster in a developing country context. The presentation will conclude with lessons to learn from the case of Dar es Salaam.

## Poster Sessions

## Core Time

Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster &amp; Exhibition (Sakura)

**[P-01] TRACING 3.11.11**\*Akari Nakai Kidd<sup>1</sup>, \*Daniel Gibbs<sup>1</sup> (1. Deakin University, School of Architecture and Built Environment, Geelong, Australia)

12:15 PM - 1:15 PM

**[P-02] Joint Development and Implementation of a Community Engagement Model Practical Education Program Based on Disaster Response Expertise : Community Planner Training at Miyagi University and the University of Hyogo**\*Shun Nakazawa<sup>1</sup>, Yu Takahashi<sup>1</sup>, Kanae Sato<sup>1</sup>, Hideyuki Sasaki<sup>1</sup>, Masaharu Goko<sup>1</sup> (1. Miyagi University)

12:15 PM - 1:15 PM

**[P-03] Response of port infrastructure to tsunami impacts: Damage observations from the 2011 Tohoku tsunami**\*Constance Ting Chua<sup>1,2</sup>, Adam Douglas Switzer<sup>1,2</sup>, Anawat Suppasri<sup>3</sup>, Kwanchai Pakoksung<sup>3</sup>, Linlin Li<sup>2,4</sup>, David Lallemant<sup>1,2</sup>, Susanna Jenkins<sup>1,2</sup>, Amanda Cheong<sup>1</sup> (1. Asian School of the Environment, Nanyang Technological University, 2. Earth Observatory of Singapore, 3. International Research Institute of Disaster Science, Tohoku University, 4. Department of Civil and Environmental Engineering, National University of Singapore)

12:15 PM - 1:15 PM

**[P-04] National Diet Library Great East Japan Earthquake Archive: HINAGIKU**\*Hiroshi Maeda<sup>1</sup> (1. National Diet Library, Japan)

12:15 PM - 1:15 PM

**[P-05] Tsunami Simulation in the 28 September 2018 Palu Bay, Indonesia, Using Submarine Landslide Source and Two-layer Depth-integrated Modeling**\*kwanchai pakoksung<sup>1</sup>, Anawat Suppasri<sup>1</sup>, Fumihiko Imamura<sup>1</sup>, Cipta Athanasius<sup>2</sup>, Amalfi Omang<sup>2</sup>, Abdul Muhari<sup>3</sup> (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Center for Volcanology and Geological Hazard Mitigation, Geological Agency of Indonesia, Bundung, Indonesia, 3. Coastal Disaster Mitigation Division, Ministry of Marine Affairs and Fisheries, Jakarta, Indonesia)

12:15 PM - 1:15 PM

**[P-06] Spatial distribution of cause of death based on resident address of the deceased in the 2011 Tohoku Tsunami: A case study of Ishinomaki City, Miyagi prefecture**\*Tomoki Serikawa<sup>1</sup>, Shuji Seto<sup>2,3</sup>, Hirokazu Kamata<sup>4</sup>, Anawat Suppasri<sup>2,3</sup>, Fumihiko Imamura<sup>2,3</sup> (1. Graduate school of Engineering, Tohoku University, 2. International Research Institute of Disaster Science, Tohoku University, 3. Core Research Cluster of Disaster Science, Tohoku University, 4. School of Engineering, Tohoku University)

12:15 PM - 1:15 PM

**[P-07] Spanish cooperation in the field of training for disaster risk reduction in Latin America and the Caribbean**\*Jose Pastrana<sup>1,3</sup>, Angela Potenciano<sup>2</sup>, Elisa Gavari<sup>1</sup> (1. National Distance Education University (UNED), Spain, 2. National School of Civil Protection, Spain, 3. Consell Insular de Menorca, Spain)

12:15 PM - 1:15 PM

**[P-08] Cascading effects of tsunami disasters**

\*Anawat Suppasri<sup>1</sup>, Miwako Kitamura<sup>1</sup>, Syamsidik Syamsidik<sup>2</sup>, Abdul Muhari<sup>3</sup>, Fumihiko Imamura<sup>1</sup>, David Alexander<sup>4</sup> (1. Tohoku University, 2. Syiah Kuala University, 3. Ministry of Marine Affairs and Fisheries, Indonesia, 4. University College London)

12:15 PM - 1:15 PM

**[P-09] The cause of death analysis based on the deceased's data in the 2011 Tohoku Tsunami: A case study of Miyagi prefecture**

\*Shuji Seto<sup>1,2</sup>, Tomoki Serikawa<sup>3</sup>, \*Hirokazu Kamata<sup>4</sup>, Anawat Suppasri<sup>1,2</sup>, Fumihiko Imamura<sup>1,2</sup> (1. International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster Science, Tohoku University, 3. Graduate School of Engineering, Tohoku University, 4. School of Engineering, Tohoku University)

12:15 PM - 1:15 PM

**[P-10] The analysis of location data related to the deceased in the 2011 Tohoku Tsunami: A case study of Miyagi prefecture**

\*Shuji Seto<sup>1,2</sup>, Hirokazu Kamata<sup>4</sup>, Tomoki Serikawa<sup>3</sup>, Anawat Suppasri<sup>1,2</sup>, Fumihiko Imamura<sup>1,2</sup> (1. International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster Science, Tohoku University, 3. Graduate School of Engineering, Tohoku University, 4. School of Engineering, Tohoku University)

12:15 PM - 1:15 PM

**[P-11] A Case Study of Cooperation between Historians and Psychologists in Providing and Assessing Community Psychosocial Support in Tsunami-affected Areas**

\*Machiko Kamiyama<sup>1</sup>, Daisuke Sato<sup>1</sup>, Masae Sato<sup>3</sup>, John Morris<sup>2</sup> (1. International Research Institute of Disaster Research, Tohoku University, 2. Miyagi Gakuin Women's University, 3. Ishinomaki Senshu University)

12:15 PM - 1:15 PM

**[P-12] Fuel stocking proposal to connect life at the time of disaster**

\*mitsuaki kizaki<sup>1</sup> (1. NIPON BCP INC)

12:15 PM - 1:15 PM

**[P-13] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"**

Hiroaki Enoki<sup>1</sup>, \*Chikako Adachi<sup>1</sup> (1. All Japan Council Company)

12:15 PM - 1:15 PM

**[P-14] Making use of uncertain earthquake forecast information: Challenges toward disaster risk reduction against the anticipated Nankai Trough Earthquake (M8-M9), western Japan**

\*Yo Fukushima<sup>1</sup>, Hiroaki Maruya<sup>1</sup>, Makoto Okumura<sup>1</sup>, Motoyuki Kido<sup>1</sup>, Natsuko Chubachi<sup>1</sup>, Ryota Hino<sup>1</sup>, Kanan Hirano<sup>1</sup>, Shunichi Koshimura<sup>1</sup>, Miwa Kuri<sup>2</sup>, Shuji Moriguchi<sup>1</sup>, Yusaku Ohta<sup>1</sup>, Hiroyuki Sasaki<sup>1</sup>, Motoaki Sugiura<sup>1</sup>, Tetsuya Torayashiki<sup>3</sup>, Fumihiko Imamura<sup>1</sup> (1. Tohoku University, 2. Japan Meteorological Agency, 3. Disaster Reduction and Human Renovation Institution)

12:15 PM - 1:15 PM

**[P-15] Concepts of Urban System's Resilience and a Mathematical Model**

\*Yuto Shiozaki<sup>1</sup> (1. Kanazawa University)

12:15 PM - 1:15 PM

- [P-16] Study on Emergency Management Using Incident Response Log Classification Based on Activity Objectives  
\*Naoko Kosaka<sup>1</sup>, Takeshi Yamaguchi<sup>2</sup>, Tomohiro Kokogawa<sup>1</sup>, Satoshi Kubota<sup>1</sup>, Kentaro Inui<sup>2</sup> (1. NTT, 2. Tohoku university)  
12:15 PM - 1:15 PM
- [P-17] **BUILDING DISASTER RESILIENT COMMUNITIES THROUGH SERVICE LEARNING: REFLECTIONS AND LESSONS OF UNIVERSITY OF SANTO TOMAS NATIONAL SERVICE TRAINING PROGRAM CWTS/LTS**  
\*Adrian Dela Cruz Romero<sup>1</sup>, Sheila Masangkay<sup>1</sup>, Eric Aboboto<sup>1</sup>, Jasmin Victoria<sup>1</sup>, Justine Joseph Gopeng<sup>1</sup> (1. University of Santo Tomas)  
12:15 PM - 1:15 PM
- [P-18] Non-structural approach to volcanic disaster risk reduction through BOSAI project phase2 in Guatemala: activities for capacity development of communities, municipalities and national institution.  
Shusuke IRABU<sup>1</sup>, Nishikawa Tomoyuki<sup>2</sup>, Yoshitaka Yamazaki<sup>3</sup>, Jun Onodera<sup>4</sup>, Noritoshi Maehara<sup>5</sup>, Abraham Marroquin<sup>6</sup>, Edy Mardonado<sup>6</sup>, Mario Ovalle<sup>6</sup>, José Giron<sup>6</sup>, \*Yeison Carrera<sup>6</sup>, Sergio Cabañas<sup>6</sup> (1. Japan International Cooperation Agency, 2. Nippon Koei Co., Ltd., Japan, 3. OYO international corporation, Japan, 4. Earth Science System, Japan, 5. IDEA consultants, Japan, 6. Executive secretary of National Coordination for Disaster Risk Reduction (SE-CONRED), Guatemala)  
12:15 PM - 1:15 PM
- [P-19] Health-Related Studies After the Great East Japan Earthquake: A Literature Review  
\*Akiko ETO<sup>1</sup>, Yasuhiro KANATANI<sup>2</sup> (1. National Institute of Public Health, 2. Tokai University, School of Medicine)  
12:15 PM - 1:15 PM
- [P-20] The analysis of tsunami evacuation behavior considering tsunami victim' s data from a case study in Kesennuma city  
\*Anna Shinka<sup>1</sup>, Shosuke Sato<sup>2</sup>, Mizutani Daijiro<sup>2</sup>, Fumihiko Imamura<sup>2</sup> (1. Graduate School of Engineering, Tohoku University, 2. International Research Institute of Disaster Science)  
12:15 PM - 1:15 PM
- [P-21] Research on the education for disaster reduction: Effects of “ Starter Guide” shelter management game (HUG).  
\*Takeshi Miyawaki<sup>1</sup>, Atsushi Kimura<sup>1</sup> (1. Nihon university)  
12:15 PM - 1:15 PM
- [P-22] Personal Networks Among Selected Elderly in Post-Disaster Community in Tacloban City  
\*Reggy Capacio Figer<sup>1</sup> (1. Hokkaido University )  
12:15 PM - 1:15 PM
- [P-23] Emergency nutritional support in Japan: history, bottleneck, and future perspective with technology  
\*Kanao Masuno<sup>1</sup>, Mayu Yokota<sup>1</sup>, Ayako Shimizu<sup>1</sup>, Masako Yokotsuka<sup>1</sup> (1. Showa Women's University)  
12:15 PM - 1:15 PM
- [P-24] SEARCH (Search Engine for Research on Risk and Resilience) - CARI! (Cerdas Antisipasi Risiko Bencana di Indonesia)

\*MIZAN BUSTANUL FUADY BISRI<sup>1</sup> (1. United Nations University-Institute for the Advanced Study of Sustainability)

12:15 PM - 1:15 PM

[P-25] Toward Resilient cities: *disaster Risk Reduction* analysis of Urban Water Infrastructures in A Potential Earthquake (Case study: Region 2 of Tehran Municipality)

\*seyedmohsen alavi<sup>1</sup>, Mohammadreza Rezaei<sup>2</sup> (1. York University, 2. Yazd University)

12:15 PM - 1:15 PM

[P-26] Local production for local protection (*Chisan Chibo*) – Proposing a standardized local-level *bosai* operations from Tohoku

\*Fumihiko Imamura<sup>1</sup>, Kanako Iuchi<sup>1</sup> (1. Tohoku University)

12:15 PM - 1:15 PM

[P-27] **HERSTORY: FACILITATING PARTICIPATORY DISASTER RISK ASSESSMENT TO THE SINGLE-MOTHERS OF SUB-URBAN POOR RESETTLEMENT HOUSING IN PHILIPPINES**

\*Imelda N. Oponda<sup>1</sup>, \*Adrian Dela Cruz Romero<sup>2</sup>, Letecia Saju<sup>1</sup>, Anna Monica Octubre<sup>1</sup>, Lilia Mondano<sup>1</sup>, Lissa B. Palero<sup>1</sup>, Reyna Liza Borres<sup>1</sup>, Evangeline Piñero<sup>1</sup>, Synel Perante<sup>1</sup>, Evelyn Sibal<sup>1</sup>, Maria Villa Degumbis<sup>1</sup>, Jenelyn Cortes<sup>1</sup>, Yolanda Javier<sup>1</sup>, Norma Bernal<sup>1</sup>, Laurencia Daang<sup>1</sup>, Ruby Ana Bernardo<sup>3</sup>, Jolly M. Lugod<sup>3</sup>, Cedric Bermiso<sup>3</sup>, Wilmor Pacay<sup>3</sup> (1. Samahang Kamanlalakbay Phase 1k, Kasiglahan Village, Rodriguez, Rizal, 2. University of Santo Tomas National Service Training Program (NSTP CWTS/LTS), 3. Alliance of Concerned Teachers-Philippines)

12:15 PM - 1:15 PM

[P-28] **Climate Change Induced Rural Socio-Economic Vulnerability: An Empirical Regional Analysis from Sub-Himalayan West Bengal, India**

\*Manoranjan Ghosh<sup>1</sup> (1. Indian Institute of Technology Kharagpur)

12:15 PM - 1:15 PM

[P-29] Disaster Awareness Improvement by Flood Simulated Experience in Virtual Reality

\*Miho Ohara<sup>1</sup>, Daisuke Kuribayashi<sup>2</sup>, Masatoshi Denda<sup>1</sup>, Yoshimasa Morooka<sup>1</sup>, Tsuyoshi Koyabu<sup>3</sup> (1. International Centre for Water Hazard and Risk Management (ICHARM), Public Works Research Institute, Japan, 2. International Centre for Water Hazard and Risk Management (ICHARM), Public Works Research Institute, Japan (Previous), 3. Disaster Information System Division, IDEA Consultants, Inc.)

12:15 PM - 1:15 PM

[P-30] How to save people from earthquake?

\*Kazuo Sasaki<sup>1</sup>, Yamaimaiti Nizhamdong<sup>1</sup> (1. Challenge Co.,Ltd)

12:15 PM - 1:15 PM

[P-31] A proposed framework for clarifying consequence impacts chain of tsunami hazards on global seaborne network

\*An chi CHENG<sup>1</sup>, Takuro OTAKE<sup>2</sup>, Anawat SUPPASRI<sup>3</sup>, Fumihiko IMAMURA<sup>3</sup> (1. Graduate School of Civil Engineering, Tohoku University, 2. NTT Data Corporation, 3. International Research Institute of Disaster Science, Tohoku University)

12:15 PM - 1:15 PM

[P-32] **Long term recovery and resilience construct- The lessons learned from Jiji earthquake**

\*JIEHJIUH WANG WANG<sup>1</sup> (1. MING CHUAN UNIVERSITY)

12:15 PM - 1:15 PM

**[P-33] Fire Service experts enhancing bush fire disaster resilience education with Primary School Geography students: A case study from New South Wales, Australia**

\*Tony Jarrett<sup>1</sup> (1. School of Education and Arts, CQUniversity, Rockhampton, Australia)

12:15 PM - 1:15 PM

**[P-34] A review of stressors affecting organisational resilience of emergency facilities and infrastructure in cascading crises**

\*Gianluca Pescaroli<sup>1</sup>, David Alexander<sup>1</sup>, Virginia Murray<sup>2</sup> (1. Institute for Risk and Disaster Reduction, University College London, 2. Public Health England)

12:15 PM - 1:15 PM

**[P-35] Comprehensive Investigation of active faults and its impacts in South East Aceh Region**

\*Muksin Umar<sup>1,2</sup>, Ibnu Rusydy<sup>1</sup>, Wiwik Ayu Ningsih<sup>1,2</sup>, Andrean Simanjuntak<sup>1,3</sup>, Arifullah Arifullah<sup>1,2</sup>, Yunita Idris<sup>1</sup>, Irwandi Nurdin<sup>1,2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC), Universitas Syiah Kuala, Banda Aceh, Indonesia, 2. Department of Physics, Universitas Syiah Kuala, Banda Aceh, Indonesia, 3. Mata le Geophysical Station of BMKG Aceh, Aceh Besar, Indonesia)

12:15 PM - 1:15 PM

**[P-36] Investigating Planned Elevated Road for Mitigating Impacts of Tsunami on Banda Aceh, Indonesia**

\*Syamsidik Syamsidik<sup>1,3</sup>, Tursina Tursina<sup>1,3</sup>, Anawat Suppasri<sup>2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC) of Universitas Syiah Kuala, Banda Aceh-Indonesia, 2. International Research Institute of Disaster Science (IRIDeS) of Tohoku University, Japan, 3. Civil Engineering of Universitas Syiah Kuala, Banda Aceh-Indonesia)

12:15 PM - 1:15 PM

**[P-37] AN OVERVIEW OF POST-DISASTER RISKS TO SCHOOL FACILITIES IN ACEH PROVINCE OF INDONESIA**

\*Ella Meilianda<sup>1,3</sup>, Yunita Idris<sup>1,3</sup>, Roberto Gentile<sup>2</sup>, Carmine Galasso<sup>2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC) Syiah Kuala University, 2. University College London, 3. Civil Engineering Department, Engineering Faculty, Syiah Kuala University)

12:15 PM - 1:15 PM

**[P-38] Extreme weather, displacement, and conflict: New insights from Somalia**

\*Christian Webersik<sup>1,2,3</sup>, Lisa Thalheimer<sup>4</sup>, Felix Pretis<sup>5</sup>, Simon Abele<sup>6</sup>, Friederike E. L. Otto<sup>4</sup> (1. University of Agder, Norway, 2. Centre for Integrated Emergency Management (CIEM), Norway, 3. Disaster Research Unit, Freie Universität Berlin, Germany, 4. Environmental Change Institute, University of Oxford, UK, 5. Department of Economics, University of Victoria, Canada, 6. School of Geography and the Environment, University of Oxford, UK)

12:15 PM - 1:15 PM

**[P-39] Using tsunami deposits and modeling to study tsunami history and sources in Washington State, USA**

\*Carrie Garrison-Laney<sup>1</sup> (1. Washington Sea Grant/Univ. of Washington)

12:15 PM - 1:15 PM



**[P-40] Typhoon Wind Speed VS. Storm Surge Inundation: Understanding Risk of Building Damage from Statistical Analysis**

\*Natt Leelawat<sup>1</sup>, Tanaporn Chaivutitorn<sup>1</sup>, Thawalrat Tanasakcharoen<sup>1</sup>, Jing Tang<sup>1</sup>, Carl Vincent C. Caro<sup>2</sup>, Alfredo Mahar Lagmay<sup>3</sup>, Anawat Suppasri<sup>4</sup>, Jeremy Bricker<sup>5</sup>, Volker Roeber<sup>6</sup>, Carine J. Yi<sup>7</sup>, Fumihiko Imamura<sup>4</sup> (1. Chulalongkorn University, 2. Philippine Disaster Resilience Foundation, 3. University of the Philippines Diliman, 4. Tohoku University, 5. Delft University of Technology, 6. Université de Pau et des Pays de l'Adour, 7. R. Park & Associates Inc.)

