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[1], *Daniel Gibbs[1] （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[1], Yu Takahashi[1], Kanae Sato[1], Hideyuki Sasaki[1], Masaharu Goko[1] （1. Miyagi University）

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

*Constance Ting Chua[1,2], Adam Douglas Switzer[1,2], Anawat Suppasri[3], Kwanchai Pakoksung[3], Linlin Li[2,4], David Lallemant[1,2], Susanna Jenkins[1,2], Amanda Cheong[1] （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[1] （1. National Diet Library, Japan）

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

*kwanchai pakoksung[1], Anawat Suppasri[1], Fumihiko Imamura[1], Cipta Athanasius[2], Amalfi Omang[2], Abdul Muhari[3] （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）

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[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[1], Shuji Seto[2,3], Hirokazu Kamata[4], Anawat Suppasri[2,3], Fumihiko Imamura[2,3] （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）

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

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

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[P-08] Cascading effects of tsunami disasters

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

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[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[1,2], Tomoki Serikawa[3], *Hirokazu Kamata[4], Anawat Suppasri[1,2], Fumihiko Imamura[1,2] （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）

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

*Shuji Seto[1,2], Hirokazu Kamata[4], Tomoki Serikawa[3], Anawat Suppasri[1,2], Fumihiko Imamura[1,2] （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)
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*Machiko Kamiyama[1], Daisuke Sato[1], Masae Sato[3], John Morris[2] (1. International Research Institute of Disaster Research, Tohoku University, 2. Miyagi Gakuin Women's University, 3. Ishinomaki Senshu University)
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[P-12] Fuel stocking proposal to connect life at the time of disaster
*mitsuaki kizaki[1] (1. NIPON BCP INC)
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Hiroaki Enoki[1], *Chikako Adachi[1] (1. All Japan Council Company)
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[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[1], Hiroaki Maruya[1], Makoto Okumura[1], Motoyuki Kido[1], Natsuko Chubachi[1], Ryota Hino[1], Kanan Hirano[1], Shunichi Koshimura[1], Miwa Kuri[2], Shuji Moriguchi[1], Yusaku Ohta[1], Hiroyuki Sasaki[1], Motoaki Sugiura[1], Tetsuya Torayashiki[3], Fumihiko Imamura[1] (1. Tohoku University, 2. Japan Meteorological Agency, 3. Disaster Reduction and Human Renovation Institution)
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[P-15] Concepts of Urban System's Resilience and a Mathematical Model
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[P-16] Study on Emergency Management Using Incident Response Log Classification Based on Activity Objectives
*Naoko Kosaka[1], Takeshi Yamaguchi[2], Tomohiro Kokogawa[1], Satoshi Kubota[1], Kentaro Inui[2] (1. NTT, 2. Tohoku university)
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[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[1], Sheila Masangkay[1], Eric Aboboto[1], Jasmin Victoria[1], Justine Joseph Gopeng[1] (1. University of Santo Tomas)
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[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[1], Nishikawa Tomoyuki[2], Yoshitaka Yamazaki[3], Jun Onodera[4], Noritoshi Maehara[5], Abraham Marroquin[6], Edy Mardonado[6], Mario Ovalle[6], José Giron[6], *Yeison Carrera[6], Sergio Cabañas[6] (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)
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[P-19] Health-Related Studies After the Great East Japan Earthquake: A Literature Review
*Akiko ETO[1], Yasuhiro KANATANI[2] (1. National Institute of Public Health, 2. Tokai University, School of Medicine)
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[P-22] Personal Networks Among Selected Elderly in Post-Disaster Community in Tacloban City

