[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-P01]Coastal erosion and land loss detection using multi-temporal ALOS/ALOS-2 data in Sittaung Estuaries, Myanmar

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The Myanmar government is faced with the risk of coastal erosion as one of the urgent issues in land use planning and coastal management in order to reduce economic losses, i.e., relocation of residents due to land loss. To evaluate the impact of coastal erosion and sedimentation in the estuary of the Sittaung River around the Gulf of Martaban in Myanmar, we conducted a preliminary investigation focusing on short-term coastal change detection using satellite optical and synthetic aperture radar (SAR) sensors. The selected study site is located 200 km east from Yangon city around the estuary of the Sittaung River, 420 km long, with a basin area of approximately 35000 km^2.

We employed ALOS (12.5m spatial resolution) and ALOS-2 (25m spatial resolution, copyright 2017, JAXA) and Landsat-8 (30m spatial resolution, copyright 2017, NASA-USGS) data to detect accurate coastal lines during the dry season between December and February considering insensitive weather conditions such as tidal effect, cloud, wind and strong wave during the similar snapshot period.

As a result of delineating by the interpretation and classification, spatially the maximum erosion rate of 2017 coastal line change (2 km/year) was faster in contrast to the average rate of 1 km/year for the period between 2007 and 2017. The maximum distance of erosion was about 2 km (west to east) along the 30 km shoreline (north to south) in the representative eroded areas in the selected western part of the Sittaung esturary.

In addition, the resultant coastal change line was also verified by ground truth and field survey data using a small unmanned aerial vehicle (sUAV: Quadcopter with a flight control system, © DJI Technology Co. Ltd., China) for comprehensive validation, i.e., a natural coastal line with 2-3 meter coastal bank.

For accurate coastal mapping based on evidence data, we will develop an automated algorithm for coastal change detection, in particular for ALOS-detected erosion and sediment. This feasibility study will continually investigate the characteristics of short-term and long-term changes with the relationship between hydrological parameters such as precipitation, river discharge, wave, and tidal effect. Also, this study will contribute to setting boundary condition options and validating a prediction model for coastal erosion changes.