12:15 PM - 1:15 PM

**[P-41] Sleep disturbance among people in Minamisanriku town after the Great East Japan Earthquake**

\*Yayoi Nakamura<sup>1</sup>, Tomomi Suda<sup>1</sup>, Aya Murakami<sup>1</sup>, Hiroyuki Sasaki<sup>1</sup>, Ichiro Tsuji<sup>2</sup>, Yumi Sugawara<sup>2</sup>, Masafumi Nishizawa<sup>3</sup>, Kazuaki Hatsugai<sup>3</sup>, Shinichi Egawa<sup>1</sup> (1. Division of International Cooperation for Disaster Medicine, International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Division of Epidemiology, Department of Public Health and Forensic Medicine, Tohoku University Graduate School of Medicine, 3. Minamisanriku Hospital)

12:15 PM - 1:15 PM

**[P-42] Strengthening Disaster-response Capabilities of Expressway**

Ryosuke Koga<sup>1</sup>, \*Yuji Sasaki<sup>1</sup>, \*Yuri Fukushi<sup>1</sup>, Rei Kasahara<sup>1</sup>, Koichi Noro<sup>1</sup> (1. East Nippon Expressway Company Limited Tohoku Regional Head Office)

12:15 PM - 1:15 PM

**[P-43] Influence of leisure time on the mental health of affected high school students by the disaster**

\*Junko Okuyama<sup>1,2</sup>, Shunichi Funakoshi<sup>3</sup>, Jun Onobe<sup>4,1</sup>, Izumi Shinichi<sup>1</sup> (1. Department of Physical Medicine and Rehabilitation, Tohoku University Graduate School of Medicine, 2. The Core Research Cluster of Disaster Science, 3. Miyagi Psychiatry Center, 4. Department of Rehabilitation, Faculty of Medical Science & Welfare, Tohoku Bunka Gakuen University)

12:15 PM - 1:15 PM

**[P-44] The Asia-Pacific Disaster Report 2019: Pathways for resilience, inclusion and empowerment**

\*Maria Bernadet Karina Dewi<sup>1</sup> (1. United Nations ESCAP)

12:15 PM - 1:15 PM

**[P-45] Investigation of typhoon no. 19 induced flood damages and historical characteristics of flood hazards around Yoshida River in Miyagi Prefecture, Japan**

\*Masakazu Hashimoto<sup>1</sup> (1. International Research Institute of Disaster Science, Tohoku University, Japan)

12:15 PM - 1:15 PM

**[P-46] Disaster Risk Reduction Knowledge Service**

Juanle Wang<sup>1,4</sup>, Kun Bu<sup>2,4</sup>, \*Yuelel Yuan<sup>1,4</sup>, Yujie Wang<sup>1,4</sup>, Xuehua Han<sup>1,3,4</sup> (1. Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, 2. Northeast Institute of geography and Agroecology, Chinese Academy of Sciences, 3. University of Chinese Academy of Sciences, 4. International Knowledge Centre for Engineering Sciences and Technology under the Auspices of UNESCO)

12:15 PM - 1:15 PM

## [P-47] Water-Related Disaster Security: Assessing National Risk in Asia

\*Ilpyon Hong<sup>1</sup> (1. Korea Institute of Civil Engineering and Building Technology (KICT))

12:15 PM - 1:15 PM

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-01] TRACING 3.11.11

\*Akari Nakai Kidd<sup>1</sup>, \*Daniel Gibbs<sup>1</sup> (1. Deakin University, School of Architecture and Built Environment, Geelong, Australia)

Keywords: architecture, resilience, tracing, recovery, community

More than eight years have passed since the Great East Japan Earthquake and Tsunami. While many reconstruction efforts in disaster-stricken communities have been completed, or are coming to completion, there remains a slow and continued state of recovery and rehabilitation, both physically and emotionally. The ARCHITECTURE OF RESILIENCE (TRACING 3.11.11) design studio (an architectural design studio at Deakin University, School of Architecture and Built Environment, Geelong, Australia) aims to develop an ongoing dialogue between architectural practitioners, academics, students, and affected communities to build them back better and stronger, considering the importance of memory, and the nature of resilience, in the context of architecture and rehabilitation. By accurately mapping the site as it was before the event, during the event, 8 years onwards, and now, in the present, the (TRACING 3.11.11) studio draws and reconstructs the site of Kesennuma as an accumulation of events, and by recording them reaffirms and seeks to re-create them as positive influences on developing mechanisms for future development and recovery. The poster will present the investigation, documentation and drawing of the specific site of Kesennuma with pre, during and post-disaster conditions by students of architecture, specifically illustrating three drawing processes: 1) DOCUMENTING AND MAPPING – accumulation, finding and revealing traces of pre-tsunami conditions, 2) DRAWING AND TRACING 3.11.11 – understanding the entropic nature and force of natural disasters, and 3) ACTING AND PROPOSING – proposing architectural structures emerging from the documented site and drawn traces. At the confluence of these three complex processes, lies myriad opportunities to understand past, present and future Kesennuma and propose ideas of how to create architectural structures that seek to “build back better”. These drawings and structures, together, become the record of 3.11, not only addressing the changing condition of the physical site, but also communicating, recovering and retaining the communities’ remembrance of 3.11.11.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-02] Joint Development and Implementation of a Community Engagement Model Practical Education Program Based on Disaster Response Expertise : Community Planner Training at Miyagi University and the University of Hyogo

\*Shun Nakazawa<sup>1</sup>, Yu Takahashi<sup>1</sup>, Kanae Sato<sup>1</sup>, Hideyuki Sasaki<sup>1</sup>, Masaharu Goko<sup>1</sup> (1. Miyagi University)

Keywords: Education Program, Community Planner, Miyagi University, University of Hyogo

Miyagi University (a public university situated in an area affected by the 2011 Great East Japan Earthquake) and the University of Hyogo (a public university situated in an area affected by the 1995 Great Hanshin Earthquake) have collaborated in developing an education program since October 2012, the year after the Great East Japan Earthquake. It is a curriculum for training “community planners,” human resources equipped to resolve issues in their local areas. This report outlines the development process, results, and prospects of this education program.

Training human resources capable of responding to the needs of disaster areas during and outside moments of crisis is urgently required. This is the social demand that has shaped this education program, which has consistently been characterized by the principle of *interdisciplinary study* since its conceptual stage. Both participating universities have incorporated three fields into the program— design, business, and caregiving— and enlisted the support of numerous instructors in these fields, as part of their work to design the program and teach the classes. An additional trait of this education program is its focus on *situated practice*. Both universities have developed curricula grounded in project- and community-based learning, where lectures are provided in situated localities, carefully drawing lessons from this program over the past seven years.

Participating students have become more interested in local issues and demonstrated results by implementing projects designed in class. In particular, at Miyagi University, there are high hopes for this program from a post-recovery perspective, given that it aims to impact local society through a combination of human resource training and local problem-solving.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### **[P-03] Response of port infrastructure to tsunami impacts: Damage observations from the 2011 Tohoku tsunami**

\*Constance Ting Chua<sup>1,2</sup>, Adam Douglas Switzer<sup>1,2</sup>, Anawat Suppasri<sup>3</sup>, Kwanchai Pakoksung<sup>3</sup>, Linlin Li<sup>2,4</sup>, David Lallemant<sup>1,2</sup>, Susanna Jenkins<sup>1,2</sup>, Amanda Cheong<sup>1</sup> (1. Asian School of the Environment, Nanyang Technological University, 2. Earth Observatory of Singapore, 3. International Research Institute of Disaster Science, Tohoku University, 4. Department of Civil and Environmental Engineering, National University of Singapore)

Keywords: tsunami, damage, port, disaster

Interest in tsunami damage has gained momentum since the 2004 Indian Ocean tsunami. To date, most studies on tsunami damage are still largely focused upon commercial and residential buildings. The response of critical facilities such as port facilities to tsunami impacts is still poorly understood. Damage fragility functions are usually developed to quantify the response of structures to hazard impacts, as well as to provide damage estimates for future events. In this present study, tsunami damage fragility functions for the port industries identified in the Tohoku region are developed based on observations from the 2011 Great East Japan tsunami. We attempt to quantify observed damage in the Tohoku region through spatial analysis based on satellite imagery and photograph interpretations in the framework of a Geographical Information System (GIS), and examine the potential relationships between tsunami flow characteristics and the damage observed.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### **[P-04] National Diet Library Great East Japan Earthquake Archive: HINAGIKU**

\*Hiroshi Maeda<sup>1</sup> (1. National Diet Library, Japan)

Keywords: Digital Archive, Permanent storage

HINAGIKU is an one stop site which enables integrated search of records and reports of the Great East Japan Earthquake disaster by public institutions, private organizations and media, and of research by universities, academic societies and research institutes. Its aim is to hand down all records and lessons to future generations and to utilize them for the restoration and reconstruction of the affected areas and for disaster prevention measures. Searches of HINAGIKU include content from 49 archives cooperating with HINAGIKU, as well as content collected by the National Diet Library. In addition, content collected in the digital storage of HINAGIKU is permanently preserved. The National Diet Library released HINAGIKU on March 7, 2013. As of the end of May 2019, the number of metadata that can be searched in HINAGIKU is approximately 4.25 million. The National Diet Library distributes brochures about HINAGIKU.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### [P-05] Tsunami Simulation in the 28 September 2018 Palu Bay, Indonesia, Using Submarine Landslide Source and Two-layer Depth-integrated Modeling

\*kwanchai pakoksung<sup>1</sup>, Anawat Suppasri<sup>1</sup>, Fumihiko Imamura<sup>1</sup>, Cipta Athanasius<sup>2</sup>, Amalfi Omang<sup>2</sup>, Abdul Muhari<sup>3</sup> (1. International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Center for Volcanology and Geological Hazard Mitigation, Geological Agency of Indonesia, Bundung, Indonesia, 3. Coastal Disaster Mitigation Division, Ministry of Marine Affairs and Fisheries, Jakarta, Indonesia)

Keywords: Tsunami, Submarine landslide tsunami, Palu tsunami, Two-layer modeling, Numerical simulation

The earthquake at 28 September 2018 (Mw 7.5) of Palu-Koro fault in Sulawesi Island has raised concerns about potential impact of generated tsunami by submarine landslide in Palu Bay, Indonesia. Based on the aforementioned unusual information of this tsunami, this study aims to investigate its possible sources using preliminary available data at early stage. Iterative inversion of global seismic observations guided by forward modeling of regional geodetic and tsunami records produces a self-consistent fault slip to create landslide location. This earthquake is similar to other large event in the area but different in generated tsunami from landslide earthquake. The epicenter is located in the land at depth about 10.4 km and its displacement is about 1 – 8 m in horizontal direction. The horizontal displacement of the Palu-Koro fault generated a landslide tsunami that covers around Palu Bay, showing hazard along the coast area from the wave. Two-layer modeling (soil and water) based on shallow water equation was used to simulate the tsunami propagation in the Bay with severe, moderate, and minor impact. The tsunami height from submarine landslide sources with combination of small and large volumes could reach up to 3.0-7.0 m along the Palu shores. The impact along the coast line of Palu Bay from peak wave can be implication for tsunami hazards for the area in future.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### [P-06] Spatial distribution of cause of death based on resident address of the deceased in the 2011 Tohoku Tsunami: A case study of Ishinomaki City, Miyagi prefecture

\*Tomoki Serikawa<sup>1</sup>, Shuji Seto<sup>2,3</sup>, Hirokazu Kamata<sup>4</sup>, Anawat Suppasri<sup>2,3</sup>, Fumihiko Imamura<sup>2,3</sup> (1. Graduate school of Engineering, Tohoku University, 2. International Research Institute of Disaster Science, Tohoku University, 3. Core Research Cluster of Disaster Science, Tohoku University, 4. School of Engineering, Tohoku University)

Keywords: 2011 Great East Japan Earthquake tsunami, Data of the deceased, Cause of death, Science of human survival from disaster

It has been considered that the main cause of death during a tsunami is drowning. It is important to avoid tsunami not to be drown. Therefore, it has been focused on evacuation behavior to mitigate human damage. However, according to Kahoku shinpo (2011), there are victims who died from hypothermia after exposure tsunami. National Police Agency (2012) reported many kinds of cause of death other than drowning, such as Death due to fire, in the 2011 Great East Japan Earthquake tsunami. Seto and Imamura (2019) classified the cause of death into 12 groups; Injuries to the head, Injuries to the neck, Injuries to the thorax, Unspecified multiple injuries, Traumatic shock, Asphyxiation except drowning, Drowning, Death due to fire, Hypothermia, Heart disease, the others death and Death from unknown origin, in the tsunami by using data of the deceased provided by Miyagi Prefecture Police. These reports indicate necessity of measures for tsunami disaster that assumes other than drowning. To adopt such measures, regional characteristics of cause of death have to be clarified.

In this study, we revealed that spatial distribution of cause of death by mapping based on resident address of the deceased in Ishinomaki City, Miyagi prefecture. We aggregate the resident address according to postal code and cause of death according the classification proposed by Seto and Imamura (2019). From the analysis, we verified drowning outside the inundation area and death due to fire outside the area reported fire caused by the tsunami. According to the result, we clarified the issues about aggregation method based on resident address of the deceased. In further study, it is important to consider data other than fatality ratio, such as cause of death, in order to understand the situation of deceased for mitigate human damage.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## **[P-07] Spanish cooperation in the field of training for disaster risk reduction in Latin America and the Caribbean**

\*Jose Pastrana<sup>1,3</sup>, Angela Potenciano<sup>2</sup>, Elisa Gavari<sup>1</sup> (1. National Distance Education University (UNED), Spain, 2. National School of Civil Protection, Spain, 3. Consell Insular de Menorca, Spain)

Keywords: International Cooperation, Spain, Latin America and the Caribbean, Training, Disaster Risk Management, Humanitarian Action

The Sendai Framework reaffirms the critical and urgent need to anticipate, plan and reduce risk to protect the population, communities, and countries more effectively, and also to increase the capacity for recovery. The Framework specifies that international cooperation for developing countries must be significantly improved through adequate and sustainable support that complements measures taken at the national level for the implementation of the Sendai Framework. This poster aims to show the actions carried out from Spain in the field of international cooperation with Latin American and Caribbean countries to strengthen capacities in the field of Disaster Risk Reduction through the "Training Program for the Improvement Systems of Prevention, Planning and Response in Disasters Risk Management in Latin America and the Caribbean", developed during the biennium 2018-2019 which is in phase of ending. The General Directorate of Civil Protection and Emergencies through the National School of Civil Protection organized by means of this

program different activities to transfer, and exchange knowledge management in Latin America and the Caribbean in collaboration with the Spanish Agency for International Cooperation for Development (AECID). This programming is linked to two priority thematic areas for AECID in the region: Risk management, to avoid disasters related to the adverse effects of climate change, through the adaptation to its effects, and humanitarian action, through the response to disasters. On the other hand, to strengthen cooperation since 2018, the "Network of experts in risk management and civil protection" is established for staffs from Latin American and Caribbean countries. Through the Network, space has created to share documentation, training actions and technical and scientific collaborations on risk management and civil protection. To this end, thematic working groups and various exchange actions are created among the participants through this network.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### [P-08] Cascading effects of tsunami disasters

\*Anawat Suppasri Suppasri<sup>1</sup>, Miwako Kitamura<sup>1</sup>, Syamsidik Syamsidik<sup>2</sup>, Abdul Muhari<sup>3</sup>, Fumihiko Imamura<sup>1</sup>, David Alexander<sup>4</sup> (1. Tohoku University, 2. Syiah Kuala University, 3. Ministry of Marine Affairs and Fisheries, Indonesia, 4. University College London)

Keywords: Cascading disasters, Tsunamis, Disaster risk reduction

In 2015, cascading disasters is defined as “cascading effect or dynamic impact of a physical event or the development of an initial technological or human subsystem that result in physical, social or economic disruption”. In 2018, a magnitude scale for cascading disasters was qualitatively defined to six levels, Level 0 [Simple or major incident], Level 1 [Major incident with limited complexity], Level 2 [Major incident or small disaster with some complex consequences], Level 3 [Disaster with complex consequences], Level 4 [Disaster with substantially complex consequences] and Level 5 [Catastrophe with overwhelmingly complex consequences]. However, the proposed magnitude scale is still lacking 1) quantitative criteria/definition for each magnitude level and 2) detailed analysis of cause, effect and escalation point of each magnitude scale. Tsunami disaster was selected as the first case study applying perspective of the cascading disasters in our study. Hazard parameters as well as consequences from recently occurred several tsunamis in Japan and other countries were reviewed and classified to each magnitude scale. As examples, the 2016 Fukushima tsunami was classified as Level 2 as the consequences were only limited to offshore area, no long-term interruption of infrastructure and no casualty as well as damage to buildings. The 2018 Palu tsunami is a good example for Level 4 as the tsunami itself was the consequence of earthquake, submarine landslide and liquefaction. Damage to ports causing interruption of shipping (both domestic and international) and local business/tourism and damage to a prison causing riot, escaping of prisoners which increased criminal rates and reduced social security were examples of escalation point of this event. The 2011 Great East Japan tsunami was selected as a case study to analyse the process of Level 5 in detail. Results from this proposal can be used for future planning and management against tsunamis in the future.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### [P-09] The cause of death analysis based on the deceased's data in the 2011 Tohoku Tsunami: A case study of Miyagi prefecture

\*Shuji Seto<sup>1,2</sup>, Tomoki Serikawa<sup>3</sup>, \*Hirokazu Kamata<sup>4</sup>, Anawat Suppasri<sup>1,2</sup>, Fumihiko Imamura<sup>1,2</sup> (1.

International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster Science, Tohoku University, 3. Graduate School of Engineering, Tohoku University, 4. School of Engineering, Tohoku University)

Keywords: 2011 Great East Japan Earthquake tsunami, Disaster science, Location of the deceased, Science of human survival from disaster

About 20,000 people died in the Great East Japan Earthquake tsunami that occurred in 2011. According to the National Police Agency (2012), 90% of the deceased in Iwate, Miyagi and Fukushima prefectures were drowned. Aoki et al. (2012) reported the results of questionnaires to physicians who actually examined in the affected areas. The questionnaire result showed that the statistical result about the cause of death reported by National Police Agency was reasonable, and that some physicians could not but describe it as drowning as a realistic problem.

This suggests that the deceased in a tsunami disaster may die from cause of death other than drowning. According to Mainichi Shimbun newspaper (2011) and Kahoku Shimpō (2011), the survivors witnessed the deceased who died of symptoms like hypothermia after exposure to the tsunami. However, the details of the cause of death excluding drowning has not been elucidated yet.

In this study, we classified the causes of death in the 2011 Great East Japan Earthquake tsunami using the deceased's data provided by Miyagi Prefecture Police. The number of original descriptions about the cause of death was 140. And we classified the cause of death based on ICD-10 and discussed the classified result with a doctor of forensic medicine. As a result, we concluded that the 140 descriptions were classified into the following 12 groups; Injuries to the head, Injuries to the neck, Injuries to the thorax, Unspecified multiple injuries, Traumatic shock, Asphyxiation except drowning, Drowning, Death due to fire, Hypothermia, Heart disease, The others death and Death from unknown origin. In addition, we also showed the proportion of each cause of death in Miyagi prefecture.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-10] The analysis of location data related to the deceased in the 2011 Tohoku Tsunami: A case study of Miyagi prefecture

\*Shuji Seto<sup>1,2</sup>, Hirokazu Kamata<sup>4</sup>, Tomoki Serikawa<sup>3</sup>, Anawat Suppasri<sup>1,2</sup>, Fumihiko Imamura<sup>1,2</sup> (1.

International Research Institute of Disaster Science, Tohoku University, 2. Core Research Cluster of Disaster Science, Tohoku University, 3. Graduate School of Engineering, Tohoku University, 4. School of Engineering, Tohoku University)

Keywords: 2011 Great East Japan Earthquake tsunami, Disaster science, Location of the deceased, Science of human survival from disaster

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symptoms like hypothermia after exposure to the tsunami. However, the details of the cause of death excluding drowning has not been elucidated yet.

Seto and Imamura(2019) classified the causes of death in the 2011 Great East Japan Earthquake tsunami using data of the deceased provided by Miyagi Prefecture Police. As a result, the cause of death was classified into the following 12 groups; Injuries to the head, Injuries to the neck, Injuries to the thorax, Unspecified multiple injuries, Traumatic shock, Asphyxiation except drowning, Drowning, Death due to fire, Hypothermia, Heart disease, The others death and Death from unknown origin. Furthermore, they showed the proportion of each cause of death in Miyagi prefecture. The proportion in each city are needed to clarify the deceased in the Great East Japan Earthquake in more detail.

In this study, we analyzed the location data related to the deceased provided by Miyagi Prefecture Police. The data are resident address, location of the deceased and its type such as on land, at sea and in debris. We showed characteristics of each location data in Miyagi prefecture.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-11] A Case Study of Cooperation between Historians and Psychologists in Providing and Assessing Community Psychosocial Support in Tsunami-affected Areas

\*Machiko Kamiyama<sup>1</sup>, Daisuke Sato<sup>1</sup>, Masae Sato<sup>3</sup>, John Morris<sup>2</sup> (1. International Research Institute of Disaster Research, Tohoku University, 2. Miyagi Gakuin Women's University, 3. Ishinomaki Senshu University)

Keywords: psycho-social support, cultural heritage, great eastern Japan earthquake, elderly people, mental health

Eight years on from the tsunami of 2011, the affected areas are facing the problems of depopulation, and social and economic decay. Historians have conducted salvage operations where possible on the historical heritage of affected areas. The owners of collections of local heritage are typically elderly people. Data on elderly people after the disaster and how their experience can help their communities is lacking.

This study assesses how historians' salvage operations can provide valid psycho-social support for affected communities and individuals, struggling to rebuild after the disaster.

Method: We conducted a series of structured interviews with people owning collections of salvaged historical heritage. All the subjects interviewed were over 60 years old. The interviews used the Personal Attitude Construct (PAC) Analysis to analyze the subjects' attitudes towards their historical heritage and self-identity.

The interviews use a stimulus sentence to elicit free word association from the subjects, and then ask the subject to pair their words on a distance matrix. These words are then grouped into clusters which the subject names. SPSS is used to perform an analysis of the clusters, and then the subject is asked to say what they feel on looking at the results of the analysis.

Results: Except for small number of subjects exhibiting extreme stress, most subjects answered that after the interview process, they were able to regain their ego integrity. Furthermore, our studies show that the work of

historians can help restore social cohesion in damaged communities. Historians cannot objectively assess the psychosocial effects of their work and interdisciplinary cooperation with psychologists can help both improve their support for affected individuals and communities.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-12] Fuel stocking proposal to connect life at the time of disaster

\*mitsuaki kizaki<sup>1</sup> (1. NIPON BCP INC)

Keywords: · About "Japan BCP" approach, · Service contents, · Past activity results, · Future prospects, · Finally

· About "Japan BCP" approach

Explanation of company profile, activity content

Situation analysis of the oil shortage in the Great East Japan Earthquake

Given the risk of disasters, the fact that large oil tanks are often found in coastal areas is dangerous and it is desirable to store them in inland areas.

Purpose of Emergency Fuel Stocking Proposal

In Japan, the Ministry of Internal Affairs and Communications must require fuel stocks to be able to operate emergency generators for 72 hours for companies with important public infrastructure such as communications and broadcasting, etc., and promote voluntary stockpiling from the Ministry of Economy, Trade and Industry There is a notification to be promoted, and each company is considering fuel storage.

· Service contents

Exclusive storage contract for oil, exclusive delivery contract for emergency

Taking into consideration the emergency, we have stockpiled petroleum fuel from normal times, and we have also operated and maintained the vehicle date and time, and have established a system that can be delivered 24 hours a day, 365 days a year.

· Past activity results

Activity results for each disaster, such as the Great East Japan Earthquake and heavy rainfall in West Japan

Osaka Prefecture, disaster prevention agreement of Osaka City

Joint research with Kansai University

- Future prospects

There is a big difference in thinking between a company that proactively measures BCP in management after the earthquake and cases that are not. The problem is how to improve awareness.

- Finally

Summarize and summarize this session.

We will work on comprehensive BCP measures and propose them as a disaster reduction and mitigation company.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-13] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hiroaki Enoki<sup>1</sup>, \*Chikako Adachi<sup>1</sup> (1. All Japan Council Company)

Keywords: Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

We worked on business warehouse "container Oami" which was not used for making of local bustling before earthquake disaster, but warehouse suffered from Great East Japan Earthquake before completion. The facility was unfinished but staff were employed, so the staff started a cell phone charging service.

Problems such as lost chargers and problems waiting in turn have been resolved each time. Other support activities include:

- Learning support

Investigate the city of Tome with the University of Tokyo for three years, make a community, and confirm the importance of the living base.

- Minami Kata temporary housing association activity support
- Tome establishment of woman support center

- Support for supplies
- The RQ Civil Disaster Relief Center starts supporting activities based on the former Masbuchi elementary school gymnasium in Towa Town, Tome City. So we decided to make an original design "Eco Brush". In order to look for areas that can be tackled by the community members, we will hold knitting classes around 40 temporary housing units and community associations so that we can become a team that can work together toward reconstruction rather than just internal jobs.

We visited the town development friends of the whole country, held lectures and knitting parties, and found fans, etc., and developed a sales destination while building a visible relationship.