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[P-23] Emergency nutritional support in Japan: histry, bottleneck, and future perspective with technology
*Kanako Masuno[1], Mayu Yokota[1], Ayako Shimizu[1], Masako Yokotsuka[1] （1. Showa Women's University）
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[P-24] SEARCH (Search Engine for Research on Risk and Resilience) - CARI! (Cerdas Antisipasi Risiko Bencana di Indonesia)
*MIZAN BUSTANUL FUADY BISRI[1] （1. United Nations University-Institute for the Advanced Study of Sustainability）
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[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[1], Mohammadreza Rezaei[2] （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[1], Kanako Iuchi[1] （1. Tohoku University）
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[P-27] **HERSTORY: FACILITATING PARTICIPATORY DISASTER RISK ASSESSMENT TO THE SINGLE-MOTHERS OF SUB-URBAN POOR RESETTLEMENT HOUSING IN PHILIPPINES**
*Imelda N. Oponda[1], *Adrian Dela Cruz Romero[2], Letecia Saju[1], Anna Monica Octobre[1], Lilia Mondano[1], Lissa B. Palero[1], Reyna Liza Borres[1], Evangeline Piñero[1], Synel Perante[1], Evelyn Sibal[1], Maria Villa Degumbis[1], Jenelyn Cortes[1], Yolanda Javier[1], Norma Bernal[1], Laurencia Daang[1], Ruby Ana Bernardo[3], Jolly M. Lugod[3], Cedric Bermiso[3], Wilmor Pacay[3] （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[1] （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[1], Daisuke Kuribayashi[2], Masatoshi Denda[1], Yoshimasa Morooka[1], Tsuyoshi Koyabu[3] （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[1], Yamaimaiti Nizhamdong[1] （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[1], Takuro OTAKE[2], Anawat SUPPASRI[3], Fumihiko IMAMURA[3] （1. Graduate School of Civil Engineering, Tohoku University, 2. NTT Data Corporation, 3. International Research Institute of Disaster Science, Tohoku University）
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[P-32] **Long term recovery and resilience construct- The lessons learned from Jiji earthquake**
*JIEHJIUH WANG WANG[1] （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[1] （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[1], David Alexander[1], Virginia Murray[2] （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[1,2], Ibnu Rusydy[1], Wiwik Ayu Ningsih[1,2], Andrean Simanjuntak[1,3], Arifullah Arifullah[1,2], Yunita Idris[1], Irwandi Nurdin[1,2] （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 Ie Geophysical Station of BMKG Aceh, Aceh Besar, Indonesia）

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

*Syamsidik Syamsidik[1,3], Tursina Tursina[1,3], Anawat Suppasri[2] （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）

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

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

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

*Christian Webersik[1,2,3], Lisa Thalheimer[4], Felix Pretis[5], Simon Abele[6], Friederike E. L. Otto[4] （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）

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

*Carrie Garrison-Laney[1] （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[1], Tanaporn Chaivutitorn[1], Thawalrat Tanasakcharoen[1], Jing Tang[1], Carl Vincent C. Caro[2], Alfredo Mahar Lagmay[3], Anawat Suppasri[4], Jeremy Bricker[5], Volker Roeber[6], Carine J. Yi[7], Fumihiko Imamura[4] （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.）

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

*Yayoi Nakamura[1], Tomomi Suda[1], Aya Murakami[1], Hiroyuki Sasaki[1], Ichiro Tsuji[2], Yumi Sugawara[2], Masafumi Nishizawa[3], Kazuaki Hatsugai[3], Shinichi Egawa[1] （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）

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

Ryosuke Koga[1], *Yuji Sasaki[1], *Yuri Fukushi[1], Rei Kasahara[1], Koichi Noro[1] （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[1,2], Shunichi Funakoshi [3], Jun Onobe[4,1], Izumi Shinichi[1] （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）

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

*Maria Bernadet Karina Dewi[1] （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[1] （1. International Research Institute of Disaster Science, Tohoku University, Japan）

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[P-46] Disaster Risk Reduction Knowledge Service

Juanle Wang[1,4], Kun Bu[2,4], *Yuelei Yuan[1,4], Yujie Wang[1,4], Xuehua Han[1,3,4] （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）

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

*Ilpyon Hong[1] （1. Korea Institute of Civil Engineering and Building Technology (KICT)）

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*MIZAN BUSTANUL FUADY BISRI[1] （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[1], Mohammadreza Rezaei[2] （1. York University, 2. Yazd University）

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

*Fumihiko Imamura[1], Kanako Iuchi[1] （1. Tohoku University）

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

*Imelda N. Oponda[1], *Adrian Dela Cruz Romero[2], Letecia Saju[1], Anna Monica Octobre[1], Lilia Mondano[1], Lissa B. Palero[1], Reyna Liza Borres[1], Evangeline Piñero[1], Synel Perante[1], Evelyn Sibal[1], Maria Villa Degumbis[1], Jenelyn Cortes[1], Yolanda Javier[1], Norma Bernal[1], Laurencia Daang[1], Ruby Ana Bernardo[3], Jolly M. Lugod[3], Cedric Bermiso[3], Wilmor Pacay[3] （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）

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

*Manoranjan Ghosh[1] （1. Indian Institute of Technology Kharagpur）

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

*Miho Ohara[1], Daisuke Kuribayashi[2], Masatoshi Denda[1], Yoshimasa Morooka[1], Tsuyoshi Koyabu[3] （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.）

