[EE] Evening Poster | H (Human Geosciences) | H-DS Disaster geosciences

[H-DS06]Advanced remote sensing toward Mega-Disaster Response

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Natural disaster under climate change is a serious threat to sustainable development, and in recent years natural disasters, i.e., hydro-geo-meteorological hazards and risks, have been frequently experienced by both developing and developed countries.
In this circumstance, advanced remote sensing can play a vital role in disaster risk management. Satellites enable monitoring and detection of changes in a widespread area and assist mapping such information.

This session introduces papers focused on both remote sensing fundamentals and applications to promote investment in disaster risk management using advanced satellite data and integrated GIS data. Earth observation (EO) products may include monitoring information and in-situ observations on global and regional mega-disasters under climate change; for example, land surface dynamics, land cover and land use changes, numerical simulation, and social applications between near-real time observation and long-term trends with water/hydrological cycle.

We encourage the presentation of new research findings and novel approaches on natural disasters, such as mega-floods, tropical cyclones (typhoons), storm surges, earthquakes, tsunamis, landslides, and wildfires, from local to global scales.

[HDS06-P03]Asia flood mapping using multiple satellite data

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Monsoon floods occur frequently as one of the major disasters in the Asian region, the most flood-prone region in the world. Therefore, flood mapping is an imperative process as part of flood risk management. With the development of advanced optical and SAR sensors, flood detection algorithms should be progressively developed to produce more accurate flood maps under climate change and environmental changes. However, there are many challenging issues regarding, for example, the limitations of each sensor type as well as data acquisition with revisit time.

Despite very limited satellite-based data, this study introduces good examples of snapshot flood detection and annual flood monitoring focusing on urbanized mega-deltas in international river basins in Asian countries using a new index-based flood algorithm with a synchronized floodwater index, SfWi[2]. Multiple types of advanced satellite data, such as Landsat-8 (NASA), MODIS (MODerate resolution Imaging Spectroradiometer, NASA-USGS), AMSR2 (Advanced Microwave Scanning Radiometer 2, NASA-JAXA), Sentinel-1 (ESA), and ALOS-2 (JAXA), were employed to detect the flood extent for wide application to a global flood mapping and operational global flood risk system. As preliminary results of most vulnerable Asian countries, the pilot studies represent the dynamics of flood extent and flood propagation process over the mega deltas in Bangladesh and India (i.e., the 2015 flood in the basins of

the Ganges, Brahmaputra and Magna rivers), China (i.e., the 2016 flood in the Yangtze River basin), Cambodia and Vietnam (the 2012 flood in the Mekong River basin), Pakistan (the 2010 flood in the Indus River basin), and Thailand (the 2011 flood in the Chao Phraya River basin).

The resultant maps show a methodological possibility for instant and comprehensive flood mapping at the international river-basin level. In addition, these satellite-detected flood maps will help validate hydrological model-based inundation areas to assess the accuracy of comparative flood maps. However, many ambiguities still remain to be solved in rapid flood mapping of urbanized mega-delta floodplains due to different spatio-temporal resolution, surface complexity, and sensor ability, and further effort is necessary to improve flood algorithms for satellite-derived products.