In Hokkaido, we participate in events around March 11 every year and report the situation in Tohoku.

In Kyushu, he has continued to interact with Kumamoto (Mashiki, Minamiaso), Isahaya, Fukuoka and Kitakyushu.

In Kansai, we are building a network with Osaka, Kobe, Ashiya and Mita.

We will continue our reconstruction support activities from the perspective of the victims.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-14] Making use of uncertain earthquake forecast information:

### Challenges toward disaster risk reduction against the anticipated Nankai Trough Earthquake (M8-M9), western Japan

\*Yo Fukushima<sup>1</sup>, Hiroaki Maruya<sup>1</sup>, Makoto Okumura<sup>1</sup>, Motoyuki Kido<sup>1</sup>, Natsuko Chubachi<sup>1</sup>, Ryota Hino<sup>1</sup>, Kanan Hirano<sup>1</sup>, Shunichi Koshimura<sup>1</sup>, Miwa Kuri<sup>2</sup>, Shuji Moriguchi<sup>1</sup>, Yusaku Ohta<sup>1</sup>, Hiroyuki Sasaki<sup>1</sup>, Motoaki Sugiura<sup>1</sup>, Tetsuya Torayashiki<sup>3</sup>, Fumihiko Imamura<sup>1</sup> (1. Tohoku University, 2. Japan Meteorological Agency, 3. Disaster Reduction and Human Renovation Institution)

Keywords: Nankai Trough Earthquake, Planning, Preparedness, Countermeasures, Tsunami

In western Japan, great earthquakes of M8-M9 are anticipated along the Nankai trough subduction zone (hereafter called the Nankai Trough Earthquakes), with 30-year probability of 70-80% (The Headquarters for Earthquake Research Promotion of Japan, 2019). The Central Disaster Management Council of the Cabinet Office, Government of Japan, updated the master plan on the promotion of the countermeasures against the Nankai Trough Earthquakes in May 2019 in such a way that the central and local governments as well as other institutions should react appropriately when the “Nankai Trough Earthquake Special Information” is issued. The local governments, public institutions and some private companies are supposed to update their countermeasure plans to be compatible with the master plan of the government. The “Special Information” is issued by the Japan Meteorological Agency when the probability of the occurrence of a Nankai Trough Earthquake becomes higher than normal.

Effective usage of such uncertain forecast information for disaster mitigation is challenging. To overcome this problem, we are developing a package of materials/tools that can help the organizations make effective plans. The core components of the packages are: 1) earthquake risk visualization tool considering various earthquake scenarios, and 2) recommended countermeasure recipes that provide check-up lists and countermeasure options for different sectors at different stages (e.g., immediate response, within one week, etc.). As for the risk visualization, we mainly deal with the tsunami inundation risk, which is the largest threat in terms of the number of anticipated victims, by considering an ensemble of inundation simulations of numerous fault models. We also investigate the societal response to the forecast information issuance for

pursuing an integrated and mutually consistent set of recipes for global minimization of social disorders.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-15] Concepts of Urban System's Resilience and a Mathematical Model

\*Yuto Shiozaki<sup>1</sup> (1. Kanazawa University)

Keywords: Resilience, Absorptive capacity, Urban system, Mathematical model

Concepts of urban resilience have recently prevailed in both academic and practical discourse of disaster risk management. Urban resilience is generally considered as the ability of an urban system to recover or transform itself into a desirable state after a disaster causes damage to the system. Our society not only needs to improve mitigation measures, but it also has to enhance the ability in preparation to a next coming large-scale disaster. However, the concepts are used in a wide range of meanings, and which is sometimes confusing. In order to control urban resilience, the definition and mechanism must be clarified.

Hence, first of all, this study classifies the concepts into i)Stability, ii)Absorptive Capacity, and iii)Adaptability based on a review of the existing studies relating to urban resilience and gives a definition to each sub-concept. Stability is the ability to return to the pre-disaster state as soon as possible after a disaster shock. Absorptive capacity is the ability to absorb the damage and maintain the condition which the system can recover or sustain. Adaptability is the ability to recover the damage and adapt the change of socio-economic environment.

Secondly, this study focuses on Absorptive capacity and clarifies the relational structure between an urban system's features and its Absorptive capacity. A mathematical model to represent the dynamics of an urban system's state is built up, which is then used to explain the degree of Absorptive capacity. Moreover, by using the model, this study analyzes how the Absorptive capacity is affected by the change of parameter values relating to the system's features. Finally, we discuss the possibility to manage the urban system's Absorptive capacity based on the above analysis.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-16] Study on Emergency Management Using Incident Response Log Classification Based on Activity Objectives

\*Naoko Kosaka<sup>1</sup>, Takeshi Yamaguchi<sup>2</sup>, Tomohiro Kokogawa<sup>1</sup>, Satoshi Kubota<sup>1</sup>, Kentaro Inui<sup>2</sup> (1. NTT, 2. Tohoku university)

Keywords: EOC(Emergency Operations Center), Emergency Management, Natural Language Processing

It is necessary for an EOC (Emergency Operations Center) to observe the whole the damage from a disaster, rather than a detailed situation of the site, and assess the impact on the organization. Therefore, EOC staff should determine the overall situation of the organization from the reports of individual organizations and allocate appropriate resources to appropriate locations.

FEMA in U.S.A. has established the ESF (Emergency Support Functions)[1] which standardizes the emergency support function in the incident response. By ESF, it becomes possible to connect to quick observation of the situation and efficient and effective resource allocation, because the incident response between organizations is unified in the axis of ESF.

In this paper, we propose a method to observe situations using incident response log on the “KADAN,” emergency management support system[2][3], based on activity objectives as an ESF-like axis, applying natural language processing.

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- [2] Naoko Kosaka et. al., “Disaster Information System Using Natural Language Processing,” JDR, Vol.12, No.1, pp.67-78, 2017.
- [3] Naoko Kosaka et. al., Applicability Assessment of An Emergency Management Support System “KADAN,” DRRSC2019.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-17] BUILDING DISASTER RESILIENT COMMUNITIES THROUGH SERVICE LEARNING: REFLECTIONS AND LESSONS OF UNIVERSITY OF SANTO TOMAS NATIONAL SERVICE TRAINING PROGRAM CWTS/LTS

\*Adrian Dela Cruz Romero<sup>1</sup>, Sheila Masangkay<sup>1</sup>, Eric Aboboto<sup>1</sup>, Jasmin Victoria<sup>1</sup>, Justine Joseph Gopeng<sup>1</sup> (1. University of Santo Tomas)

Keywords: service learning, DRRM, inclusive and participatory community development, sendai framework for disaster risk reduction, NSTP

As a response to Sendai Framework for Disaster Risk Reduction and Sustainable Development Goals, this poster illustrates the process, narratives and experiences of the UST National Service Training Program (UST NSTP) in the implementation of Disaster Risk Reduction and Management (DRRM) to their curriculum. The NSTP was instituted by the Philippine government by virtue of the Republic Act 9163 that aims to enhance civic consciousness and defense preparedness in the Filipino youth by developing the ethics of service and patriotism while undergoing community development activity to the marginalized community. As a major part of the curriculum, the UST NSTP college students learned the concepts, theories and skills of community-based disaster risk reduction management and emergency preparedness which equip them to practice and apply this in their fieldwork activity in various partner communities and institutions suffered from marginalization and voicelessness during disaster management.

In the process of community fieldwork, UST NSTP facilitators and students utilized Participatory Capacities and Vulnerabilities Assessment (PCVA), a participatory research methodology that holistically collects, analyzes and synthesizes communities’ resources and vulnerabilities in dealing with disasters. As a service-learning tool for students and partner communities, PCVA is significant in understanding disaster risks and exposure to different natural and anthropogenic hazards through their collective and individual experience. The process lets the NSTP students worked with various at-risk sectors such as children, women, urban poor, farmers and indigenous peoples so that they can formulate their inclusive disaster risk assessment. Starting

on the communities' local knowledge, NSTP students build on the capacity of the community by weaving their local experience, practices and skills in facing disaster risk.

With this, the poster seeks to contribute and respond to the call for a participatory, inclusive pro-poor, gender-sensitive and empowering service-learning in disaster risk reduction and management.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-18] Non-structural approach to volcanic disaster risk reduction through BOSAI project phase2 in Guatemala: activities for capacity development of communities, municipalities and national institution.

Shusuke IRABU<sup>1</sup>, Nishikawa Tomoyuki<sup>2</sup>, Yoshitaka Yamazaki<sup>3</sup>, Jun Onodera<sup>4</sup>, Noritoshi Maehara<sup>5</sup>, Abraham Marroquin<sup>6</sup>, Edy Mardonado<sup>6</sup>, Mario Ovalle<sup>6</sup>, José Giron<sup>6</sup>, \*Yeison Carrera<sup>6</sup>, Sergio Cabañas<sup>6</sup> (1. Japan International Cooperation Agency, 2. Nippon Koei Co., Ltd., Japan, 3. OYO international corporation, Japan, 4. Earth Science System, Japan, 5. IDEA consultants, Japan, 6. Executive secretary of National Coordination for Disaster Risk Reduction (SE-CONRED), Guatemala)

Keywords: volcanic disaster risk reduction, volcanic disaster risk reduction council, BOSAI map, community disaster risk reduction committee

Areas around two active volcanoes in Guatemala, Pacaya and Santiaguito volcanos, are considered by national disaster risk reduction agency in Guatemala, SE-CONRED, to be the area where needs proactive intervention to communities and local governments to reduce volcanic disaster risk. In June of 2015, SE-CONRED started working with Japan International Cooperation Agency, JICA, to implement a project "Capacity development for disaster risk reduction in Central America, BOSAI phase 2". The project has worked with seven municipalities and 27 communities in the above mentioned volcanic areas and has developed various activities in volcanic disaster risk reduction focusing on the following four results to expect, (1) promotion of access to volcanic disaster risk information for better understanding of it, (2) development of institutional capacity including an inter-institution coordination, (3) human resource capacity development on disaster risk management through practical exercise methods, (4) building basic capacity of communities on activities for volcanic disaster risk reduction.

As a result of the project, the following progress has been observed for examples; two volcanic disaster risk reduction councils with multi-local governments have been established in the two volcanic areas, a guide for municipalities on office of disaster risk reduction has been elaborated and published, BOSAI map has been elaborated and published, and 27 community disaster risk reduction committee have been organized with capacity of volcanic activity monitoring.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-19] Health-Related Studies After the Great East Japan Earthquake: A Literature Review

\*Akiko ETO<sup>1</sup>, Yasuhiro KANATANI<sup>2</sup> (1. National Institute of Public Health, 2. Tokai University, School of Medicine)

Keywords: Great East Japan Earthquake, Health-related disaster research

Health-related disaster research provides beneficial evidence for decision-making for disaster response and therefore conducting studies on time is important. However, the priority should be disaster response activities during and after disasters, and researchers should avoid burdening affected peoples. "Health" is a focus of the Sendai Framework 2015-2030 and, to accomplish its goals, it is important to understand the long-term of health effects of disasters and disasters' impacts on vulnerable populations are important (1).

The 2011 Great East Japan Earthquake caused about 20,000 casualties or missing person. Prolonged displacement created health issues among the affected people. After the earthquake, hundreds of health-related studies, mostly in Japanese or in English, were published. To contribute to future disaster preparedness, we conducted a literature review of studies on the 2011 earthquake, focusing the way these studies were conducted.

Literature databases, including PubMed (National Library of Medicine), Web of Science (Clarivate), Japanese database Ichushi (Japan Medical Abstract Society), and J-Dream III (JST), were searched for relevant articles. The publication period was set from 2011 until March 2018. Articles irrelevant to human health outcomes were excluded.

About 400 articles in Japanese and 300 articles in English were retrieved and classified according to subject, health topic, and publication year. The way the studies were conducted was evaluated. Understanding how research is conducted on disaster-related health effects and their characteristics will contribute to future disaster research.

#### Reference

(1) Chan and Murray, Lancet, 2017

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-20] The analysis of tsunami evacuation behavior considering tsunami victim' s data from a case study in Kesennuma city

\*Anna Shinka<sup>1</sup>, Shosuke Sato<sup>2</sup>, Mizutani Daijiro<sup>2</sup>, Fumihiko Imamura<sup>2</sup> (1. Graduate School of Engineering, Tohoku University, 2. International Research Institute of Disaster Science)

Keywords: tsunami evacuation behavior, missing data, tsunami victim

Many researches have been conducted to clarify what make people evacuate earlier using questionnaires and interviews. In most of those researches, only tsunami survivors behavior are analyzed but tsunami victim' s behaviors haven' t been considered. However, if we analyze the evacuation behavior excluding data of victims, analyzed evacuation status would be biased. In addition, conducting interview is difficult in some cases and survivor' s impression about victims would be different from those of the actual victims. So, complementing methods of victim' s data are required to consider their actual evacuation behaviors. In this research, we develop a method of complementing victims to estimate their tsunami evacuation behaviors based on the data of the survivor' s. Specifically, the evacuation behaviors are estimated as evacuation start times which vary depending on preliminary preparation and risk recognition for tsunami. To complement the



data of victims, we used the hypothesis that preliminary preparation and risk recognition for tsunami of survivors who encountered tsunami and that of victims are same. The propability of early evacuate is empathzed by a logit model and Markov chain Monte Carlo method is used to estimate the parameters in the model to complement the victim' s behavior considering uncertainly. The method of complementating victim' s evacuation behavior is developed and we found that the probability of early evaucation was decreased when we consider about the victims in frequent family meeting.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-21] Research on the education for disaster reduction: Effects of “ Starter Guide” shelter management game (HUG).

\*Takeshi Miyawaki<sup>1</sup>, Atsushi Kimura<sup>1</sup> (1. Nhion university)

Keywords: education for disaster reduction, the shelter management game (HUG)

In recent years, natural disasters are increasing in Japan. Therefore, attention is paid to the education for disaster reduction. Then, the state, local governments, educational institutions, etc. educate on disaster reduction. Experience-based education for disaster reduction like the shelter management game (HUG) is effective for a wide range of ages. However, the rules of HUG are complex. Although HUG has the effect of deepening participants' discussions and deepening their understanding, it is difficult for those who have not educated on disaster reduction. Therefore, we created a “ Starter Guide” HUG game with the purpose of understanding the importance of disaster reduction and consideration for others. This study measures its educational effects. Natural disasters can equally occur to anyone regardless of age. Therefore, it is essential to understand the considerations needed at shelters where various people, from the elderly to the children, gather.

Therefore, in order to measure the effects of the simplified version HUG, this study created two groups, one group that provided information on shelters (possible problems) and the other group that provided information on shelters, and the group that implemented HUG. After a while, we conducted a descriptive questionnaire survey on the points to be considered in the shelters, and verified whether there was a difference in awareness about the shelters in both groups. As a result, the group that conducted the “ Starter Guide” HUG had more descriptions for consideration to others than the group that provided information on shelters. The effect of the “ Starter Guide” HUG could be measured.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-22] Personal Networks Among Selected Elderly in Post-Disaster Community in Tacloban City

\*Reggy Capacio Figer<sup>1</sup> (1. Hokkaido University )

Keywords: Elderly, Haiyan disaster, personal networks

In recent years, we have witnessed the increase occurrence of natural disasters around the world. Flooding and monsoons, hurricanes and major earthquakes, landslides and drought and tsunami threats have been affecting individuals and communities in every part of the globe. This research looks into one of the most vulnerable sectors in communities affected by natural disasters - the elderly. With societies becoming aged, mature, and at risk, it is important that we take action in protecting as well as safeguarding their well-being.

For these reasons, this study explores on the personal networks of selected elderly in a post-disaster community in Tacloban, a city ravaged by a super typhoon named Haiyan (locally dubbed as Yolanda) in 2013. This category five cyclone was the most destructive typhoon to hit the Philippines which caused thousands of people dead and loss of billions of dollars in agriculture and infrastructure. Findings revealed that the elderly remain steadfast and positive with the impacts of Haiyan because of their personal networks that include their families, relatives, the local community and city government, NGOs, and the church. These personal networks foster social networks and trust among the elderly which cultivated social capital and resilience amongst them. Some of the elderly have initiated projects suited for the welfare of their own communities. It is hoped that through this study, personal networks may well be capitalized in order to enable, engage, and empower the elderly in disaster situations.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-23] Emergency nutritional support in Japan: history, bottleneck, and future perspective with technology

\*Kanako Masuno<sup>1</sup>, Mayu Yokota<sup>1</sup>, Ayako Shimizu<sup>1</sup>, Masako Yokotsuka<sup>1</sup> (1. Showa Women's University)

Keywords: disaster preparedness, health, nutrition, vulnerable population, technology

Background: Japan have been experienced large scale natural disasters through its long history. The more the urbanization accelerated, the more the scale of damage expected to be enormous. From previous experience of large-scale disasters, the period of evacuation lasts several months to several years. Not a few evacuees are still living in prefabricated housing even eight years after Great East Japan Earthquake (3418 as of January 2019, which account for 3% of 116,565 as of March 2012). From the acute phase of disaster throughout long evacuation period, well balanced nutritious food is inevitable to maintain the physical condition and prevent diseases regardless of age, medical history and the ability of daily life. Especially, consideration should have been paid for elderly as well as baby and infant who potentially have functional restriction. However, the lack of integrated nutritional support system in Japan have been pointed out especially regarding to vulnerable populations such as individuals who have chewing difficulty, food allergy and nutritional restriction.

Objective: Review the current situation about emergency nutritional support in Japan in order to explore the reasonable framework which will leave no one behind regardless of age, physical condition and ability of daily life.

Method: Literature review and key informant interview

Result and Discussion: Overview of current situation about nutritional support in Japan will be presented. Given the gap between Sphere Standard, Japan should make good effort to fulfill the need of people. Liquid milk for baby which finally adopted in 2019 in Japan is good example. Whereas Japan have several advantages to scaling up the disaster preparedness along with developing the food for extreme circumstance regardless of age, medical history and physical impairment. Multisectoral partnership between public and private sector will accelerate the practical disaster preparedness which respect the health and life of every individuals.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-24] SEARCH (Search Engine for Research on Risk and Resilience) - CARI! (Cerdas Antisipasi Risiko Bencana di Indonesia)

\*MIZAN BUSTANUL FUADY BISRI<sup>1</sup> (1. United Nations University-Institute for the Advanced Study of Sustainability)

Keywords: disaster research repository, scientometric, risk platform, science-policy-actions nexus, network analysis

In this poster, we are presenting a pilot platform named SEARCH (Search Engine for Research on Risk and Resilience), which in its initial stage has been specifically developed for Indonesia and named CARI! (Cerdas Antisipasi Risiko Bencana di Indonesia). The platform is currently accessible at <https://caribencana.id/>

SEARCH/CARI! is combining automated research repository, scientometric, and machine learning (for screening vast amount of disaster-related research) with spatial-based national and local risk information. It is a spatial-based search engine that locates and connects science, research, and innovation available with any resilience building and disaster risk reduction (DRR) activities for ensuring adoption/inclusion of knowledge-based policy, investment, and development. By using SEARCH/CARI!, resilience stakeholder can receive a machine-assisted recommendation of research products that for developing their DRR strategies, policy, and programs. The development of SEARCH/CARI is our contribution to ensuring a knowledge-informed national/local DRR strategies to achieve Sendai Framework for Disaster Risk Reduction Target E.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-25] Toward Resilient cities: *disaster Risk Reduction* analysis of Urban Water Infrastructures in A Potential Earthquake (Case study: Region 2 of Tehran Municipality)

\*seyedmohsen alavi<sup>1</sup>, Mohammadreza Rezaei<sup>2</sup> (1. York University, 2. Yazd University)

Keywords: Risk , Resilience, Earthquake, Infrastructure, Urban

The increasing dependence on urban lifeline systems, especially, water infrastructure, have led to an increased emphasis on disaster-resilience cities. Water infrastructure resilience is the ability of a system to both withstand uncertain conditions caused by natural disasters and to recover quickly from the disastrous events. Urban infrastructure resilience evaluates by a model which analysis restoration time, serviceability index and resistance features. The purpose of this research is to promote a new practical approach to analyze urban resilience and propose a risk reduction plan. This research analysis urban disaster risks based on earthquake scenarios, infrastructures serviceability and affected urban population in a metropolitan area. The methodological approach of this paper is practical and focuses on the water system risk management in district two of Tehran city, Iran, in the context of the proposed scenario earthquakes. This article's methodological approach is practical and concentrates on the risk reduction analysis of water infrastructure services in a probable earthquake. This research uses Probabilistic Seismic Hazard Analysis (PSHA) to estimate the seismic features such as PGA and PGV of a most probable earthquake in the case study area. To better understand the system resilience, three restoration scenarios based on disaster risk analysis were analyzed. Complete restoration of the system takes more than 89.5 days, which is more than the urban resilience threshold. Results indicate that existing risk reduction plans of urban infrastructure need to be

changed. Based on disaster scenarios, urban water infrastructure's damages and inhabitants' minimum demands, this research proposes a comprehensive urban risk reduction plan. Analyses of the proposed risk reduction plan indicate that the increase of the resilience factor will reduce restoration time to less than 29.8 days, which fulfill the standard threshold target for emergency water supply.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-26] Local production for local protection (*Chisan Chibo*) – Proposing a standardized local-level *bosai* operations from Tohoku

\*Fumihiko Imamura<sup>1</sup>, Kanako Iuchi<sup>1</sup> (1. Tohoku University)

Keywords: standardized local-level , operation on bosai operations

By following the oral session as same topics, the idea/pla/suggestion will be introduced to discuss on a standardized local-level *bosai* in this poster session. The Local operations are critical to reducing disaster risk. With this understanding, Japan has developed various strategies, policies, and instruments for disaster management operations. One of the recent examples, after the 2011 Great East Japan Earthquake and tsunami, is the System on Community Disaster Management Plan (*Chiku Bousai Keikaku Seido*) approved for implementation in 2014. It urges local communities to make their bosai plan to prepare their actions during the time of disasters. Meanwhile, the 2015 Sendai Framework for Disaster Risk Reduction internationally shares the goal of reducing risk and adapting climate change by increasing the number of nations taking actions towards disaster risk reduction. Sharing a standardized operation on bosai operations for the interested states are an important step forward.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-27] HERSTORY: FACILITATING PARTICIPATORY DISASTER RISK ASSESSMENT TO THE SINGLE-MOTHERS OF SUB-URBAN POOR RESETTLEMENT HOUSING IN PHILIPPINES

\*Imelda N. Oponda<sup>1</sup>, \*Adrian Dela Cruz Romero<sup>2</sup>, Letecia Saju<sup>1</sup>, Anna Monica Octubre<sup>1</sup>, Lilia Mondano<sup>1</sup>, Lissa B. Palero<sup>1</sup>, Reyna Liza Borres<sup>1</sup>, Evangeline Piñero<sup>1</sup>, Synel Perante<sup>1</sup>, Evelyn Sibal<sup>1</sup>, Maria Villa Degumbis<sup>1</sup>, Jenelyn Cortes<sup>1</sup>, Yolanda Javier<sup>1</sup>, Norma Bernal<sup>1</sup>, Laurencia Daang<sup>1</sup>, Ruby Ana Bernardo<sup>3</sup>, Jolly M. Lugod<sup>3</sup>, Cedric Bermiso<sup>3</sup>, Wilmor Pacay<sup>3</sup> (1. Samahang Kamanlalakbay Phase 1k, Kasiglahan Village, Rodriguez, Rizal, 2. University of Santo Tomas National Service Training Program (NSTP CWTS/LTS), 3. Alliance of Concerned Teachers-Philippines)

Keywords: single mother and disasters, resettlement government housing project , participatory capacities and vulnerabilities assessment, community and gender based disaster risk reduction and management, understanding risk

This poster will illustrate the major findings of the participatory risk assessment of single mothers of Phase 1k Phase 1k, Kasiglahan Village, Rodriguez, Rizal. Using Participatory Capacities and Vulnerabilities workshop tools, single-mothers gauge their exposure, vulnerability and capacity to hazards in their community which contributed to their knowledge as which hazards are most likely to occur and to have the biggest impact on their community and in their assets. The poster will highlight also their coping mechanism, adaptive

measures and strategies when they faced disasters. Based on the research workshop, it was shown that their community is a flood-prone area and earthquake-prone due to different structural factors such as poor urban development planning. Kasiglahan Village is a low-cost housing facility build by National Housing Authority that aims to relocate urban poor families in Metro Manila. The single mothers who are co-researchers pointed out that houses built for them did not have the adequate structural integrity to withstand an earthquake and positioned in the high-risk areas such as near fault lines and riverbanks.