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

*Kazuo Sasaki[1], Yamaimaiti Nizhamdong[1] （1. Challenge Co.,Ltd）

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

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

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

*JIEHJIUH WANG WANG[1] （1. MING CHUAN UNIVERSITY）

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[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[1] （1. School of Education and Arts, CQUniversity, Rockhampton, Australia）

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

*Gianluca Pescaroli[1], David Alexander[1], Virginia Murray[2] （1. Institute for Risk and Disaster Reduction, University College London, 2. Public Health England）

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

*Muksin Umar[1,2], Ibnu Rusydy[1], Wiwik Ayu Ningsih[1,2], Andrean Simanjuntak[1,3], Arifullah Arifullah[1,2], Yunita Idris[1], Irwandi Nurdin[1,2] （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 Ie Geophysical Station of BMKG Aceh, Aceh Besar, Indonesia）

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

*Syamsidik Syamsidik[1,3], Tursina Tursina[1,3], Anawat Suppasri[2] （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）

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

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

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

*Christian Webersik[1,2,3], Lisa Thalheimer[4], Felix Pretis[5], Simon Abele[6], Friederike E. L. Otto[4] （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）

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

*Carrie Garrison-Laney[1] （1. Washington Sea Grant/Univ. of Washington）

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

*Natt Leelawat[1], Tanaporn Chaivutitorn[1], Thawalrat Tanasakcharoen[1], Jing Tang[1], Carl Vincent C. Caro[2], Alfredo Mahar Lagmay[3], Anawat Suppasri[4], Jeremy Bricker[5], Volker Roeber[6], Carine J. Yi[7], Fumihiko Imamura[4] （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.）

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

*Yayoi Nakamura[1], Tomomi Suda[1], Aya Murakami[1], Hiroyuki Sasaki[1], Ichiro Tsuji[2], Yumi Sugawara[2], Masafumi Nishizawa[3], Kazuaki Hatsugai[3], Shinichi Egawa[1] （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）

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

Ryosuke Koga[1], *Yuji Sasaki[1], *Yuri Fukushi[1], Rei Kasahara[1], Koichi Noro[1] （1. East Nippon Expressway Company Limited Tohoku Regional Head Office）

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

*Junko Okuyama[1,2], Shunichi Funakoshi [3], Jun Onobe[4,1], Izumi Shinichi[1] （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）

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

*Maria Bernadet Karina Dewi[1] （1. United Nations ESCAP）

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[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[1] （1. International Research Institute of Disaster Science, Tohoku University, Japan）

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[P-46] Disaster Risk Reduction Knowledge Service

Juanle Wang[1,4], Kun Bu[2,4], *Yuelei Yuan[1,4], Yujie Wang[1,4], Xuehua Han[1,3,4] （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）

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

*Ilpyon Hong[1] （1. Korea Institute of Civil Engineering and Building Technology (KICT)）

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[P-01] TRACING 3.11.11

*Akari Nakai Kidd[1], *Daniel Gibbs[1] (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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[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[1], Yu Takahashi[1], Kanae Sato[1], Hideyuki Sasaki[1], Masaharu Goko[1] (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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[P-03] Response of port infrastructure to tsunami impacts: Damage observations from the 2011 Tohoku tsunami

*Constance Ting Chua[1,2], Adam Douglas Switzer[1,2], Anawat Suppasri[3], Kwanchai Pakoksung[3], Linlin Li[2,4], David Lallemant[1,2], Susanna Jenkins[1,2], Amanda Cheong[1] （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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[P-04] National Diet Library Great East Japan Earthquake Archive: HINAGIKU

*Hiroshi Maeda[1] （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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[P-05] Tsunami Simulation in the 28 September 2018 Palu Bay, Indonesia, Using Submarine Landslide Source and Two-layer Depth-integrated Modeling

*kwanchai pakoksung[1], Anawat Suppasri[1], Fumihiko Imamura[1], Cipta Athanasius[2], Amalfi Omang[2], Abdul Muhari[3] (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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[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[1], Shuji Seto[2,3], Hirokazu Kamata[4], Anawat Suppasri[2,3], Fumihiko Imamura[2,3] （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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[P-07] Spanish cooperation in the field of training for disaster risk reduction in Latin America and the Caribbean

*Jose Pastrana[1,3], Angela Potenciano[2], Elisa Gavari[1] （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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[P-08] Cascading effects of tsunami disasters