Moreover, single-mothers in Phase 1k is one of the sectors who are most vulnerable to experience disasters due to their pre-existing conditions such as lack of financial income as their livelihood relies on the informal economy. Single-mothers are the sole provider of resources and care of the children. When natural hazard strikes; it will intensify their responsibility to their household in which will result in a detrimental effect on their physical, psychological and economic well-being. However, single-mothers pointed out during workshops that they have the ability to cope up. If in case of flood and other emergencies they prepared to evacuate to safer spots in their community by utilizing their early warning system.

With this, HERSTORY responds to the challenges of the previous studies on disaster risk reduction to have a gender-sensitive and pro-poor perspective in understanding and managing disaster risk as this participatory research provides space for the vulnerable women to share their own experiences and aspirations in their/her own voice.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## **[P-28] Climate Change Induced Rural Socio-Economic Vulnerability: An Empirical Regional Analysis from Sub-Himalayan West Bengal, India**

\*Manoranjan Ghosh<sup>1</sup> (1. Indian Institute of Technology Kharagpur)

Keywords: Climate Change Vulnerability, , Regional Analysis, , Livelihoods' strategy, , Environmental Profile, , Livelihoods' Insecurity.

It has been generally acknowledged that poor people in the Global South are highly vulnerable to global as well as regional climate changes. From the existing literature, based on India, it is noticed that often the studies regarding climate change impacts are a model-based estimation of climate change vulnerability. However, these model-based approaches lack ground reality. Therefore, there is a need to explore the bottom-up effects of climate change on livelihood generation in the rural parts of India. Therefore, household-based primary field survey studies can help to overcome the uncertainties which exist in model-based climate vulnerability assessment. In India, so far, no research has been conducted considering the regional patterns of socio-economic vulnerability assessment in context of climate change based on primary households' survey. Here, the Socio-Economic Vulnerability Index has been proposed to assess the climate change vulnerability, and regional patterns of vulnerability that have been assessed in thirteen Community Development Blocks (CD Blocks) in sub-Himalayan West Bengal. It comprises of 384 household samples and twenty-two indicators covering seven significant dimensions of climate change vulnerability including climate variability, natural disaster risk, socio-demographic profile, livelihoods' strategy, environmental profile, livelihoods' insecurity, and accessibility of necessary infrastructure. The results suggest that the region where the temperature and rainfall instability is more, the magnitude of climate change risk is also high. Alipurduar-II, Jalpaiguri, and Mal, which are highly exposed to climate variability and natural disaster risk, at

the same time, have low adaptive capacity. On the other hand, the livelihoods' strategy, socio-demographic and environmental profile are the determining factors of regional vulnerability in the study region. The CD blocks, for example, Falakata, Dhupguri, and Rajganj which have a higher adaptive capacity are less sensitive to climate change vulnerability, although the exposure of climate vulnerability is the same in the entire region. The survey findings indicate that adaptive capacity is high in Falakata and Rajganj, therefore, these blocks are less susceptible to climate change vulnerability. Finally, the overall results of the present research would be helpful for policymakers to identify the priority regions for implementation of suitable public schemes and also to make sector-wise development strategies to confront the contemporary climate change vulnerabilities.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-29] Disaster Awareness Improvement by Flood Simulated Experience in Virtual Reality

\*Miho Ohara<sup>1</sup>, Daisuke Kuribayashi<sup>2</sup>, Masatoshi Denda<sup>1</sup>, Yoshimasa Morooka<sup>1</sup>, Tsuyoshi Koyabu<sup>3</sup> (1. International Centre for Water Hazard and Risk Management (ICHARM), Public Works Research Institute, Japan, 2. International Centre for Water Hazard and Risk Management (ICHARM), Public Works Research Institute, Japan (Previous), 3. Disaster Information System Division, IDEA Consultants, Inc.)

Keywords: Understanding disaster risk, Awareness, Virtual Reality, Flood simulation

Improving the understanding of flood risk among people is essential to reduce future casualty caused by delay in evacuation. In this research, a computer application was developed for people to experience a simulated flood using virtual reality (VR) technology, which has been used in various fields in recent years. This application can be easily installed on commercially available VR goggles, and people can experience a virtual flood simply by wearing them. The authors offered opportunities for local residents to try out this application and experience virtual floodwaters coming inside the house due to flooding from a river. After that, a questionnaire survey was conducted for the residents in order to verify whether or not a virtual flood experience can contribute to raising people's awareness towards floods. A total of 111 residents, consisting of the roughly same number of men and women, answered the questions. Of them, 26% were in their 40s, and 17% in their 30s. When the respondents were asked if they were usually worried about flooding during the rainy and typhoon seasons, those who answered "Not worried too much" accounted for 38%, and those who answered "Somewhat worried" for 34%. When they were asked the same question again after experiencing a virtual flood, 57% answered "Somewhat worried," and 22% "Very worried." In other words, merely about 40% were worried about flooding before the flood simulation experience, but about 80%, roughly twice as many, came to be worried about flooding after the flood simulation experience. These results indicate that a virtual flood experience contributed to raising people's awareness of flood disasters.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-30] How to save people from earthquake?

\*Kazuo Sasaki<sup>1</sup>, Yamaimaiti Nizhamdong<sup>1</sup> (1. Challenge Co.,Ltd)

Keywords: How to save people from earthquake.

In order to save people from Earthquake, Alarm + evacuation drill is necessary.

Many countries are constructing observation nation wide dense seismology NW for long time such as 10years, 20years, 30years and more. It need too long time.

We propose new method that include alarm system and evacuation drill.

We introduce some examples.

12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## **[P-31] A proposed framework for clarifying consequence impacts chain of tsunami hazards on global seaborne network**

\*An chi CHENG<sup>1</sup>, Takuro OTAKE<sup>2</sup>, Anawat SUPPASRI<sup>3</sup>, Fumihiko IMAMURA<sup>3</sup> (1. Graduate School of Civil Engineering, Tohoku University, 2. NTT Data Corporation, 3. International Research Institute of Disaster Science, Tohoku University)

Keywords: Global Seaborne network, Supply chain, Consequence impact chain, Tsunami numerical simulation, Hazard mitigation

With more than 90 percent world trade carried by ships, global seaborne network provides most energy efficient type of long-distance transportation for large quantities of merchandise and consequently enhanced its role in global supply chain during the past decades. However, this growth in interdependence of supply chain has significantly increased the exposure of ports and maritime network and make it even more vulnerable to tsunami hazards. The most well-known empirical evidence is the Great East Japan Earthquake tsunami in 2011, the sharp drop of Japanese exports of vehicle parts and components due to disruption of ports on east coast of Japan and consequently result in dramatically decreasing of output value in vehicle and related manufacturing industries in the world. This can be explained by the fact that impacts of tsunami are not only single occurrence in region but also complex occurrence in global scale due to disconnection of supply chain. While this phenomenon has been discussed repeatedly in previous, still little related studies are available. To fulfill the lack understanding of consequence chain impacts of tsunami hazard on global seaborne network, tsunami numerical simulation is conducted to display tsunami force and global seaborne network is constructed base on public shipping route information provided by OOCL corporation, Hongkong to investigate global- scale impacts of tsunami hazards. This study proposed a framework for clarifying global chain impacts of tsunami hazards in the purpose of quantifying global impacts associated with tsunami event and could further provide information for developing strategies for hazard mitigation.

12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## **[P-32] Long term recovery and resilience construct- The lessons learned from Jiji earthquake**

\*JIEHJIUH WANG WANG<sup>1</sup> (1. MING CHUAN UNIVERSITY)

Keywords: Jiji earthquake, recovery, resilience, risk reduction education, seismic retrofit

870 school buildings collapsed during the 1999 921 Jiji earthquake in Taiwan, it was indeed a mercy that it occurred in early morning, no massive casualties of school faculty and students were reported. In order to understand how the Taiwanese authority improve the safety of campus, this study conducts in-depth

interviews to teachers and students from the affected schools, analyzes records of the damaged schools and collected data to understand the pre-disaster and post-disaster situation of the school. Based on safe school framework, this study explores disaster management and restoration designed for schools, from safe learning facilities, school disaster management, and risk reduction and resilience education, that includes seismic retrofit of school buildings and reinforcement of building safety. Through the comprehensive promotion of disaster prevention education to construct school disaster prevention system, outline disaster prevention plan, as well as develop teaching materials and exercise drills to strengthen disaster resilience of campus.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## **[P-33] Fire Service experts enhancing bush fire disaster resilience education with Primary School Geography students: A case study from New South Wales, Australia**

\*Tony Jarrett<sup>1</sup> (1. School of Education and Arts, CQUniversity, Rockhampton, Australia)

Keywords: disaster resilience education, children and young people, geography, bush fire, natural hazards

The Sendai Framework for Disaster Risk Reduction states that ‘ children and youths are agents of change and should be given the space and modalities to contribute to disaster risk reduction, in accordance with legislation, national practice and educational curricula’ .

Australia is subject to regular natural hazards events that cause significant impacts on human, social, community and economic structures. Each year in the State of New South Wales, 100,000 Stage 3 Geography students (Years 5 &6) study how bush fire affects people, place and the environment. Students apply Inquiry Learning approaches to explore bush fire issues, identify authentic problems, and work on local solutions.

Outside content experts such as NSW Rural Fire Service volunteer fire fighters support Teachers to deliver education outcomes and disaster resilience education activity. However, there is no understanding of the enablers and barriers to consistent, sustained and quality support from fire fighters. There is also no understanding of the extent fire fighter experts contribute to student learning.

This research study will apply Case Study methodologies to identify and explore in-depth the disaster resilience education practices being applied by classroom teachers, the contribution of outside content experts to the classroom, and what disaster resilience education learning outcomes can be attributed to those fire fighter experts.

The research study will benefit policy makers and emergency services whose experts are engaged with



school teachers and students about disaster risk reduction in any natural hazard setting.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### **[P-34] A review of stressors affecting organisational resilience of emergency facilities and infrastructure in cascading crises**

\*Gianluca Pescaroli<sup>1</sup>, David Alexander<sup>1</sup>, Virginia Murray<sup>2</sup> (1. Institute for Risk and Disaster Reduction, University College London, 2. Public Health England)

Keywords: Cascading risk, Critical infrastructure, Emergency Facilities , Organisational Resilience, Operational Resilience

A significant part of the academic literature investigated the dependencies between critical infrastructure such as electricity, transport, or communications. Much less attention has been devoted to the analysis of assets that are more peripheral in the interconnected functional networks. This paper focuses on those critical infrastructure and facilities that are the backbone of emergency responses, such as civil protection coordination centres, hospitals, fire and police stations. Despite being not perceived as essential assets for maintaining ‘business as usual’ functions, any substantial reduction of their capacity can worsen ongoing incidents, affecting both organisations and society.

In this work, we propose a review of which are the essential challenges associated with the organisational resilience of emergency infrastructure and facilities in terms of continuity management. First, we explain the role of emergency infrastructure and facilities, describing their operational duties and their role in response to crises. Secondly, we define which could be possible stressors, including both functional and human factors. This is supported through a set of examples and lessons learned that is integrated into practical advice for continuity management and organisational resilience policies. Finally, we systematise how cascading effects caused by disruptions in other infrastructures can affect the capacity to maintain continuity of services, proposing further steps for practices and areas for future research.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### **[P-35] Comprehensive Investigation of active faults and its impacts in South East Aceh Region**

\*Muksin Umar<sup>1,2</sup>, Ibnu Rusydy<sup>1</sup>, Wiwik Ayu Ningsih<sup>1,2</sup>, Andrean Simanjuntak<sup>1,3</sup>, Arifullah Arifullah<sup>1,2</sup>, Yunita Idris<sup>1</sup>, Irwandi Nurdin<sup>1,2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC), Universitas Syiah Kuala, Banda Aceh, Indonesia, 2. Department of Physics, Universitas Syiah Kuala, Banda Aceh, Indonesia, 3. Mata le Geophysical Station of BMKG Aceh, Aceh Besar, Indonesia)

Keywords: active faults, loss analysis, seismic vulnerability, Aceh

The active fault system in South East Aceh seems to be complicated seems several earthquakes have occurred in different zones within the area. However, the faults system of the area has not been studied in detail whereas it is important to hazards within an area before proposing a mitigation concept. Therefore, we propose to investigate the active faults system and its impact by using several different methods. We deployed 7 seismometers combined with permanent broadband BMKG stations to record earthquakes. The recorded earthquakes were relocated by using coupled hypocentre-velocity inversion to delineate active faults. We found 3 earthquake clusters delineating the active faults namely, Lokop, Pining, and Alas. We also

investigated the seismic vulnerability and structure of the area by using H/V method and found the area along the Kutacane Basin seems to be more vulnerable. Based on the distribution of the fault, structure, and vulnerability values we analyse the potential loss if earthquakes occur by using GIS based method and found the potential loss correlate with the location of faults and seismic vulnerability values.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## **[P-36] Investigating Planned Elevated Road for Mitigating Impacts of Tsunami on Banda Aceh, Indonesia**

\*Syamsidik Syamsidik<sup>1,3</sup>, Tursina Tursina<sup>1,3</sup>, Anawat Suppasri<sup>2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC) of Universitas Syiah Kuala, Banda Aceh-Indonesia, 2. International Research Institute of Disaster Science (IRIDeS) of Tohoku University, Japan, 3. Civil Engineering of Universitas Syiah Kuala, Banda Aceh-Indonesia)

Keywords: tsunami, mitigation, numerical simulations, elevated road

A tsunami multi-layer defense system applied in Sendai plain after the 2011 Great East Japan Earthquake and Tsunami is one of recent advanced mitigation measures. However, it was noted that applying giant seawalls could be beyond financial capacity for some tsunami-prone cities in Indonesia. On the other hand, the needs for long-term tsunami mitigation measures are urgent for a city like Banda Aceh that was once severely destroyed by the 2004 Indian Ocean Tsunami. This research is aimed at investigating the co-benefit uses of a road transect to reduce tsunami wave energy. Here, we used numerical simulations to investigate the potential uses of a planned Banda Aceh Outer Ring Road (BORR), which will be parallel to its coastline. We used Cornell Multi Grid Coupled tsunami Model (COMCOT) for a series of numerical simulations. Validations of the models were done using the 2004 tsunami sources and flow depths data. Two earthquake magnitudes were used, namely 8.5 Mw and 9.15 Mw. With the elevated road, it can potentially reduce the tsunami flow depths about 9% in the case of 9.15 Mw and about 22% for the case of 8.5 Mw earthquak. Also, the elevated road could reduce tsunami inundation area and speed.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## **[P-37] AN OVERVIEW OF POST-DISASTER RISKS TO SCHOOL FACILITIES IN ACEH PROVINCE OF INDONESIA**

\*Ella Meilianda<sup>1,3</sup>, Yunita Idris<sup>1,3</sup>, Roberto Gentile<sup>2</sup>, Carmine Galasso<sup>2</sup> (1. Tsunami and Disaster Mitigation Research Center (TDMRC) Syiah Kuala University, 2. University College London, 3. Civil Engineering Department, Engineering Faculty, Syiah Kuala University)

Keywords: school buildings, retrofit, construction, post-disaster, Aceh

Over 200 school buildings in the districts of Pidie, Pidie Jaya and Bireuen, Aceh Province of Indonesia were assessed after the event of a major earthquake in December 2016, using Rapid Vulnerability Assessments (RVA) method to assist post-disaster school retrofitting and reconstruction program. Also, the 2004 Tsunami was included in RVA to assess multiple natural hazards known to affect the area. Separately, assessment of 85 reinforced concrete school buildings at the capital city of Banda Aceh was conducted using a

combination of INSPIRE seismic risk prioritization index and the Papathoma Tsunami Vulnerability Assessment (PTVA) to assess the multi-hazard prioritization scheme. The objective is to assess the damage and vulnerability of post-earthquake school facilities that were affected, retrofitted or newly built after the events of disasters in different locations across the Aceh Province. Both methods use the entire data collections to define the representative type of buildings. Lateral support system for the typical construction was analyzed using pushover analysis to estimate the potential damage levels of the buildings, ductility ratio and further achieving the fragility curve of the typical school construction. The results reveal that school building construction practices and techniques have remained relatively unchanged over the last 40 years in Aceh Province. However, the types of school buildings in Banda Aceh were found to be slightly different from the ones in Pidie, Pidie Jaya, and Bireuen. The domination of reinforced concrete (lateral frame supporting system) was found in Banda Aceh, while in Pidie, Pidie Jaya and Bireuen the school buildings majority was masonry (wall support system). Despite a simplified post-disaster building retrofit is feasible, however, the improvement of Indonesian building standards incorporating seismic retrofitting strategy is urgently needed. This study contributes to elaborate on the recommendation of the retrofit system of the post-disaster construction as one of the structural mitigation strategies.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-38] Extreme weather, displacement, and conflict: New insights from Somalia

\*Christian Webersik<sup>1,2,3</sup>, Lisa Thalheimer<sup>4</sup>, Felix Pretis<sup>5</sup>, Simon Abele<sup>6</sup>, Friederike E. L. Otto<sup>4</sup> (1. University of Agder, Norway, 2. Centre for Integrated Emergency Management (CIEM), Norway, 3. Disaster Research Unit, Freie Universität Berlin, Germany, 4. Environmental Change Institute, University of Oxford, UK, 5. Department of Economics, University of Victoria, Canada, 6. School of Geography and the Environment, University of Oxford, UK)

Keywords: Climate change, Drought, Conflict, Migration, Somalia

Throughout history, populations in environmentally challenging regions such as Somalia have developed means for adapting to the harsh physical and climatic conditions, including population mobility. Anthropogenic climate change is predicted to alter these dynamics, potentially trapping people. With the East African drought in 2011, Somalia has suffered from prolonged drought and armed conflict conditions, and an on-going humanitarian crisis. Political conflict has hindered humanitarian access to mitigate the effects of recent droughts. Even though climate change may increase the drought risk in Somalia, insecurity and armed conflict are likely to remain leading causes of food shortages and irregular migration incidences. In the context of climate change, the questions arise: When do climatic change-impacts and resource problems lead to conflicts and how does this create incentives for migration? The starting point of this poster is the recent debate as to whether and to what extent climatic variability of rainfall and temperature interconnect with conflict and fragility. Overall, we present a case for migration as an intermediary and bidirectional causal variable. We use monthly regional data on displacement, conflict and climate to explore intermediary factors of the 2016 - 2018 climate conflicts in Somalia. We argue that close attention needs to be paid to regional manifestations of conflict and (mal)adaptive forms of population movements to understand the effects of climate change on conflict and society in Somalia.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster &amp; Exhibition)

## [P-39] Using tsunami deposits and modeling to study tsunami history and sources in Washington State, USA

\*Carrie Garrison-Laney<sup>1</sup> (1. Washington Sea Grant/Univ. of Washington)

Keywords: tsunami source, tsunami deposit, Cascadia, tsunami modeling, paleotsunami

Washington State, on the Pacific coast of the United States, has many tsunami sources, including the Cascadia subduction zone, shallow faults that cross waterways, submarine and subaerial landslides, and distant source trans-Pacific tsunamis. However, Washington has had very few tsunamis in the last 150 years, and of those, only landslide and distant source tsunamis have been observed. Because of this, accurate assessments of future tsunami size and frequency must rely on the study of paleotsunami deposits and the modeling of tsunami flow and sediment transport. A tidal marsh at Discovery Bay, along the Strait of Juan de Fuca, is an ideal setting to study the history of tsunamis from various sources. There are at least nine distinct tsunami deposits spanning the last 2,500 years in the marsh deposits at Discovery Bay; and several thinner, less distinct deposits that may represent distant source tsunamis, such as the 1964 Great Alaska Earthquake tsunami, which flooded the site. The marsh contains a deposit inferred to be from the 1700 A.D. Cascadia earthquake, and some of the older deposits are likely from earlier Cascadia tsunamis. Tsunami deposits can be used to provide estimates of tsunami inundation extent, flow depths, and current velocities, which can be compared to output from tsunami inundation models. Tsunami deposits can also be used to study tsunami sources. A collaboration with Tohoku University modeling tsunami sediment transport using the characteristics of tsunami deposits will test various sources. There are a greater number of tsunami deposits at Discovery Bay than known tsunamis or earthquakes in the same timespan, so further study must be done to accurately assess the tsunami hazard in Discovery Bay and the Strait of Juan de Fuca.

12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster &amp; Exhibition)

## [P-40] Typhoon Wind Speed VS. Storm Surge Inundation: Understanding Risk of Building Damage from Statistical Analysis

\*Natt Leelawat<sup>1</sup>, Tanaporn Chaivutitorn<sup>1</sup>, Thawalrat Tanasakcharoen<sup>1</sup>, Jing Tang<sup>1</sup>, Carl Vincent C. Caro<sup>2</sup>, Alfredo Mahar Lagmay<sup>3</sup>, Anawat Suppasri<sup>4</sup>, Jeremy Bricker<sup>5</sup>, Volker Roeber<sup>6</sup>, Carine J. Yi<sup>7</sup>, Fumihiko Imamura<sup>4</sup>

(1. Chulalongkorn University, 2. Philippine Disaster Resilience Foundation, 3. University of the Philippines Diliman, 4. Tohoku University, 5. Delft University of Technology, 6. Université de Pau et des Pays de l'Adour, 7. R. Park & Associates Inc.)

Keywords: Super Typhoon, Storm Surge, Building Damage, Statistical Analysis

In November 2013, Super Typhoon Haiyan (Local name: Yolanda), with the highest category 5, hit the Philippines. When we look at the number of collapsed buildings, some interesting issues can be found. Some similar buildings did not collapse equally after the hitting of the typhoon. We also found that some of them got high impact from storm surge. These findings induce our research problem of determining the potential association between the typhoon and the storm surge. The research purpose is to develop a statistical model for building damage from the Super Typhoon Haiyan and its storm surge. The independent parameter is wind speed and depth of storm surge while the dependent setting is the damage level. The data is based on the satellite and other sources. The maximum wind speed is calculated from the Holland parametric hurricane model based on the Japan Meteorological Agency typhoon track data. Storm surge inundation depth is calculated by Delft3D models. The statistical analysis, including correlation analysis and multinomial logistic

regression, was conducted. Surprisingly, the affecting factors of urban and remote areas show different results. The result of this work is expected to be used to develop urban planning for preventing buildings located in a typhoon risk area.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-41] Sleep disturbance among people in Minamisanriku town after the Great East Japan Earthquake

\*Yayoi Nakamura<sup>1</sup>, Tomomi Suda<sup>1</sup>, Aya Murakami<sup>1</sup>, Hiroyuki Sasaki<sup>1</sup>, Ichiro Tsuji<sup>2</sup>, Yumi Sugawara<sup>2</sup>, Masafumi Nishizawa<sup>3</sup>, Kazuaki Hatsugai<sup>3</sup>, Shinichi Egawa<sup>1</sup> (1. Division of International Cooperation for Disaster Medicine, International Research Institute of Disaster Science (IRIDeS), Tohoku University, 2. Division of Epidemiology, Department of Public Health and Forensic Medicine, Tohoku University Graduate School of Medicine, 3. Minamisanriku Hospital)

Keywords: disaster medicine, medical needs, non-communicable disease, prescription, sleep disturbance

In 2011, the Great East Japan Earthquake (GEJE), all medical facilities (one hospital and four clinics) in Minamisanriku town were lost by earthquake and tsunami. A variety of medical needs people including residents and responders arised and changed dynamically. We analyzed the risk factors for sleep disturbance using anonymized disaster medical records (DMR). Out of 10,460 valid records with 18,525 diagnoses from March 11 through May 13, we identified 1,498 patients with sleep disturbance who was diagnosed and/or who got prescription of sleeping or anxiolytic pills. We classified 18,525 diagnoses into five modules: non-communicable diseases (NCD), infectious disease, trauma, mental health issues, and maternal and child health (MCH) and analyzed the relations with sleep disturbance. Sleep disturbance was included in the mental health issues module and if the patient received only prescription without appropriate diagnosis, the diagnosis was classified as NCD.

Univariate and multivariate analysis revealed several risk factors related to sleep disturbance. Odds ratio (OR) of sleep disturbance was highest if the patient has mental health module (OR 83.60) followed by NCD module. If the patient has two or more diagnoses of NCD, the OR was higher (OR 2.29) than the patients with single (OR 1.83) or no description (control) of NCD. Female (OR 1.70) and age above 60 (OR 7.22) had higher risk of sleep disturbance. Patients who was diagnosed anxiety, stress distress, panic disorder, depressive status including bipolar disorder, schizophrenia and other psychiatric disease had very strong association with sleep disturbance. The place of evacuation did not significantly correlate with sleep disturbance.

Sleep disturbance is known to exacerbate NCD such as hypertension or cardiovascular diseases. The medical and non-medical support for sleep disturbance is an essential strategy after disaster.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-42] Strengthening Disaster-response Capabilities of Expressway

Ryosuke Koga<sup>1</sup>, \*Yuji Sasaki<sup>1</sup>, \*Yuri Fukushi<sup>1</sup>, Rei Kasahara<sup>1</sup>, Koichi Noro<sup>1</sup> (1. East Nippon Expressway Company Limited Tohoku Regional Head Office)

Keywords: expressway, initial information

Faster receipt and processing of disaster information

In case of a disaster it is necessary to understand the initial information, and we are promoting the development and introduction of various information-gathering tool.

12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### [P-43] Influence of leisure time on the mental health of affected high school students by the disaster

\*Junko Okuyama<sup>1,2</sup>, Shunichi Funakoshi<sup>3</sup>, Jun Onobe<sup>4,1</sup>, Izumi Shinichi<sup>1</sup> (1. Department of Physical Medicine and Rehabilitation, Tohoku University Graduate School of Medicine, 2. The Core Research Cluster of Disaster Science, 3. Miyagi Psychiatry Center, 4. Department of Rehabilitation, Faculty of Medical Science & Welfare, Tohoku Bunka Gakuen University)

Keywords: Disaster medicine, Adolescent psychology, resilience, leisure time, the Great East Japan Earthquake

**BACKGROUND:** On March 11, 2011, Japan was struck by a massive earthquake and tsunami. The tsunami caused tremendous damage and traumatized many people, including adolescents. This study was conducted to find out how affected high school students spend their leisure time, including electronic games, and how they affect mental health after the 2011 Great East Japan Earthquake and Tsunami with those observed for 3 years.

**METHODS:** This study was conducted for three high school students, comprised of 2,532 adolescents in Miyagi prefecture south, close to the epicenter of the Great East Japan Earthquake. Electronic game time, time to watch TV, time to play outside was investigated. And the four types of psychological tests were conducted.

**RESULTS:** Electronic game time was negatively correlated with the CD-RISC-10 score in the psychological test for 3 years (1st year -0.056;  $p < .005$ ) (2nd year -0.062; 3rd year -0.091;  $p < .001$ ). The external playtime was positively correlated with the IES-R score in the psychological test for 3 years (1st year 0.097; 2nd year 0.087; 3rd year 0.087;  $p < .005$ ).

**CONCLUSIONS:** We conclude that playing electric game of adolescents who survived the earthquake and tsunami may reduce resilience. And playing outside may improve the traumatic symptoms of affected adolescents over time.

12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

### [P-44] The Asia-Pacific Disaster Report 2019: Pathways for resilience, inclusion and empowerment

\*Maria Bernadet Karina Dewi<sup>1</sup> (1. United Nations ESCAP)

Keywords: The Asia-Pacific Disaster Report

The Asia-Pacific Disaster Report 2019 Report captures a comprehensive picture of the complexity of disaster risk in the Asia-Pacific region for the first time. Slow-onset disasters account for nearly two thirds of disaster losses in the region. The intensification and changing geography of disaster risks signal a new climate reality.

Hazards are deviating from their usual tracks and becoming more intense, creating greater complexity and deep uncertainty that are harder to predict. The Asia-Pacific region is facing complex disaster risks clustered around hotspots where fragile environments are converging with critical socioeconomic vulnerabilities. It is demonstrated that disasters widen inequalities in outcomes and opportunities and slow down poverty reduction.

Furthermore, the Report highlights that inclusive investments can outpace disaster risk. It is indicated how a comprehensive portfolio of risk-informed investments in social sectors may reduce the numbers of people living in extreme poverty. Investments in resilience deliver important social co-benefits. Thus, policymakers can enhance the quality of investments through policy reforms for more inclusive and empowered societies. Furthermore, big data innovations help to mitigate the challenges of climate reality. It is vital that vulnerable, marginalized groups are protected from disaster risks, so that everybody can benefit from this rich, new source of information and knowledge.

Countries have committed themselves to achieving the Sustainable Development Goals (SDGs) by 2030, to ensure that ‘no one is left behind’. Ultimately regional cooperation is required to reinforce national efforts. ESCAP can support this through the Asia-Pacific Disaster Resilience Network (APDRN), which will pool the strengths of the region to address transboundary disasters as all countries of the region adjust to the new climate reality.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-45] Investigation of typhoon no. 19 induced flood damages and historical characteristics of flood hazards around Yoshida River in Miyagi Prefecture, Japan

\*Masakazu Hashimoto<sup>1</sup> (1. International Research Institute of Disaster Science, Tohoku University, Japan)

Keywords: Investigation of typhoon no. 19

Typhoon no. 19/(Typhoon Hagibis) which was one of the strongest to make landfall in Japan in several decades caused severe flooding in eastern Japan in October 2019. The Yoshida River that flows through Miyagi Prefecture also suffered severely from the flooding. In this context, we examined the historical background of the flood inundation due to a dyke breach at Kasukawa area in Osato-cho, Miyagi prefecture. In order to understand the flooding processes and the damage scenario, we conducted a field survey of the affected area. Historical data and documents were collected and analyzed especially regarding the flood in 1986. Additionally, we also performed numerical simulations to further understand the flood and inundation characteristics considering both with and without dyke breach. This study revealed clear change in the historical flood hazard and also depicted the impact of dyke breach in increasing the extent of the flood damage.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-46] Disaster Risk Reduction Knowledge Service

Juanle Wang<sup>1,4</sup>, Kun Bu<sup>2,4</sup>, \*Yuelel Yuan<sup>1,4</sup>, Yujie Wang<sup>1,4</sup>, Xuehua Han<sup>1,3,4</sup> (1. Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, 2. Northeast Institute of geography and Agroecology, Chinese Academy of Sciences, 3. University of Chinese Academy of Sciences, 4. International Knowledge Centre for Engineering Sciences and Technology under the Auspices of UNESCO)  
 Keywords: Disaster risk reduction, Knowledge service, Data driven, Engineering technology, Knowledge center

Disaster risk reduction is a global concerned issue pushed by UN Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction. The requirement for disaster risk reduction platform based on international cooperation and big data mining is urgent. Under this background, Disaster Risk Reduction Knowledge Service (DRR) was born under the guidance of the International Knowledge Centre for Engineering Sciences and Technology under the Auspices of UNESCO (IKCEST) in China in 2016. DRR sets up global disaster metadata standards, disaster thematic database of earthquake, flood, drought, freezing, etc., and historical disaster map database, knowledge databases including disaster experts, disaster events, disaster documents, disaster media, disaster institutions, etc., and knowledge applications of Global earthquake daily distribution map service, map visualization services of China historical disasters, thematic knowledge services for emergency relief, natural disaster relief experiences from China and international, the spatio-temporal distribution of arable land drought in the Belt and Road area and so on. The DRR system has been online (<http://drr.ikcest.org>) and provides knowledge services for international communities. Through the 3 years research and development, DRR integrated the basic national information of resources and environment data of the 54 countries along "The Belt and Road" and sets up 111 thematic databases, with a total of 165 disaster datasets, for the serious disaster types such as drought, earthquake, flood disaster and frost rain and snow disaster. DRR have carried out 13 thematic knowledge services based on big data mining and analysis technology. Till the end of July, 2019, DRR platform has attracted 11 thousand page views per month, about 29% from abroad and 71% from domestic.

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12:15 PM - 1:15 PM (Mon. Nov 11, 2019 12:15 PM - 1:15 PM Poster & Exhibition)

## [P-47] Water-Related Disaster Security: Assessing National Risk in Asia

\*Ilpyon Hong<sup>1</sup> (1. Korea Institute of Civil Engineering and Building Technology (KICT))

Keywords: Water-Related Disaster Security

In association with Asian Development Bank (ADB), KICT and JHSUSTAIN have partnered to develop an index assessing national water-related disaster risk at a sub-basin level which uses indicators that can be scaled up to represent risk at a national level. Researchers adapted a methodology for disaster resilience pioneered by the International Centre for Water Hazard and Risk Management (ICHARM) by incorporating hazard factors though data from the Centre for Research on the Epidemiology of Disasters (CRED), expanding the scope of indicators and utilizing the most recent national data from trusted international sources. This index considers hydrological, meteorological, and climatological disasters. Risk is assessed in this index through three indicators; hazard-exposure, vulnerability, and capacity. The water-related disaster risk indicators are assessed based on 16 sub-indicators, including 6 for hazard-exposure, 5 for vulnerability, and 5 for capacity. Each of these sub-indicators have been developed and aligned with data which can be readily collected (if it does not already exist) at a sub-basin level, a provincial level, or a national level. The concept was to develop an index which can scale to allow for both regional and national assessments of water-related disaster risk. The objective is to create a practical tool which can be utilized by policy-makers to understand at a glance the relative risk parts of their country to water-related disaster. The broader goal, in combination with a



separate project developing a national-level index for 49 Asian nations as part of ADB's Asian Water Development Outlook 2020, will be to allow for practical comparison of water-related disaster risk across national borders and to allow users to drill down into the details to understand where that risk comes from.

Flash Talk Presentation

## Enterprise Risk Management platform to minimize economic losses from disasters

Yudai Tsuda

Mon. Nov 11, 2019 12:15 PM - 12:30 PM Flash Talk Presentation 1 (Meeting Room 6)

Tech Design Co.,Ltd.

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### [MP2-01] Enterprise Risk Management platform to minimize economic losses from disasters

Yudai Tsuda (Tech Design Co.,Ltd.)

12:15 PM - 12:30 PM

12:15 PM - 12:30 PM (Mon. Nov 11, 2019 12:15 PM - 12:30 PM Flash Talk Presentation 1)

## **[MP2-01] Enterprise Risk Management platform to minimize economic losses from disasters**

Yudai Tsuda (Tech Design Co.,Ltd.)

Especially in Japan, natural disasters are a major factor that prevents business continuity of companies. As BCP and BCM are the shortcuts to disaster reduction, we will provide the solutions utilizing Big Data and AI that companies are easy to prepare for.

Flash Talk Presentation

## New Sports Day for Bosai

～ Disaster Prevention “ Revolution" by Entertainment force～

DAIKI AKASAKA

Mon. Nov 11, 2019 12:35 PM - 12:50 PM Flash Talk Presentation 1 (Meeting Room 6)

IKUSA Inc.

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[MP2-02] New Sports Day for Bosai

～ Disaster Prevention “ Revolution" by Entertainment force～

DAIKI AKASAKA (IKUSA Inc.)

12:35 PM - 12:50 PM

12:35 PM - 12:50 PM (Mon. Nov 11, 2019 12:35 PM - 12:50 PM Flash Talk Presentation 1)

## [MP2-02] New Sports Day for Bosai

～ Disaster Prevention “ Revolution" by Entertainment force～

DAIKI AKASAKA (IKUSA Inc.)

With our proven entertainment force, we hold a Revolutionary Sports festival for disaster prevention. Groundbreaking Plays for learning Self-help and Help Others during a disaster. No more lack for disaster prevention. This festival confidently open up young people and businessman who should be necessary leader during a disaster.

Flash Talk Presentation

## The Creation of “ Investment Crowdfunding Platform for Non-Profit Organization”

Yusaku Izumi

Mon. Nov 11, 2019 12:55 PM - 1:10 PM Flash Talk Presentation 1 (Meeting Room 6)

KOKUA

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### [MP2-03] The Creation of “ Investment Crowdfunding Platform for Non-Profit Organization”

Yusaku Izumi (KOKUA)

12:55 PM - 1:10 PM

12:55 PM - 1:10 PM (Mon. Nov 11, 2019 12:55 PM - 1:10 PM Flash Talk Presentation 1)

## [MP2-03] The Creation of “ Investment Crowdfunding Platform for Non-Profit Organization”

Yusaku Izumi (KOKUA)

We are planning to create to “ Investment Crowdfunding Platform for Non-Profit Organization” .

This platform supports non-profit organization with corporate social activity costs and general consumer philanthropy. We are sure it will make an innovation.

The presentation will explain about “ what is this” , “ why do we make it” and “ What is different from the current system”.

Flash Talk Presentation

## why free restaurants for children can be bousai platform.

Kojiro Akiyama

Mon. Nov 11, 2019 1:15 PM - 1:30 PM Flash Talk Presentation 1 (Meeting Room 6)

Kodomo-shokudo support organization

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### [MP2-04] why free restaurants for children can be bousai platform.

Kojiro Akiyama (Kodomo-shokudo support organization)

1:15 PM - 1:30 PM



1:15 PM - 1:30 PM (Mon. Nov 11, 2019 1:15 PM - 1:30 PM Flash Talk Presentation 1)

## **[MP2-04] why free restaurants for children can be bousai plattform.**

Kojiro Akiyama (Kodomo-shokudo support organization)

In Japan, some of children have troubles. Some have economically trouble, some have family trouble. For such a child, there are 4,000 Kodomo-shokudos. Kodomo-shokudo is a restaurant that serve a free or cheep meal for children.

Now, many Kodomo-shokudos owner start bousai education in there restaurants.

I show you one bousai product that make Kodomo-shokudos teach bousai and show you why Kodomo-shokudos can be bousai platforms.

Flash Talk Presentation

## Forestry technology to DRR field

Akihiro Matsushita

Mon. Nov 11, 2019 3:05 PM - 3:20 PM Flash Talk Presentation 1 (Meeting Room 6)

CINQ.Co., Ltd

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### [MP2-05] Forestry technology to DRR field

Akihiro Matsushita (CINQ.Co., Ltd)

3:05 PM - 3:20 PM

3:05 PM - 3:20 PM (Mon. Nov 11, 2019 3:05 PM - 3:20 PM Flash Talk Presentation 1)

## [MP2-05] Forestry technology to DRR field

Akihiro Matsushita (CINQ.Co., Ltd)

Information we know only because we work every day in the forest where people do not usually go

There is a danger that can be found from a different angle.

The information is collected through photos and managed centrally.

Forestry machines, tree climbing, and forest road building techniques can help prevent and recover from landslide disasters.

We will create a system that allows forestry engineers throughout Japan to play an active role in the DRR.

And we will make zero victims of landslide disasters from Japan.

Flash Talk Presentation

## Development of the new disaster information analysis system which looking ahead for the next-generation Japan.

Akihiro Nakamura

Mon. Nov 11, 2019 5:05 PM - 5:20 PM Flash Talk Presentation 1 (Meeting Room 6)

LPP (Life Protect Plan)

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### [MP2-06] Development of the new disaster information analysis system which looking ahead for the next-generation Japan.

Akihiro Nakamura (LPP (Life Protect Plan))

5:05 PM - 5:20 PM

5:05 PM - 5:20 PM (Mon. Nov 11, 2019 5:05 PM - 5:20 PM Flash Talk Presentation 1)

## **[MP2-06] Development of the new disaster information analysis system which looking ahead for the next-generation Japan.**

Akihiro Nakamura (LPP (Life Protect Plan))

In recent years, various large-scale natural disaster such as an earthquake or the typhoon occurs almost every year in our country.

And along with the super-ageing society, number of emergency dispatch is increasing.

Flash Talk Presentation

## Fuel stocking proposal to connect life at the time of disaster

Mitsuaki Kizaki

Mon. Nov 11, 2019 12:15 PM - 12:30 PM Flash Talk Presentation 2 (Meeting Room 7)

Nippon BCP Inc

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### [MP2-07] Fuel stocking proposal to connect life at the time of disaster

Mitsuaki Kizaki (Nippon BCP Inc)

12:15 PM - 12:30 PM

12:15 PM - 12:30 PM (Mon. Nov 11, 2019 12:15 PM - 12:30 PM Flash Talk Presentation 2)

## [MP2-07] Fuel stocking proposal to connect life at the time of disaster

Mitsuaki Kizaki (Nippon BCP Inc)

Japan BCP Initiatives Description of the company profile, activities, and Analysis of oil shortages in the Great East Japan Earthquake Service contents Oil exclusive storage contract, emergency exclusive delivery contract Activities so far Activities in each disaster, such as the Great East Japan Earthquake and heavy rains in Western Japan Disaster Prevention Agreement between Osaka Prefecture and Osaka City Joint research with Kansai University Future prospects At the end I will summarize this session. We will work on comprehensive BCP countermeasures and make proposals as a disaster prevention mitigation company.

Flash Talk Presentation

## Gender in disaster: Elderly caregiver circumstances during the Great East Japan Earthquake example study of rural coastal area in Iwate prefecture

Miwako Kitamura

Mon. Nov 11, 2019 12:35 PM - 12:50 PM Flash Talk Presentation 2 (Meeting Room 7)

Tohoku University Graduate school of Engineering

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[MP2-08] Gender in disaster: Elderly caregiver circumstances during the Great East Japan Earthquake example study of rural coastal area in Iwate prefecture

Miwako Kitamura (Tohoku University Graduate school of Engineering)

12:35 PM - 12:50 PM



12:35 PM - 12:50 PM (Mon. Nov 11, 2019 12:35 PM - 12:50 PM Flash Talk Presentation 2)

## [MP2-08] Gender in disaster: Elderly caregiver circumstances during the Great East Japan Earthquake example study of rural coastal area in Iwate prefecture

Miwako Kitamura (Tohoku University Graduate school of Engineering)

Many older adults died in the Great East Japan Earthquake who were engaged in care-givers. In this study, we clarified what kind of behavior the woman who was involved in the care for the older adults who lived in the Kirikiri area in Otuchi-cho, Iwate Prefecture when the Great East Japan Earthquake occurred. This research analyzes the testimony of "live proof," which is a collection of testimonies of the bereaved of the people who lost in the Great East Japan Earthquake. Not only that, this study conducted using interviews and statistics data of survivors.