*Anawat Suppasri Suppasri[1], Miwako Kitamura[1], Syamsidik Syamsidik[2], Abdul Muhari[3], Fumihiko Imamura[1], David Alexander[4] （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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[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[1,2], Tomoki Serikawa[3], *Hirokazu Kamata[4], Anawat Suppasri[1,2], Fumihiko Imamura[1,2] (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 diefromcause of death other than drowning. According to Mainichi Shimbun newspaper (2011) and Kahoku Shimpo (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 inthe 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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[P-10] The analysis of location data related to the deceased in the 2011 Tohoku Tsunami: A case study of Miyagi prefecture

*Shuji Seto[1,2], Hirokazu Kamata[4], Tomoki Serikawa[3], Anawat Suppasri[1,2], Fumihiko Imamura[1,2] (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)
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Seto and Imamura(2019) classified the causes of death inthe 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 deceasedin the Great East Japan Earthquake in more detail.

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

*Machiko Kamiyama[1], Daisuke Sato[1], Masae Sato[3], John Morris[2] (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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[P-12] Fuel stocking proposal to connect life at the time of disaster

*mitsuaki kizaki[1] （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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[P-13] Support for affected areas by "local residents" in the Great East Japan Earthquake "Connecting" town development by "collaboration"

Hiroaki Enoki[1], *Chikako Adachi[1] （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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[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[1], Hiroaki Maruya[1], Makoto Okumura[1], Motoyuki Kido[1], Natsuko Chubachi[1], Ryota Hino[1], Kanan Hirano[1], Shunichi Koshimura[1], Miwa Kuri[2], Shuji Moriguchi[1], Yusaku Ohta[1], Hiroyuki Sasaki[1], Motoaki Sugiura[1], Tetsuya Torayashiki[3], Fumihiko Imamura[1] （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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[P-15] Concepts of Urban System's Resilience and a Mathematical Model

*Yuto Shiozaki[1] (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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[P-16] Study on Emergency Management Using Incident Response Log Classification Based on Activity Objectives

*Naoko Kosaka[1], Takeshi Yamaguchi[2], Tomohiro Kokogawa[1], Satoshi Kubota[1], Kentaro Inui[2] (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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[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[1], Sheila Masangkay[1], Eric Aboboto[1], Jasmin Victoria[1], Justine Joseph Gopeng[1] (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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[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[1], Nishikawa Tomoyuki[2], Yoshitaka Yamazaki[3], Jun Onodera[4], Noritoshi Maehara[5], Abraham Marroquin[6], Edy Mardonado[6], Mario Ovalle[6], José Giron[6], *Yeison Carrera[6], Sergio Cabañas[6] (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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[P-19] Health-Related Studies After the Great East Japan Earthquake: A Literature Review

*Akiko ETO[1], Yasuhiro KANATANI[2] （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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[P-20] The analysis of tsunami evacuation behavior considering tsunami victim’ s data from a case study in Kesennuma city

*Anna Shinka[1], Shosuke Sato[2], Mizutani Daijiro[2], Fumihiko Imamura[2] （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 impresseion about victims would be different from those of the actual victims. So, complimenting 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 uncertenly. 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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[P-21] Research on the education for disaster reduction: Effects of “ Starter Guide” shelter management game (HUG).

*Takeshi Miyawaki[1], Atsushi Kimura[1] （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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[P-22] Personal Networks Among Selected Elderly in Post-Disaster Community in Tacloban City

*Reggy Capacio Figer[1] （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 amongts 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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[P-23] Emergency nutritional support in Japan: histry, bottleneck, and future perspective with technology

*Kanako Masuno[1], Mayu Yokota[1], Ayako Shimizu[1], Masako Yokotsuka[1] (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 heath and life of every individuals.

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

*MIZAN BUSTANUL FUADY BISRI[1] (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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[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[1], Mohammadreza Rezaei[2] (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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[P-26] Local production for local protection (*Chisan Chibo*) – Proposing a standardized local-level *bosai*operations from Tohoku

*Fumihiko Imamura[1], Kanako Iuchi[1] （1. Tohoku University）

Keywords: standardized local-level , operation on bosai operations

By following the oral session as same topics, the idea/pla/suggesion will be introduced to discuss on a standardized local-level *bosai iin 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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[P-27] HERSTORY: FACILITATING PARTICIPATORY DISASTER RISK ASSESSMENT TO THE SINGLE-MOTHERS OF SUB-URBAN POOR RESETTLEMENT HOUSING IN PHILIPPINES