Flash Talk Presentation

## Enhancing the Access of Foreigners to the Disaster Relief Assistance

Ikuyo Kikusawa

Mon. Nov 11, 2019 12:55 PM - 1:10 PM Flash Talk Presentation 2 (Meeting Room 7)

Chief Researcher, Fukuoka Urban Research Center

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### [MP2-09] Enhancing the Access of Foreigners to the Disaster Relief Assistance

Ikuyo Kikusawa (Chief Researcher, Fukuoka Urban Research Center)

12:55 PM - 1:10 PM

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12:55 PM - 1:10 PM (Mon. Nov 11, 2019 12:55 PM - 1:10 PM Flash Talk Presentation 2)

## [MP2-09] Enhancing the Access of Foreigners to the Disaster Relief Assistance

Ikuyo Kikusawa (Chief Researcher, Fukuoka Urban Research Center)

Fukuoka City has seen a remarkable increase in the number of both international residents and foreign visitors. It is critical to strengthen disaster relief assistance for foreigners. The study focuses on the “access” of foreigners to the concerned assistance. Although disaster prevention information has been translated into multiple languages, whether the information is surely reached to target groups is not verified. The study examines the vulnerability and constraints of foreigners in the case of natural disasters, and see whether and how existing disaster management policy and information technology measures for disaster risk reduction respond to the constraints.

Flash Talk Presentation

## Disaster Management through Augmented Reality and Satellite Data

Ariston N. Gonzalez

Mon. Nov 11, 2019 1:15 PM - 1:30 PM Flash Talk Presentation 2 (Meeting Room 7)

Adarna Aerospace

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### [MP2-10] Disaster Management through Augmented Reality and Satellite Data

Ariston N. Gonzalez (Adarna Aerospace)

1:15 PM - 1:30 PM

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1:15 PM - 1:30 PM (Mon. Nov 11, 2019 1:15 PM - 1:30 PM Flash Talk Presentation 2)

## [MP2-10] Disaster Management through Augmented Reality and Satellite Data

Ariston N. Gonzalez (Adarna Aerospace)

### Geospatial

information from remote sensing satellite data, if leveraged correctly, can drastically aid in disaster management productivity, hazard mapping, and building resilience. Unfortunately, these technical data are mostly utilized only by scientists and specialists. Rarely do the ground level responders, users, and even disaster operations managers, incorporate this information into their operations.

The main barrier for this is that data

visualization is limited to two dimensional (2D)

maps and graphs, leaving data without three dimensional (3D) spatial anchors. Having an intuitive immersion through augmented and virtual reality is a key to effective data contextualization. Additionally, the scenarios in the virtual space can be recreated to simulate real world disaster conditions, helping in pre disaster preparedness of disaster manager, responders, and volunteers alike.

At

Adarna Aerospace, we break the barriers to utilization of technology, because we believe that data can save resources, save time, and more importantly, save lives!

Flash Talk Presentation

## Crisis Management in the field of Tourism

Hokuto Asano

Mon. Nov 11, 2019 3:05 PM - 3:20 PM Flash Talk Presentation 2 (Meeting Room 7)

Japan Tourism Agency

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### [MP2-11] Crisis Management in the field of Tourism

Hokuto Asano (Japan Tourism Agency)

3:05 PM - 3:20 PM

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3:05 PM - 3:20 PM (Mon. Nov 11, 2019 3:05 PM - 3:20 PM Flash Talk Presentation 2)

## [MP2-11] Crisis Management in the field of Tourism

Hokuto Asano (Japan Tourism Agency)

Tourism faces various kinds of threats. Since natural disasters occurs everywhere, the protection of tourists following natural disasters and the recovery from reputational damage are recognized as key issues all over the world. On this point, Japan Tourism Agency is working on the improvement of tourism resilience against natural disasters. The Japan Tourism agency will share its knowledge and experience regarding tourism resilience with international communities. In addition, Japan will host the G20 Tourism Ministers Meeting in this October and its main theme is “Tourism’ s contribution to SDGs” including tourism resilience. The Japan Tourism Agency also explain the discussion at the G20 Tourism Ministers Meeting.

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Flash Talk Presentation

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Mon. Nov 11, 2019 5:05 PM - 5:20 PM Flash Talk Presentation 2 (Meeting Room 7)

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[MP2-12] -

5:05 PM - 5:20 PM



5:05 PM - 5:20 PM (Mon. Nov 11, 2019 5:05 PM - 5:20 PM Flash Talk Presentation 2)

[MP2-12] -

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Keynote Speech

[K01]

Hidden Stories of the Sendai Framework negotiation processes?

-How Japanese BOUSAI experiences embedded to Sendai Framework-

Kimio Takeya

Mon. Nov 11, 2019 8:00 AM - 8:20 AM Room 1 (Main Hall)

Distinguished Senior Adviser to the President of JICA

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[K01] Hidden Stories of the Sendai Framework negotiation processes?

-How Japanese BOUSAI experiences embedded to Sendai Framework-

Kimio Takeya (Distinguished Senior Adviser to the President of JICA)

8:00 AM - 10:00 AM

8:00 AM - 10:00 AM (Mon. Nov 11, 2019 8:00 AM - 8:20 AM Room 1)

[K01] Hidden Stories of the Sendai Framework negotiation processes?  
-How Japanese BOUSAI experiences embedded to Sendai  
Framework-

Kimio Takeya (Distinguished Senior Adviser to the President of JICA)

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Oral Sessions | Session

[O3-1]

## Toward Restoration after Fukushima Daiichi Nuclear Accident

Tue. Nov 12, 2019 8:30 AM - 10:00 AM Room 1 (Main Hall)

Tohoku University

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### [O3-1-01] Toward Restoration after Fukushima Daiichi Nuclear Accident

\*Nobuyoshi Hara<sup>1</sup>, \*Akira HASEGAWA<sup>2</sup>, \*Masatoshi SUZUKI<sup>3</sup>, \*Masashi KONYO<sup>4</sup>, \*Yutaka WATANABE<sup>5</sup> (1. Institute for Disaster Reconstruction and Regeneration Research, Tohoku University, 2. School of Engineering, Tohoku University, 3. International Research Institute of Disaster Science, Tohoku University, 4. Graduate School of Information Sciences, Tohoku University, 5. Center for Fundamental Research on Nuclear Decommissioning, Tohoku University)

8:30 AM - 10:00 AM

8:30 AM - 10:00 AM (Tue. Nov 12, 2019 8:30 AM - 10:00 AM Room 1)

## [O3-1-01] Toward Restoration after Fukushima Daiichi Nuclear Accident

\*Nobuyoshi Hara<sup>1</sup>, \*Akira HASEGAWA<sup>2</sup>, \*Masatoshi SUZUKI<sup>3</sup>, \*Masashi KONYO<sup>4</sup>, \*Yutaka WATANABE<sup>5</sup> (1.

Institute for Disaster Reconstruction and Regeneration Research, Tohoku University, 2. School of Engineering, Tohoku University, 3. International Research Institute of Disaster Science, Tohoku University, 4. Graduate School of Information Sciences, Tohoku University, 5. Center for Fundamental Research on Nuclear Decommissioning, Tohoku University)

Keywords: Fukushima Daiichi Nuclear Accident, Nuclear Decommissioning, Restoration of Living Environments, Disaster Response Robots, Human Resource Development

A few selected activities being set forward by Institute for Disaster Reconstruction and Regeneration Research, Tohoku University, for restoration after Fukushima Daiichi Nuclear Accident will be shared with the audience in this session.

The first topic is “technology development for the restoration of living environments contaminated by radioactive materials”. The project aspires to develop technology for the restoration of living environments contaminated with radioactive materials. That is, decontamination technology for soil, technology effectively utilizing collected radioactive materials, methods for the cultivation of non-radioactive crops, or non-destructive (whole) monitoring technology for gamma radiation. The outcomes are offered to residents living in the areas damaged by Great East Japan Earthquake for their recovering from the disaster.

The second topic is “comprehensive radiation assessment of disaster affected animals”. Biological effects by long-term exposure of low dose/ low dose-rate radiation have been drawing scientific and social attention since the accident of Fukushima Daiichi Nuclear Power Station occurred. The presentation will introduce the activities in which biological samples were collected from livestock and Japanese macaques living within the ex-evacuation zone of the accident and biological effects were analyzed.

The third topic is “disaster response robots and remote technologies”. Remote operation in confined spaces with many obstacles is a tough mission for the disaster response robots. The talk introduces a snake-like long flexible robot applied for the Fukushima Daiichi Accident and its recent advanced technologies.

The fourth topic is “activities of Center for Fundamental Research on Nuclear Decommissioning”, where our approaches of fundamental research and human resource development to contribute to decommissioning of Fukushima Daiichi NPS will be introduced.

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Oral Sessions | Session

[O3-3]

## Value of advance information for earthquake damage reduction and its feasibility

Tue. Nov 12, 2019 1:30 PM - 3:00 PM Room 1 (Main Hall)

OPTAGE Inc.

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### [O3-3-01] Value of advance information for earthquake damage reduction and its feasibility

Toshihiro Mori<sup>1</sup>, \*Izumi Tobo<sup>2</sup>, \*Ken Umeno<sup>3</sup>, \*Yukio Fujinawa<sup>4</sup>, Atsushi Oono<sup>1</sup>, Takashi Mii<sup>1</sup>, Tadahiro Eguchi<sup>1</sup>, Morihiro Matsuda<sup>1</sup>, Michiaki Yokoyama<sup>1</sup> (1. OPTAGE Inc., 2. Mitsubishi Research Institute, Inc., 3. Kyoto University, 4. Organization for Development of Resilient Communities)

1:30 PM - 3:00 PM

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1:30 PM - 3:00 PM (Tue. Nov 12, 2019 1:30 PM - 3:00 PM Room 1)

## [O3-3-01] Value of advance information for earthquake damage reduction and its feasibility

Toshihiro Mori<sup>1</sup>, \*Izumi Tobo<sup>2</sup>, \*Ken Umeno<sup>3</sup>, \*Yukio Fujinawa<sup>4</sup>, Atsushi Oono<sup>1</sup>, Takashi Mii<sup>1</sup>, Tadahiro Eguchi<sup>1</sup>, Morihiro Matsuda<sup>1</sup>, Michiaki Yokoyama<sup>1</sup> (1. OPTAGE Inc., 2. Mitsubishi Research Institute, Inc., 3. Kyoto University, 4. Organization for Development of Resilient Communities)

Keywords: Value of advance information, Nankai Trough Earthquake, the state-of-the-art earthquake technology, feasibility, earthquake precursors

In this session, the value of advance information for earthquake damage reduction will be shared, and experts will introduce the state-of-the-art earthquake precursor detection technology in Japan.

The probability of a huge earthquake in the Nankai Trough is estimated to be 70-80% within the next 30 years.

In addition, the estimated number of fatalities is up to 320,000, of which 230,000 are caused by the tsunami.

In order to reduce such expected damage, the Meteorological Agency has announced that it will issue an order of emergency information if an abnormal phenomenon is observed along the Nankai Trough.

(Case of abnormal phenomenon)

- Half of Nankai Trough's epicenter is broken and the other half remains
- M7 class earthquake occurs near the epicenter area of Nankai Trough
- A significant change is observed by a strain gauge

By distributing such advance information, many people can take actions in advance, which leads to mitigation of earthquake damages.

We believe that we need to improve the accuracy of useful emergency information.

That is because people can understand the increased risk, but they do not know when an earthquake will occur.

Recently, a number of abnormal phenomena before an earthquake have been reported.

We believe that it will lead to further improvement in accuracy by using such information.

In this session, we introduce the latest research and discuss its feasibility.

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Oral Sessions | Session

## [O3-4]

### Support to Disaster Risk Reduction by private sector

Tue. Nov 12, 2019 3:30 PM - 5:00 PM Room 1 (Main Hall)

JAPAN TOBACCO INC.

Simultaneous Interpretation is available. (同時通訳有り)

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#### [O3-4-01] Support to Disaster Risk Reduction by private sector

\*Hisashi Hamada<sup>1</sup> (1. JAPAN TOBACCO INC.)

3:30 PM - 5:00 PM



3:30 PM - 5:00 PM (Tue. Nov 12, 2019 3:30 PM - 5:00 PM Room 1)

## [O3-4-01] Support to Disaster Risk Reduction by private sector

\*Hisashi Hamada<sup>1</sup> (1. JAPAN TOBACCO INC.)

Keywords: Disaster Risk Reduction, Tohoku earthquake reconstruction, word-of-mouth tradition

- Introduction of our support for Tohoku earthquake reconstruction
- Introduction of our support for Disaster Risk Reduction program
- Necessity of word-of-mouth tradition (Introduction of 311 memorial network)

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Oral Sessions | Session

[O3-5]

## Spiritual care and relevant faith-based activity in disaster relief and recovery

Tue. Nov 12, 2019 8:30 AM - 10:00 AM Room 2 (Tachibana)

Soka Gakkai International

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### [O3-5-01] Spiritual care and relevant faith-based activity in disaster relief and recovery

Takaaki Ito<sup>3</sup>, Nobuhiko Katayama<sup>2</sup>, \*Emiko Kubo<sup>1</sup> (1. Soka Gakkai International, 2. World Vision Japan, 3. Sophia University)

8:30 AM - 10:00 AM

8:30 AM - 10:00 AM (Tue. Nov 12, 2019 8:30 AM - 10:00 AM Room 2)

## [O3-5-01] Spiritual care and relevant faith-based activity in disaster relief and recovery

Takaaki Ito<sup>3</sup>, Nobuhiko Katayama<sup>2</sup>, \*Emiko Kubo<sup>1</sup> (1. Soka Gakkai International, 2. World Vision Japan, 3. Sophia University)

Keywords: spiritual care, grief and loss, faith, faith-based organizations

The spiritual or psychosocial care of each victim of disaster is vitally important for their recovery. This aspect, however, tends to be given little attention in debates on disaster relief and recovery by governments. On the other hand, some academics and faith-based organizations proactively promote such care in a unique way that is beginning to receive increased attention.

In this session, Prof. Ito will share an overview of spiritual care for disaster victims and how faith can make a difference in all aspects of recovery. Mr. Katayama will elaborate how World Vision Japan is involving local churches in disaster preparation. He will address both the physical and spiritual aspects of recovery. Ms. Kubo will focus on the Soka Gakkai Japan's concert initiative that utilizes the power of music to aid recovery in the aftermath of disaster.

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Oral Sessions | Session

[O3-6]

## BOSAI DIVERSITY Diversity in disaster preparation

Tue. Nov 12, 2019 10:30 AM - 12:00 PM Room 2 (Tachibana)

Yahoo Japan co.

Simultaneous Interpretation is available. (同時通訳有り)

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[O3-6-01] **BOSAI DIVERSITY**

Diversity in disaster preparation.

\*Shuichi Nishida<sup>1</sup>, Takahiro Koga<sup>1</sup> (1. Yahoo Japan Corporation)

10:30 AM - 12:00 PM

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10:30 AM - 12:00 PM (Tue. Nov 12, 2019 10:30 AM - 12:00 PM Room 2)

## [O3-6-01] BOSAI DIVERSITY

### Diversity in disaster preparation.

\*Shuichi Nishida<sup>1</sup>, Takahiro Koga<sup>1</sup> (1. Yahoo Japan Corporation)

Keywords: diversity, preparation, emergency kit

Talk to anyone who's lived through a disaster, and they'll tell you the same thing:

There's no such thing as a universal emergency kit. Different people have specific needs that can only be met with specific items.

We saw that this led to low levels of disaster preparedness, and wanted to let everyone know the preparations required for each person in evacuation shelters.

Immediately after an earthquake or other disaster, media coverage and interest among the government, corporations and populace focuses on the afflicted area. But few take into consideration the diverse characteristics and living environments of people forced to evacuate. It is a little-known fact that many people in post-disaster shelters suffer from declining health, or even lose their lives. For this reason, we wanted to make it easier for people who have never experienced a disaster to immediately take action by clearly presenting the kinds of emergency kit items that people would need for themselves and their own living environments.

The launch of the project was timed to the week before the anniversary of the Great East Japan Earthquake and Tsunami, when reporting and awareness about disasters and disaster preparedness are highest in Japan. Our approach was to present a new concept that emergency kits are unique for diverse types of people. We communicated this through a website and hands-on events with illustrated cards that show how different kinds of people should prepare for disasters. These were covered in numerous online articles and TV reports, and participants posted positive comments about the project on social media, along with support from Japan's Cabinet Office, the United Nations Information Centre, UNICEF, and other government and international non-governmental organizations.

This widespread recognition contributed to greater awareness about disaster preparations. Celebrities, government agencies, international NGOs and others saluted our new concept and began promoting it on their own.

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Oral Sessions | Session

[O3-7]

## The Asia-Pacific Disaster Report 2019: Pathways for resilience, inclusion and empowerment

Tue. Nov 12, 2019 1:30 PM - 3:00 PM Room 2 (Tachibana)

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### [O3-7-01] The Asia-Pacific Disaster Report 2019: Pathways for resilience, inclusion and empowerment

\*Laura Louise Hendy<sup>1</sup>, Maria Bernadet Karina Dewi<sup>1</sup> (1. United Nations ESCAP)

1:30 PM - 3:00 PM

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1:30 PM - 3:00 PM (Tue. Nov 12, 2019 1:30 PM - 3:00 PM Room 2)

## [O3-7-01] The Asia-Pacific Disaster Report 2019: Pathways for resilience, inclusion and empowerment

\*Laura Louise Hendy<sup>1</sup>, Maria Bernadet Karina Dewi<sup>1</sup> (1. United Nations ESCAP)

Keywords: The Asia-Pacific Disaster Report

The Asia-Pacific region faces a daunting spectrum of natural hazards. Many countries could be reaching a tipping point beyond which disaster risk, fueled by climate change, exceeds their capacity to respond. This session will explore the findings of The Asia-Pacific Disaster Report 2019, which captures the full complexity of disaster risk in the region for the first time and introduces policy actions for strengthening disaster resilience.

Representatives from ESCAP will present the regional ‘riskscape’ introduced by the Report. This reveals that annual economic losses are quadruple previous estimates, at US \$ 675 billion a year until 2030. The risks are distributed unevenly across the region, clustered around four transboundary disaster risk hotspots in which environmental fragility converges with critical socioeconomic vulnerabilities. Furthermore, the report demonstrates how disasters are widening inequalities in incomes and opportunities, thereby threatening hard won development gains.

In a second presentation, representatives from ESCAP will then outline the policy actions introduced by the Report, to break the links between disasters, poverty and inequality. It will demonstrate that governments can outpace disaster risk through a comprehensive portfolio of risk-informed social sector investments and innovative pro-poor disaster risk reduction measures. Similarly, it will showcase how emerging technologies such as big data and digital identities are being applied to ensure that the poorest and most vulnerable groups are included in these policy interventions. Finally, it will outline the potential for strengthened regional cooperation to reinforce national efforts.

The session will then proceed with a series of presentations in which organizations and researchers will provide feedback on the findings from their perspectives. This will inform a subsequent open discussion, wherein participants will consider how the policy actions introduced by the report can be used to strengthen the resilience across the riskscape.

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Oral Sessions | Session

[O3-8]

## "FUKUSHIMA" its disasters archives, current revitalization status and the future

Tue. Nov 12, 2019 3:30 PM - 5:00 PM Room 2 (Tachibana)

Business Council for the Fukushima Innovation Coast Initiative (representative of Tokyo Electric Power Company)

Simultaneous Interpretation is available. (同時通訳有り)

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### [O3-8-01] "FUKUSHIMA" its disasters archives, current revitalization status and the future

\*Hideya KITAMURA<sup>1</sup>, \*Shubun ENDO<sup>2</sup>, \*looking for suitable person looking for suitable person<sup>3</sup>

(1. Business Council for the Fukushima Innovation Coast Initiative (representative of Tokyo Electric Power Company), 2. Futaba Inc, 3. Fukushima prefecture or University of Fukushima)

3:30 PM - 5:00 PM



3:30 PM - 5:00 PM (Tue. Nov 12, 2019 3:30 PM - 5:00 PM Room 2)

## [O3-8-01] "FUKUSHIMA" its disasters archives, current revitalization status and the future

\*Hideya KITAMURA<sup>1</sup>, \*Shubun ENDO<sup>2</sup>, \*looking for suitable person looking for suitable person<sup>3</sup> (1. Business Council for the Fukushima Innovation Coast Initiative (representative of Tokyo Electric Power Company), 2. Futaba Inc, 3. Fukushima prefecture or University of Fukushima)

Keywords: Great East Japan Earthquake, Fukushima Innovation Coast Initiative, Accident of Fukushima Daiichi Nuclear Power Plant, Revitalization, Resilience

Over 8 years has passed from Great East Japan Earthquake and following nuclear power plants accident in Fukushima. We will briefly provide feedback about the disasters, and explain the current revitalization efforts such as decontamination activities of environment, Innovation Coast Program (national industrial development program) in detail. We also run a panel discussion about the current regional problems and possible efforts to create the future.

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Oral Sessions | Session

[O3-10]

## Interdisciplinary Strategies in General Education for Disaster Risk Reduction: The Six-Year Experience by DRMAPS at the University of the Philippines

Tue. Nov 12, 2019 10:30 AM - 12:00 PM Room 3 (Hagi)

University of the Philippines Diliman

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### [O3-10-01] **Interdisciplinary Strategies in General Education for Disaster Risk Reduction:**

**The Six-Year Experience by DRMAPS at the University of the Philippines**

\*Benito M. Pacheco<sup>1</sup>, \*Flaudette May V. Datuin<sup>1</sup>, \*Aurora Odette C. Mendoza<sup>1</sup>, \*Elenita N. Que<sup>1</sup>, \*Leonardo C. Rosete<sup>1</sup>, \*Mark Albert H. Zarco<sup>1</sup> (1. University of the Philippines Diliman)

10:30 AM - 12:00 PM

10:30 AM - 12:00 PM (Tue. Nov 12, 2019 10:30 AM - 12:00 PM Room 3)

## [O3-10-01] Interdisciplinary Strategies in General Education for Disaster Risk Reduction:

### The Six-Year Experience by DRMAPS at the University of the Philippines

\*Benito M. Pacheco<sup>1</sup>, \*Flaudette May V. Datuin<sup>1</sup>, \*Aurora Odette C. Mendoza<sup>1</sup>, \*Elenita N. Que<sup>1</sup>, \*Leonardo C. Rosete<sup>1</sup>, \*Mark Albert H. Zarco<sup>1</sup> (1. University of the Philippines Diliman)

Keywords: General education, Interdisciplinary, Strategies

In panel discussion, professors from different colleges of the University of the Philippines Diliman share their experience co-pioneering the course DRMAPS (formerly DMAPS) or Disaster Risk Mitigation, Adaptation, and Preparedness Strategies, for general education of undergraduates. In open forum, ideas are solicited how DRR education may be improved.

The professors come from departments of art studies, civil engineering, educational technology, psychology, and visual communication. Students of the class also come from different disciplines.

Over six years, the course has been offered in ten semesters and taken by more than 1,000 students; with recent curricular revisions in the university, more students are expected.

Among the themes of this session are:

- (a) Disaster risk reduction, rather than disaster management, is the preferred focus of general education; preemptive strategy is preferred over reactive.
- (b) Interdisciplinary is the preferred character of general education, intersecting arts and humanities, social sciences and philosophy, and mathematics, science and technology.
- (c) Interdisciplinary or transdisciplinary is the preferred character of disaster risk reduction strategies.
- (d) Collaboration is encouraged not only among the teachers but also among the students.
- (e) Risk perception and risk communication are as important as risk assessment.
- (f) Understanding risk is facilitated by distinguishing such risk factors as hazard, exposure, and vulnerability; considered are multiple hazards, various exposed elements including human, and the unique vulnerabilities of each element as exposed to each particular hazard.
- (g) In framing questions about risk and risk factors, equally useful are such frameworks as ecocritical, psychosocial, and sociopolitical.
- (h) ICT in education must capture the imagination of today's students, to hasten the assimilation of disaster risk reduction ideas into the households and communities.

The session panelists introduce some outcomes of their researches and creative works, while they preview the conduct of DRMAPS class and share practical lessons in teaching the class.

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Oral Sessions | Session

[O3-11]

**BOSAI POINT.**A new disaster-preventing service,using your untouched points to raise donations

Tue. Nov 12, 2019 1:30 PM - 3:00 PM Room 3 (Hagi)

BOSAI POINT PROJECT

Simultaneous Interpretation is available. (同時通訳有り)

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[O3-11-01] **BOSAI POINT.**

**A new disaster-preventing service,  
using your untouched points to raise donations.**

\*JUNSHIRO KAMEYAMA<sup>1</sup> (1. BOSAI POINT PROJECT)

1:30 PM - 3:00 PM

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1:30 PM - 3:00 PM (Tue. Nov 12, 2019 1:30 PM - 3:00 PM Room 3)

## [O3-11-01] BOSAI POINT.

### **A new disaster-preventing service, using your untouched points to raise donations.**

\*JUNSHIRO KAMEYAMA<sup>1</sup> (1. BOSAI POINT PROJECT)

Keywords: non

#### **BOSAI POINT.**

**A new disaster-preventing service,  
using your untouched points to raise donations.**

There was a huge earthquake in Hokkaido, on the night of September 6th, 2018. Sapporo, one of the biggest cities in Japan, experienced a severe blackout, and the earthquake touched off enormous landslides. It was broadcasted across the country, and shocked people all over Japan.

Since there could be more natural disasters in the near future, can't we invent a new way to prepare for them?

From that standpoint, we started a whole new disaster-preventing service, using an untouched asset to raise donations; the points.

In September, the service has been launched in Hokkaido, and is planned to be available across the country next year.

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Oral Sessions | Session

[O3-12]

## The future of wide area disaster response by drones and air mobilities

Tue. Nov 12, 2019 3:30 PM - 5:00 PM Room 3 (Hagi)

Drone Fund

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[O3-12-01] The future of wide area disaster response by drones and air mobilities

\*Shintaro Takahashi<sup>1</sup>, Kotara Chiba<sup>1</sup>, Kenichi Ohmae<sup>1</sup>, Yukihiro Maru<sup>2</sup> (1. Drone Fund, 2. Leave a Nest)

3:30 PM - 5:00 PM

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3:30 PM - 5:00 PM (Tue. Nov 12, 2019 3:30 PM - 5:00 PM Room 3)

## [O3-12-01] The future of wide area disaster response by drones and air mobilities

\*Shintaro Takahashi<sup>1</sup>, Kotara Chiba<sup>1</sup>, Kenichi Ohmae<sup>1</sup>, Yukihiro Maru<sup>2</sup> (1. Drone Fund, 2. Leave a Nest)

Keywords: Drone, Air Mobility

This session aims to discuss the future of wide area disaster response by drones and air mobilities. Japan is facing problems of population decline so it is necessary to consider the social implementation of new technologies in order to cope with large-scale disasters. When disasters occur, Unmanned Aircraft Systems are expected to be active in areas such as wide-area disaster surveys and emergency transportations. Many first responders have already started using small multicopters for research purposes. In the 2020s, commercialization of large cargo drones and air mobilities are expected. In this session, we will mainly discuss three themes. Firstly, we will consider the future image of drone and air mobility based society. The Japanese government has made cabinet decisions on commercialization of drone at level 4 in 2022 and air mobility in 2023 as important policy goals. Secondly, we will analyze how to use new technologies including Unmanned Aircraft Systems and eVTOL. eVTOL has the potential to contribute to the potential of emergency supplies, medical staff and patients. Thirdly, we will discuss technical and legal issues.

In order to proceed with the implementation of drones for disaster response, it is necessary to work on the improvement of safety. We also need to share significance of this approach with various stakeholders including public and private sectors.

## [O3-13]

### Advances of International Collaboration on M9 Disaster Science

Tue. Nov 12, 2019 8:30 AM - 10:00 AM Room 4 (Shirakashi 1)

Tohoku University- IRIDeS

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#### [O3-13-01] Advances of International Collaboration on M9 Disaster Science

\*Kenjiro Terada<sup>1,4</sup>, \*Shunichi Koshimura<sup>1,4</sup>, \*Jorge Leon<sup>3,6</sup>, Randall J LeVeque<sup>2</sup>, Gabriel Gonzalez<sup>3,7</sup>, \*Patricio Catalan<sup>3,6</sup>, Elizabeth Maly<sup>1</sup>, \*Dan Abramson<sup>2</sup>, Carrie Garrison-Laney<sup>2</sup>, \*Michael Motley<sup>2</sup>, \*Naoko Kuriyama<sup>5</sup>, \*Lan Nguyen<sup>2</sup>, \*Adams Adams<sup>2</sup>, Anawat Suppasri<sup>1,4</sup>, Erick Mas<sup>1,4</sup>, Shuji Moriguchi<sup>1</sup> (1. IRIDeS, Tohoku University, 2. University of Washington, 3. CIGIDEN, Chile, 4. Core Research Cluster of Disaster Science, Tohoku University, 5. Kobe University, 6. Universidad Federico Santa Maria, 7. Universidad Católica del Norte)  
8:30 AM - 10:00 AM



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8:30 AM - 10:00 AM (Tue. Nov 12, 2019 8:30 AM - 10:00 AM Room 4)

## [O3-13-01] Advances of International Collaboration on M9 Disaster Science

\*Kenjiro Terada<sup>1,4</sup>, \*Shunichi Koshimura<sup>1,4</sup>, \*Jorge Leon<sup>3,6</sup>, Randall J LeVeque<sup>2</sup>, Gabriel Gonzalez<sup>3,7</sup>, \*Patricio Catalan<sup>3,6</sup>, Elizabeth Maly<sup>1</sup>, \*Dan Abramson<sup>2</sup>, Carrie Garrison-Laney<sup>2</sup>, \*Michael Motley<sup>2</sup>, \*Naoko Kuriyama<sup>5</sup>, \*Lan Nguyen<sup>2</sup>, \*Adams Adams<sup>2</sup>, Anawat Suppasri<sup>1,4</sup>, Erick Mas<sup>1,4</sup>, Shuji Moriguchi<sup>1</sup> (1. IRIDeS, Tohoku University, 2. University of Washington, 3. CIGIDEN, Chile, 4. Core Research Cluster of Disaster Science, Tohoku University, 5. Kobe University, 6. Universidad Federico Santa Maria, 7. Universidad Católica del Norte)

Keywords: Magnitude Nine (M9), Disaster simulation, Modeling, Planning, Sensing

Megathrust earthquakes along the subduction zones have caused significant impacts on our society and will be causes of future enormous risks and crisis. Many challenges and issues in reducing risks and enhancing disaster resilience have been addressed by on-going and previous research efforts. Now it is time to share the issues and produce innovative outcomes.

This session is a sequel of the International Workshop on Magnitude Nine (M9) Disaster Science that aims to initiate and accelerate the collaborations among the participants from the countries that have experienced megathrust earthquakes with M9, e.g. 1700 Cascadia, 1960 Chile, 1964 Alaska, and 2011 Japan.

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Oral Sessions | Session

[O3-14]

## Fuel stocking proposal to connect life at the time of disaster

Tue. Nov 12, 2019 10:30 AM - 12:00 PM Room 4 (Shirakashi 1)

NIOPN BCP INC

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[O3-14-01] Fuel stocking proposal to connect life at the time of disaster

mitsuaki kizaki<sup>1</sup>, \*Masataka Nakai<sup>1</sup>, \*Toru Matsunaga<sup>1</sup> (1. NIPON BCP INC)

10:30 AM - 12:00 PM

10:30 AM - 12:00 PM (Tue. Nov 12, 2019 10:30 AM - 12:00 PM Room 4)

## [O3-14-01] Fuel stocking proposal to connect life at the time of disaster

mitsuaki kizaki<sup>1</sup>, \*Masataka Nakai<sup>1</sup>, \*Toru Matsunaga<sup>1</sup> (1. NIPON BCP INC)

Keywords: · About "Japan BCP" approach, · Service contents, · Past activity results, · Future prospects,  
· Finally

· About "Japan BCP" approach

Explanation of company profile, activity content

Situation analysis of the oil shortage in the Great East Japan Earthquake

Given the risk of disasters, the fact that large oil tanks are often found in coastal areas is dangerous and it is desirable to store them in inland areas.

Purpose of Emergency Fuel Stocking Proposal

In Japan, the Ministry of Internal Affairs and Communications must require fuel stocks to be able to operate emergency generators for 72 hours for companies with important public infrastructure such as communications and broadcasting, etc., and promote voluntary stockpiling from the Ministry of Economy, Trade and Industry There is a notification to be promoted, and each company is considering fuel storage.

· Service contents

Exclusive storage contract for oil, exclusive delivery contract for emergency

Taking into consideration the emergency, we have stockpiled petroleum fuel from normal times, and we have also operated and maintained the vehicle date and time, and have established a system that can be delivered 24 hours a day, 365 days a year.

· Past activity results

Activity results for each disaster, such as the Great East Japan Earthquake and heavy rainfall in West Japan

Osaka Prefecture, disaster prevention agreement of Osaka City

Joint research with Kansai University

- Future prospects

There is a big difference in thinking between a company that proactively measures BCP in management after the earthquake and cases that are not. The problem is how to improve awareness.

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Oral Sessions | Session

[O3-15]

## Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Tue. Nov 12, 2019 1:30 PM - 3:00 PM Room 4 (Shirakashi 1)

All Japan Council Company

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[O3-15-01] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

\*Hideaki Murai<sup>1</sup>, \*Chikako Adachi<sup>1</sup>, Hiroaki Enoki<sup>1</sup>, \*Fumihiko Sugawara<sup>1</sup> (1. All Japan Council Company)

1:30 PM - 3:00 PM

1:30 PM - 3:00 PM (Tue. Nov 12, 2019 1:30 PM - 3:00 PM Room 4)

## [O3-15-01] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

\*Hideaki Murai<sup>1</sup>, \*Chikako Adachi<sup>1</sup>, Hiroaki Enoki<sup>1</sup>, \*Fumihiko Sugawara<sup>1</sup> (1. All Japan Council Company)

Keywords: Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

We worked on business warehouse "container Oami" which was not used for making of local bustling before earthquake disaster, but warehouse suffered from Great East Japan Earthquake before completion. The facility was unfinished but staff were employed, so the staff started a cell phone charging service.

Problems such as lost chargers and problems waiting in turn have been resolved each time. Other support activities include:

- Learning support

Investigate the city of Tome with the University of Tokyo for three years, make a community, and confirm the importance of the living base.

- Minami Kata temporary housing association activity support
- Tome establishment of woman support center
- Support for supplies

• The RQ Civil Disaster Relief Center starts supporting activities based on the former Masbuchi elementary school gymnasium in Towa Town, Tome City. So we decided to make an original design "Eco Brush". In order to look for areas that can be tackled by the community members, we will hold knitting classes around 40 temporary housing units and community associations so that we can become a team that can work together toward reconstruction rather than just internal jobs.

Develops and sells "Eco-Brush" as a community business.

We visited the town development friends of the whole country, held lectures and knitting parties, and found fans, etc., and developed a sales destination while building a visible relationship

In Hokkaido, we participate in events around March 11 every year and report the situation in Tohoku.

In Kyushu, he has continued to interact with Kumamoto (Mashiki, Minamiaso), Isahaya, Fukuoka and

Kitakyushu.

In Kansai, we are building a network with Osaka, Kobe, Ashiya and Mita.

- We worked on business warehouse "container Oami" which was not used for making of local bustling before earthquake disaster, but warehouse suffered from Great East Japan Earthquake before completion. The facility was unfinished but staff were employed, so the staff started a cell phone charging service.

Problems such as lost chargers and problems waiting in turn have been resolved each time. Other support activities include

We will continue our reconstruction support activities from the perspective of the victims.

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Oral Sessions | Session

[O3-16]

The Factors Regulate to Community Participation in Sustainable Disaster Recovery Program: An Experience of Cyclone Aila Disaster Affected Coastal People Bangladesh

Tue. Nov 12, 2019 3:30 PM - 5:00 PM Room 4 (Shirakashi 1)

University of Malaya, Malaysia

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[O3-16-01] **The Factors Regulate to Community Participation in Sustainable Disaster Recovery Program: An Experience of Cyclone Aila Disaster Affected Coastal People Bangladesh**

\*Emadul Islam<sup>1</sup>, Haris Abd Wahab<sup>1</sup> (1. University of Malaya, Malaysia)

3:30 PM - 5:00 PM



3:30 PM - 5:00 PM (Tue. Nov 12, 2019 3:30 PM - 5:00 PM Room 4)

## **[O3-16-01] The Factors Regulate to Community Participation in Sustainable Disaster Recovery Program: An Experience of Cyclone Aila Disaster Affected Coastal People Bangladesh**

\*Emadul Islam<sup>1</sup>, Haris Abd Wahab<sup>1</sup> (1. University of Malaya, Malaysia)

Keywords: Community participation, Factors, Sustainable disaster recovery, Bangladesh

Community participation is crucial for sustainable disaster recovery. The philosophy of Build Back Better in sustainable disaster recovery has emerged in the early 90s and progressed by the United Nations office of the Disaster Risk Reduction (UNISDR) Sendai Framework of Action (2015-2030). Bangladesh ranked 7<sup>th</sup> top disaster-affected country in the world in recent climate risk index (2019). However, Bangladesh has shown remarkable progress in disaster preparedness, response policy, and planning, but the disaster recovery phase is still remaining weak and ignore in national policy and planning.

This study aim was to identify the factors regulate to community participation in disaster recovery GO and NGO,s program and provide a model to strengthen the local and national strategies to promote bottom-up participation in a disaster recovery program for sustainability.

The study employed a convergent parallel mixed method design where the pragmatic paradigm and concurrent strategies applied in data collection, analysis, and interface. The study interviewed 230 Aila affected people, who participated in the government and non-government recovery program. In addition, a total 20 in-depth interview, 10 key informant interviews, and 2 focus group discussion were conducted for qualitative data. The study had developed a semi-structured questionnaire for quantitative and 3 different checklists for an in-depth interview, KII, and FGD, which was submitted to the University of Malaya Research Ethics Committee (UMREC) for getting ethical approval of the study.

Findings reveal that community participation in GO and NGO,s recovery program can be defined as passive participation. Because of project participant has no or limited access to project related decision making, while they have participated mostly in the project related information and consultation. The study identified eight dominant factors namely, disaster experience and vulnerability, resources, coordination, implementation strategies, ignorance, social capital, commitment and expectation of the community regulate to community participation in the disaster recovery program. In addition, leadership capacity, stakeholder power, political wishes, and power structure influence are also predictor to community participation in the recovery program. The study findings argue that to promote bottom-up participation, collaboration, and integration between GO and NGOs recovery program needed to improve for updating the existing policy or adopting a new policy. The proposition of the study developed from the expert level consultation that in the developing country context the “time paradox” in the disaster management administration has created the new challenge for adopting new policy and planning in the sustainable disaster recovery.

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Oral Sessions | Session

[O3-17]

## Redefining and be preparing for disasters: the lessons from the Moken sea nomads of Thailand

Tue. Nov 12, 2019 8:30 AM - 10:00 AM Room 5 (Shirakashi 2)

Chulalongkorn University

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### [O3-17-01] Redefining and be preparing for disasters: the lessons from the Moken sea nomads of Thailand

\*Narumon Arunotai<sup>1</sup> (1. Research Unit on Indigenous Peoples and Alternative Development, Social Research Institute, Chulalongkorn University, )

8:30 AM - 10:00 AM

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8:30 AM - 10:00 AM (Tue. Nov 12, 2019 8:30 AM - 10:00 AM Room 5)

## [O3-17-01] Redefining and be preparing for disasters: the lessons from the Moken sea nomads of Thailand

\*Narumon Arunotai<sup>1</sup> (1. Research Unit on Indigenous Peoples and Alternative Development, Social Research Institute, Chulalongkorn University, )

Keywords: Moken, Seas nomads, Surin Islands, disaster, relief

Prior to the Indian Ocean tsunami “disaster” of 2004, the Moken sea nomads of Thailand were practically invisible to the Thai public as well as the world. Yet the fact that one village on the Surin Islands in Phang-nga Province survived the incident despite their village being totally destroyed made them visible almost overnight. Recovery was also quick, as they did not have many material possessions and the huts were rebuilt within 3 weeks. In 2019, another “disaster” struck again, this time in the form of village fire, and again, 61 out of 80 huts were destroyed while all villagers escaped safely. Rebuilding huts was quickly done with the help and donation from outside the community. This presentation will trace the Moken’ s definition and interpretation of “disasters” and make the analysis of the lessons to be learned from the two incidents and possible ways of thinking about “disasters.” In addition, the presentation will problematize how the “relief” and “recovery” is perceived by the Moken and those outsiders who meant well and who tried to help facilitating the relief and recovery.

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Oral Sessions | Session

[O3-18]

## IFIP session on IT in Disaster Risk Reduction (ITDRR)

Tue. Nov 12, 2019 10:30 AM - 12:00 PM Room 5 (Shirakashi 2)

Tsuda University

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### [O3-18-01] IFIP session on IT in Disaster Risk Reduction (ITDRR)

\*Yuko MURAYAMA<sup>1</sup>, \*Jun Sasaki<sup>2</sup>, \*Takashi Yoshino<sup>3</sup> (1. Tsuda University and  
IFIP(International Federation for Information Processing), 2. Iwate Prefectural University, 3.  
Wakayama University)  
10:30 AM - 12:00 PM

10:30 AM - 12:00 PM (Tue. Nov 12, 2019 10:30 AM - 12:00 PM Room 5)

## [O3-18-01] IFIP session on IT in Disaster Risk Reduction (ITDRR)

\*Yuko MURAYAMA<sup>1</sup>, \*Jun Sasaki<sup>2</sup>, \*Takashi Yoshino<sup>3</sup> (1. Tsuda University and IFIP(International Federation for Information Processing), 2. Iwate Prefectural University, 3. Wakayama University)

Keywords: Information Processing and Sharing for Disaster, Disaster Communications, Use of IT for Disaster Risk Reduction, Tools and Systems for Situation Awareness, Trust Issues at Disaster Management

This IFIP session on IT in Disaster Risk Reduction (ITDRR) is organized to promote a novel area within the IT community, disaster risk reduction (DRR). We have founded an IFIP domain committee on ITDRR and organized annual conferences since 2016. We also organized a workshop related to disaster and diversity at WSIS organized by ITU and UNESCO for three years. We introduce such activities as well as those in Japan: IPSJ as an IFIP Japanese representative, has organized the Disaster Communication Symposium since 2011. We introduce our work as well as introducing this area of research in this session.

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Flash Talk Presentation

## SERVICE LEARNING THROUGH NSTP CWTS/LTS: The Community Based Disaster Risk Reduction Program of University of Santo Tomas-National Service Training Program (NSTP) CWTS/LTS

Mr. Adrian D. Romero; Ms. Sheila Ruth Masangkay, Ms. Jasmin Victoria

Tue. Nov 12, 2019 12:15 PM - 12:30 PM Flash Talk Presentation 1 (Meeting Room 6)

University of Santo Tomas-National Service Training Program CWTS/LTS

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### [MP3-01] SERVICE LEARNING THROUGH NSTP CWTS/LTS: The Community Based Disaster Risk Reduction Program of University of Santo Tomas-National Service Training Program (NSTP) CWTS/LTS

Mr. Adrian D. Romero; Ms. Sheila Ruth Masangkay, Ms. Jasmin Victoria (University of Santo Tomas-National Service Training Program CWTS/LTS)

12:15 PM - 12:30 PM

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12:15 PM - 12:30 PM (Tue. Nov 12, 2019 12:15 PM - 12:30 PM Flash Talk Presentation 1)

## [MP3-01] SERVICE LEARNING THROUGH NSTP CWTS/LTS: The Community Based Disaster Risk Reduction Program of University of Santo Tomas-National Service Training Program (NSTP) CWTS/LTS

Mr. Adrian D. Romero; Ms. Sheila Ruth Masangkay, Ms. Jasmin Victoria (University of Santo Tomas-National Service Training Program CWTS/LTS)

As a response to Sendai Framework for Disaster Risk Reduction and Sustainable Development Goals, this presentation illustrates the process, narratives and experiences of UST National Service Training Program (UST NSTP) in the implementation of Disaster Risk Reduction and Management (DRRM) to their curriculum. NSTP was instituted by the Philippine government by virtue of Republic Act 9163 that aims to enhance civic consciousness and defense preparedness in the Filipino youth by developing the ethics of service and patriotism while undergoing community development activity to the marginalized community. As major part of the curriculum, the UST NSTP college students taught the concepts, theories and skills of community based disaster risk reduction management and emergency preparedness and equip them to practice and apply this to in their fieldwork activity in various partner communities and institutions suffered from marginalization and voicelessness during disaster management. In the process during community work, UST NSTP facilitators and students utilized Participatory Capacities and Vulnerabilities Assessment (PCVA), a participatory research methodology developed by different community development workers that holistically collects, analyzes and synthesizes communities' resources and vulnerabilities in dealing with disasters. As a service learning tool for students and partner communities, PCVA is useful in understanding disaster risks and exposure to different natural and anthropogenic hazards through their collective and individual experience. The process let the NSTP students worked with various at-risk sectors such as children, women, urban poor, farmers and indigenous peoples so that they can formulate their inclusive disaster risk assessment. Starting on the communities' local knowledge, NSTP students build on the capacity of the community by weaving their local experience, practices and skills in facing disaster risk. With this, the presentation seeks to contribute and respond to the call for a participatory, inclusive pro-poor, gender sensitive and empowering service-learning in disaster risk reduction and management.