*Imelda N. Oponda[1], *Adrian Dela Cruz Romero[2], Letecia Saju[1], Anna Monica Octobre[1], Lilia Mondano[1], Lissa B. Palero[1], Reyna Liza Borres[1], Evangeline Piñero[1], Synel Perante[1], Evelyn Sibal[1], Maria Villa Degumbis[1], Jenelyn Cortes[1], Yolanda Javier[1], Norma Bernal[1], Laurencia Daang[1], Ruby Ana Bernardo[3], Jolly M. Lugod[3], Cedric Bermiso[3], Wilmor Pacay[3] （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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[P-28] Climate Change Induced Rural Socio-Economic Vulnerability: An Empirical Regional Analysis from Sub-Himalayan West Bengal, India

*Manoranjan Ghosh[1] (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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[P-29] Disaster Awareness Improvement by Flood Simulated Experience in Virtual Reality

*Miho Ohara[1], Daisuke Kuribayashi[2], Masatoshi Denda[1], Yoshimasa Morooka[1], Tsuyoshi Koyabu[3] (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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[P-30] How to save people from earthquake?

*Kazuo Sasaki[1], Yamaimaiti Nizhamdong[1] (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 dence 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.

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

*An chi CHENG[1], Takuro OTAKE[2], Anawat SUPPASRI[3], Fumihiko IMAMURA[3] （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 seaborn network is constructed base on public shipping route information provided by OCCL 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.

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

*JIEHJIUH WANG WANG[1] （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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[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[1] （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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[P-34] A review of stressors affecting organisational resilience of emergency facilities and infrastructure in cascading crises

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Keywords: Cascading risk, Critical infrastructure, Emergency Facilities , Organisational Resilience, Operational Resesilience

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

*Muksin Umar[1,2], Ibnu Rusydy[1], Wiwik Ayu Ningsih[1,2], Andrean Simanjuntak[1,3], Arifullah Arifullah[1,2], Yunita Idris[1], Irwandi Nurdin[1,2] （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 Ie 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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[P-36] Investigating Planned Elevated Road for Mitigating Impacts of Tsunami on Banda Aceh, IndonesiaInvestigating Planned Elevated Road for Mitigating Impacts of Tsunami on Banda Aceh, Indonesia

*Syamsidik Syamsidik[1,3], Tursina Tursina[1,3], Anawat Suppasri[2] （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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[P-37] AN OVERVIEW OF POST-DISASTER RISKS TO SCHOOL FACILITIES IN ACEH PROVINCE OF INDONESIA

*Ella Meilianda[1,3], Yunita Idris[1,3], Roberto Gentile[2], Carmine Galasso[2] （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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[P-38] Extreme weather, displacement, and conflict: New insights from Somalia

*Christian Webersik[1,2,3], Lisa Thalheimer[4], Felix Pretis[5], Simon Abele[6], Friederike E. L. Otto[4] (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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[P-39] Using tsunami deposits and modeling to study tsunami history and sources in Washington State, USA

*Carrie Garrison-Laney[1] （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.

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

*Natt Leelawat[1], Tanaporn Chaivutitorn[1], Thawalrat Tanasakcharoen[1], Jing Tang[1], Carl Vincent C. Caro[2], Alfredo Mahar Lagmay[3], Anawat Suppasri[4], Jeremy Bricker[5], Volker Roeber[6], Carine J. Yi[7], Fumihiko Imamura[4] （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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[P-41] Sleep disturbance among people in Minamisanriku town after the Great East Japan Earthquake

*Yayoi Nakamura[1], Tomomi Suda[1], Aya Murakami[1], Hiroyuki Sasaki[1], Ichiro Tsuji[2], Yumi Sugawara[2], Masafumi Nishizawa[3], Kazuaki Hatsugai[3], Shinichi Egawa[1] （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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[P-42] Strengthening Disaster-response Capabilities of Expressway

Ryosuke Koga[1], *Yuji Sasaki[1], *Yuri Fukushi[1], Rei Kasahara[1], Koichi Noro[1] （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 nesessary to understand the initial information, and we are promoting the development and introduction of various information-gathering tool.

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

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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.

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

*Maria Bernadet Karina Dewi[1] (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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[P-45] Investigation of typhoon no. 19 induced flood damages and historical characteristics of flood hazards around Yoshida River in Miyagi Prefecture, Japan

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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 alsoperformed numerical simulations to further understand the floodand 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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[P-46] Disaster Risk Reduction Knowledge Service

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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.

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

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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.