Flash Talk Presentation

## A social-ecological approach to disaster risk management applied to the case study of the Marche Region, Italy

Alessandra Colocci

Tue. Nov 12, 2019 12:35 PM - 12:50 PM Flash Talk Presentation 1 (Meeting Room 6)

Universita Politecnica delle Marche

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### [MP3-02] A social-ecological approach to disaster risk management applied to the case study of the Marche Region, Italy

Alessandra Colocci (Universita Politecnica delle Marche)

12:35 PM - 12:50 PM



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12:35 PM - 12:50 PM (Tue. Nov 12, 2019 12:35 PM - 12:50 PM Flash Talk Presentation 1)

## [MP3-02] A social-ecological approach to disaster risk management applied to the case study of the Marche Region, Italy

Alessandra Colocci (Universita Politecnica delle Marche)

Nowadays, disasters claim more and more severe tolls from human communities: even though they are decreasing in number, their impacts are worsening, also due to the current climatic changes. The core of this crisis are the unsustainable interactions occurring between humans and nature: it is a complex and extensive problem that requires flexible tools to be comprehended. One of such tools may be the panarchy theory: it allows to consider the mutual influences and paired evolution of the components of a multifaceted complex system. This is made possible by describing the unceasing transformations of every component through adaptive cycles and then arranging them in an interconnected nested hierarchy. As human activities are deeply interlaced with natural processes, they form a multi-scale, complex social-ecological system. Hence, a social-ecological approach based on Gunderson and Holling's panarchy theory was developed and adapted to the questions posed by risks and their consequences. The aim is to shed some more light on how humans and nature interact and how such interactions can bring to disastrous effects, for both sides. Further, an attempt was made to include a quantitative dimension into the descriptive theory, in order to more easily recognise the possible critical issues within a social-ecological system. Hence, an application to an Italian case study was carried on, involving the 229 Municipalities of the Marche Region and focusing on flood risk; nevertheless, further implementations are also envisioned. The delivered results can serve as a basis to assess the efficacy of existing plans and to assist in a continuous monitoring of the outcomes. However, they may as well inform a more thorough endeavour that humans are called to undertake, devoted to designing and enhancing further effective strategies to address disaster risk mitigation and environmental challenges.

Flash Talk Presentation

## Mobilizing Local Knowledge in Local Disaster Risk Reduction Strategies

Dr Aaron Opdyke

Tue. Nov 12, 2019 12:55 PM - 1:10 PM Flash Talk Presentation 1 (Meeting Room 6)

The University of Sydney

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### [MP3-03] Mobilizing Local Knowledge in Local Disaster Risk Reduction Strategies

Dr Aaron Opdyke (The University of Sydney)

12:55 PM - 1:10 PM

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12:55 PM - 1:10 PM (Tue. Nov 12, 2019 12:55 PM - 1:10 PM Flash Talk Presentation 1)

## [MP3-03] Mobilizing Local Knowledge in Local Disaster Risk Reduction Strategies

Dr Aaron Opdyke (The University of Sydney)

The Sendai Framework has targeted increasing the adoption of national and local disaster risk reduction strategies by 2020. There is evidence to suggest that significant progress has been made toward this goal, but are we doing enough to turn these strategies into action? Furthermore, who are is being left behind? This talk will explore challenges and advancements in the creation of national and local DRR strategies, drawing on experiences from the Philippines. Using the Municipality of Carigara (located in the province of Leyte) as a case study, the session will share lessons that can help guide the creation and activation of effective local strategies. Specifically, the talk will showcase how local DRM offices can lead in creating a common vision but also enable resilience as a cross-cutting theme in local governments. The talk will discuss how Carigara's hazard mapping project, a Sasakawa Award nominee, was central in organizing a participative process to engage communities in creating a shared vision and priorities. The session will conclude with a discussion of how the local knowledge embedded in DRR strategies can be mobilized for achieve other Sendai Framework targets in the decade ahead.

Flash Talk Presentation

## Water, Sanitation, and Hygiene (WASH) assessments two years after Nepal 2015 earthquake

Sital Uprety

Tue. Nov 12, 2019 1:15 PM - 1:30 PM Flash Talk Presentation 1 (Meeting Room 6)

Department of Civil and Environmental Engineering, Univesity of Illinois and Department of Frontier Science for Advanced Environment, Tohoku University

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### [MP3-04] Water, Sanitation, and Hygiene (WASH) assessments two years after Nepal 2015 earthquake

Sital Uprety (Department of Civil and Environmental Engineering, Univesity of Illinois and Department of Frontier Science for Advanced Environment, Tohoku University)

1:15 PM - 1:30 PM

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1:15 PM - 1:30 PM (Tue. Nov 12, 2019 1:15 PM - 1:30 PM Flash Talk Presentation 1)

## [MP3-04] Water, Sanitation, and Hygiene (WASH) assessments two years after Nepal 2015 earthquake

Sital Uprety (Department of Civil and Environmental Engineering, University of Illinois and Department of Frontier Science for Advanced Environment, Tohoku University)

Waterborne diseases pose a major threat to human health all over the world causing millions of deaths every year. Low-income countries like Nepal face several problems in water, sanitation, and hygiene (WASH). Extreme Natural Events (ENEs) like earthquakes are known to alter human behavior which can lead to an increase in diarrheal diseases. To reduce the risk of diarrheal diseases, it is essential to understand the impact of ENEs on water microbiome and human behavior along with the interaction between water microbiome and human exposure to pathogens. For this purpose, we selected two communities (V1 and V2) completely destroyed during 2015 Nepal Earthquake but one village (V1) was fully recovered by 2017 with people living in permanent houses whereas the other village (V2) was recovering with people living in temporary settlements. A total of 360 water and sanitation samples were collected which were tested for 24 pathogens causing diarrheal diseases. In addition, 50 out of 360 samples were randomly selected and were sequenced for 16S rRNA gene using MiSeq platform. The results indicated a compromised WASH scenario in both villages with *Enterococcus* spp. being detected in 78% of the samples, *Legionella pneumophila* in 63%, general *E. coli* in 58% and *Salmonella typhimurium* in 34% of the samples. In addition, genes of Shiga toxin-producing *E. coli*, *Giardia lamblia*, Enteropathogenic *E. coli*, *Campylobacter jejuni*, were also found in 39%, 13%, 7%, and 3% samples respectively. There was no significant difference ( $p$ -value = 0.82) in pathogen concentration between V1 and V2. However, investigating individual pathogens for different sample types indicated deteriorated sanitation practices in V2 compared to V1. Bray-Curtis analysis showed very different bacterial diversity between water samples, handwash samples and sanitation samples collected in V1 and V2. This study provides a foundation for WASH study in sites affected by ENEs and would help effective WASH intervention activities following any ENEs.

Flash Talk Presentation

## The state-of-the-art review of vulnerability indices: with a special focus on urban flood

Tanaya Sarmah

Tue. Nov 12, 2019 3:05 PM - 3:20 PM Flash Talk Presentation 1 (Meeting Room 6)

Indian Institute of Technology Kharagpur

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### [MP3-05] The state-of-the-art review of vulnerability indices: with a special focus on urban flood

Tanaya Sarmah (Indian Institute of Technology Kharagpur)

3:05 PM - 3:20 PM

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3:05 PM - 3:20 PM (Tue. Nov 12, 2019 3:05 PM - 3:20 PM Flash Talk Presentation 1)

## [MP3-05] The state-of-the-art review of vulnerability indices: with a special focus on urban flood

Tanaya Sarmah (Indian Institute of Technology Kharagpur)

With the adoption of the Hyogo Framework for Action (HFA) 2005-2015, building resilient communities which can withstand the effects of disasters, has gained wider importance and popularity among researchers and practitioners. Vulnerability indices aim to provide a means of quantifying numerically the damage to humans and buildings sustained under various disaster types. However, vulnerability index does not have a single definition but it is concerned as multi-faceted by various researchers in various contexts. This paper gives a review of vulnerability indices, with particular reference to their use in assessing human and building vulnerability. A total of 64 journal papers published from 1998 to December 2018 were systematically analysed. A wide range of vulnerability indicators has come up in recent years to help evaluate the resilience of the people and the buildings. These indicators help to assess the vulnerability of multiple fields (social, physical, economic, cultural, environmental, etc.) to specific hazards (floods, earthquakes, landslides, etc.) at the regional or local scale. The methodology in this paper has been applied to Guwahati city in the north-east Indian state of Assam which faces urban flood multiple numbers of times, annually. The results show that disaster resilience varies widely depending on the spatial variations and type of disaster the area is prone to. The indices selected for the city will address the following: (a) identification of vulnerable people and buildings; (b) raising awareness; (c) allocation of funds; (d) stating and implementation of policies; and (e) conducting research. This could help to increase the quality of decisions in choosing the parameters specific to the disaster type and the location.

Flash Talk Presentation

## Damage Distribution of Typhoon No. 21 in 2018 on Osaka and Wakayama Prefecture based on Questionnaire Surveys

Haris Rahadiano

Tue. Nov 12, 2019 5:05 PM - 5:20 PM Flash Talk Presentation 1 (Meeting Room 6)

Kyoto University

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### [MP3-06] Damage Distribution of Typhoon No. 21 in 2018 on Osaka and Wakayama Prefecture based on Questionnaire Surveys

Haris Rahadiano (Kyoto University)

5:05 PM - 5:20 PM



5:05 PM - 5:20 PM (Tue. Nov 12, 2019 5:05 PM - 5:20 PM Flash Talk Presentation 1)

## [MP3-06] Damage Distribution of Typhoon No. 21 in 2018 on Osaka and Wakayama Prefecture based on Questionnaire Surveys

Haris Rahadiano (Kyoto University)

This article summarizes a series of damage distribution of the industry caused by the Typhoon Jebi based on conducted questionnaire surveys in February 2019. Typhoon Jebi causes extreme wind speed in the wider areas in not only Kinki areas but also other parts of Japan. Strong wind caused power shutdown in wide areas and its effect spreads in Kinki and other areas. The typhoon also brought about storm surge and caused inundation, although most of areas were outside of the seawalls. We are focusing on the damages Osaka and Wakayama area in which got direct and the biggest impact from the typhoon. More ten thousand firms listed as a candidate for the survey based on the survey of the distribution of strong winds and storm surge inundation. Recognizing the distribution pattern is the first step to capture economic impact to the industry caused by strong wind disaster.

Flash Talk Presentation

## Exploring the DRRM Landscape of the University of the Philippines Diliman: How prepared are university students in case of a disaster?

Danielle Marie Alcoriza Parreno

Tue. Nov 12, 2019 12:15 PM - 12:30 PM Flash Talk Presentation 2 (Meeting Room 7)

University of the Philippines Diliman

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### [MP3-07] Exploring the DRRM Landscape of the University of the Philippines Diliman: How prepared are university students in case of a disaster?

Danielle Marie Alcoriza Parreno, Yra Marie Limos Calamiong (University of the Philippines  
Diliman, University of the Philippines Diliman)

12:15 PM - 12:30 PM

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12:15 PM - 12:30 PM (Tue. Nov 12, 2019 12:15 PM - 12:30 PM Flash Talk Presentation 2)

## [MP3-07] Exploring the DRRM Landscape of the University of the Philippines Diliman: How prepared are university students in case of a disaster?

Danielle Marie Alcoriza Parreno, Yra Marie Limos Calamiong (University of the Philippines Diliman, University of the Philippines Diliman)

The Philippines is considered to be a disaster-prone country due to its geographical location. Therefore, all Filipinos (including university students) should be prepared in the face of any disaster regardless of where they are located. This study aims to explore the disaster-related knowledge, disaster preparedness and readiness behaviors, disaster adaptation, disaster awareness, and disaster risk perception of the University of the Philippines (UP) Diliman undergraduate students. This study used a mixed-method approach, wherein the students (n=145) were asked to answer a 20-item questionnaire adapted from Tuladhar, et al. (2015). A Focus Group Discussion (FGD) on select UP students (n=6) and a key informant interview were likewise done to triangulate the data. Quantitative analysis such as histogram analysis and distribution analysis and qualitative analysis using thematic analysis revealed significant themes such as the current deficiencies and limitations in the process of DRRM knowledge dissemination to the UP Diliman students, lack of sufficient training, as well as limited opportunities to constantly reinforce DRRM practices in the campus. It is recommended that the DRRM training in UP Diliman should be examined for effectivity and to explore other means of training students on DRRM based on evidence-based strategies such as involving the stakeholders (including the students) through needs assessment when planning the DRRM training as well as exploring a simulation-based model of training.

Flash Talk Presentation

## Fragility curves for economic losses in industrial sectors after strong wind disaster: A case of 2018 Typhoon Jebi

Hasi

Tue. Nov 12, 2019 12:35 PM - 12:50 PM Flash Talk Presentation 2 (Meeting Room 7)

Kyoto University

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[MP3-08] Fragility curves for economic losses in industrial sectors after strong wind disaster: A case of 2018 Typhoon Jebi

Hasi (Kyoto University)

12:35 PM - 12:50 PM

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12:35 PM - 12:50 PM (Tue. Nov 12, 2019 12:35 PM - 12:50 PM Flash Talk Presentation 2)

## [MP3-08] Fragility curves for economic losses in industrial sectors after strong wind disaster: A case of 2018 Typhoon Jebi

Hasi (Kyoto University)

This study proposes strong wind disaster fragility curves for economic losses of industrial sectors, which represent conditional probabilities of reduction of economic losses given a strong wind. This is an extension of the method of fragility curves for structural vulnerability. The present paper conducts a questionnaire survey regarding economic impacts on business activities of firms after the 2018 Typhoon Jebi and estimates the functional fragility curves by using the data. The estimation is conducted for different industrial sectors and the result implies that functional fragility curves are different between sectors. The information of functional fragility curves in this paper are helpful for conducting quick estimation of economic impacts on business sectors in case of large scale strong wind disaster. In addition, the functional fragility curves can be used by individual firms for understanding the potential impacts of future disaster on their businesses and preparing countermeasures for the risk such as business continuity plan (BCP).

Flash Talk Presentation

## Recent Activity for DRR in Turkey

Mr. Ozmen Ozgu Tuna

Tue. Nov 12, 2019 12:55 PM - 1:10 PM Flash Talk Presentation 2 (Meeting Room 7)

Disaster and Emergency Management Presidency (AFAD)

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### [MP3-09] Recent Activity for DRR in Turkey

Mr. Ozmen Ozgu Tuna (Disaster and Emergency Management Presidency (AFAD))

12:55 PM - 1:10 PM

12:55 PM - 1:10 PM (Tue. Nov 12, 2019 12:55 PM - 1:10 PM Flash Talk Presentation 2)

## [MP3-09] Recent Activity for DRR in Turkey

Mr. Ozmen Ozgu Tuna (Disaster and Emergency Management Presidency (AFAD))

Turkey is prone country for earthquakes in history. As one of tragic disaster, the 1999 Izmit earthquake hit on 17 August and had a moment magnitude of 7.6. According to this earthquake, around 17,000 people were killed and left approximately half a million people homeless. Government of Turkey has been conducting multi DRR projects such as constructed museum, capacity building, education program, etc.

In this presentation, Mr. Ozmen would like to share an information about recent activity for DRR as standpoint of national disaster management agency in Pakistan.

Flash Talk Presentation

## How to save people from earthquakes

Kazuo Sasaki

Tue. Nov 12, 2019 1:15 PM - 1:30 PM Flash Talk Presentation 2 (Meeting Room 7)

Challenge Co.,Ltd

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### [MP3-10] How to save people from earthquakes

Kazuo Sasaki (Challenge Co.,Ltd)

1:15 PM - 1:30 PM



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1:15 PM - 1:30 PM (Tue. Nov 12, 2019 1:15 PM - 1:30 PM Flash Talk Presentation 2)

## [MP3-10] How to save people from earthquakes

Kazuo Sasaki (Challenge Co.,Ltd)

Many countries are constructing nationwide observation networks replete with sensors, but these require much money and time to complete. It is therefore not easy to realize such observation networks. In order to save people from earthquakes by issuing alarms in advance, we propose an easier yet more effective system called Earthquake Guard III (hereafter EQG-III) which is an earthquake alarm system using embedded sensors. This system can be applied to realize a regional earthquake alarm network quickly at low cost. Additionally, the system can be used for evacuation drills, effective upon enhancing disaster management capability.

We have constructed earthquake sensor alarm systems overseas and conducted evacuation drills in several countries. We introduce the case of Romania.

Flash Talk Presentation

## Saglam KOBİ Project

Ruya Kaya

Tue. Nov 12, 2019 3:05 PM - 3:20 PM Flash Talk Presentation 2 (Meeting Room 7)

IDEMA

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### [MP3-11] Saglam KOBİ Project

Ruya Kaya (IDEMA)

3:05 PM - 3:20 PM

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3:05 PM - 3:20 PM (Tue. Nov 12, 2019 3:05 PM - 3:20 PM Flash Talk Presentation 2)

## [MP3-11] Saglam KOBİ Project

Ruya Kaya (IDEMA)

After the devastating 2011 Van Earthquake in Turkey, a disaster preparedness initiative entitled “ Business Disaster Resiliency Program for Turkey” (or “ Saglam KOBİ” in Turkish) was developed by the World Economic Forum, the U.S. Chamber of Commerce Foundation, the UPS Foundation, IDEMA International Development Management Agency and UPS Turkey. The project aims to engage the private and public sector and civil society organizations to work together to identify best practices to enhance the resiliency of small and medium sized enterprises (SMEs) in Turkey. The project which has been operating since 2013 is being managed by IDEMA.

Through this collective effort, Saglam KOBİ aspires to provide SMEs with a suite of resources designed to assist businesses of all sizes. Businesses that only have a few minutes can access simple tips to prepare themselves and their staff for disasters, through reading the unique content on [www.saglamkobi.com](http://www.saglamkobi.com) website, disaster preparedness checklist, 20 tips for preparedness, workbook 101, Saglam KOBİ also offers a toolkit available for free for businesses to create their own emergency action plans.

Saglam KOBİ was publicly launched on September 17, 2013. In the first year, 12 training sessions were conducted with 246 businesses trained and more than 5,000 unique visitors to the website. Saglam KOBİ has 19 partners who form the Advisory Board to advise the program and support where appropriate. Now in its sixth year, Saglam KOBİ has scaled its impact through not only continuing the direct trainings for SMEs but now also offers Train the Trainer sessions to educate more trainers to help SMEs prepare an emergency action plan. To date, more than 3000 SMEs have gone through the training program and 25 trainings and train the trainer sessions have been conducted in 65 cities.

Flash Talk Presentation

## Understanding child and youth resilience in the aftermath of disasters: The case of the 2016 Alberta wildfires in Canada

Dr. Julie Drolet

Tue. Nov 12, 2019 5:05 PM - 5:20 PM Flash Talk Presentation 2 (Meeting Room 7)

Professor, University of Calgary

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### [MP3-12] Understanding child and youth resilience in the aftermath of disasters: The case of the 2016 Alberta wildfires in Canada

Dr. Julie Drolet (Professor, University of Calgary)

5:05 PM - 5:20 PM

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5:05 PM - 5:20 PM (Tue. Nov 12, 2019 5:05 PM - 5:20 PM Flash Talk Presentation 2)

## [MP3-12] Understanding child and youth resilience in the aftermath of disasters: The case of the 2016 Alberta wildfires in Canada

Dr. Julie Drolet (Professor, University of Calgary)

The 2016 Alberta wildfires resulted in devastating human, economic and environmental impacts. Children and youth are particularly affected by disasters because of their dependence on adults, and psychological and social factors related to their developmental stage, life cycle, and structural vulnerabilities. However, children and youth also demonstrate resilience when faced with disasters, and can act as powerful catalysts for change in their families and communities in the post-disaster environment. Resilience is defined as both an individual capacity to identify and access resources (e.g., psychological, social, cultural, and physical) and the individual and collective ability to ensure the equitable and culturally relevant provision and access to these resources. Findings from the study ‘Health Effects of the Alberta Wildfires: Pediatric Resilience’ will be presented on the physical, psychological, emotional, and health effects of the 2016 wildfires on children and youth (5-18 years) in order to better understand the social, economic, cultural, personal, and health factors that contribute to positive mental health and resiliency. A mixed methods research design was used to investigate the experiences of children and youth at the population level and at the individual and community level. Using qualitative data collected through face-to-face interviews with 130 participants (100 children and 30 community service providers), we discuss the unique challenges that children face as a result of experiencing the wildfire, the factors, mechanisms, and conditions that influence and support children’s resilience, and the specific ways that community influencers can best support the mental health, well-being, and overall recovery post-disaster. We discuss the implications of these findings for contributing to a better understanding of child and youth resilience, and for informing program and service interventions that will foster disaster recovery and community resilience. The study is funded by Alberta Innovates, Canadian Red Cross, and Canadian Institute of Health Research (CIHR).

Keynote Speech

[K02]

## Keynote Speech

Gretchen Kalonji, Denise Konan, Jihyeon Park

Tue. Nov 12, 2019 8:00 AM - 8:20 AM Room 1 (Main Hall)

Sichuan University, University of Hawaii, JHSUSTAIN

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[K02]

Gretchen Kalonji (Sichuan University)

[K02]

Denise Konan (University of Hawaii)

[K02]

Jihyeon Park (JHSUSTAIN)

(Tue. Nov 12, 2019 8:00 AM - 8:20 AM Room 1)

[K02]

Gretchen Kalonji (Sichuan University)

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(Tue. Nov 12, 2019 8:00 AM - 8:20 AM Room 1)

[K02]

Denise Konan (University of Hawaii)

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(Tue. Nov 12, 2019 8:00 AM - 8:20 AM Room 1)

[K02]

Jihyeon Park (JHSUSTAIN)

Closing

## Closing

Tue. Nov 12, 2019 5:30 PM - 6:00 PM Room 2 (Tachibana)

Simultaneous Interpretation is available. (同時通訳有り)

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### [CL-01] Closing

5:30 PM - 6:00 PM



5:30 PM - 6:00 PM (Tue. Nov 12, 2019 5:30 PM - 6:00 PM Room 2)

## [CL-01] Closing