IAG Webinar East & Southeast Asia

7 March 2025 at 14:00–17:00 SST (UTC+8)

Coordinators: Edward Park (Singapore), Noelynna T. Ramos (Philippines), Takashi Oguchi (Japan)

INTERNATIONAL GEOMORPHOLOGY WEEK 2025

14:00–14:20

Geomorphological mapping and landform characterization of Welirang Volcano's Maspo Sub-watershed using GIS and remote sensing

Heni Masruroh, State University of Malang, Indonesia

Detailed geomorphological mapping is crucial for environmental management, particularly in developing regions. This study examines the Maspo Sub-watershed on the northern slopes of Welirang Volcano, East Java, using GIS and remote sensing. A high-resolution (1:10,000) geomorphological map was created based on the Italian Geomorphological Mapping System and the Topographic Position Index. Results indicate active erosional processes on upper slopes due to water flow, while downstream plains reflect anthropogenic influences. Fluvial, landslide, and volcanic landforms dominate the area. These findings provide essential data for hazard management and sustainable land use planning.

14:20–14:40

Geomorphic approaches to sustainable sand mining: Hydrodynamic modeling for stability and resource management

Sonu Kumar, Nanyang Technological University, Singapore

Sand mining drives infrastructure development but destabilizes riverbanks and alters sediment transport. This study introduces Sustainable Mining Zones (SMZs), integrating hydrodynamic and geomorphic modeling to identify stable extraction sites. Tested in the Vietnamese Mekong Delta, the approach achieves 70–80% accuracy in predicting suitable mining locations, minimizing erosion risks while balancing environmental and societal needs. By coupling numerical simulations with real-world geomorphic data, SMZs offer a scalable framework for sustainable sand management in sediment-rich river systems worldwide.

14:40–15:00

Step-wise sea level drop: evidence based on strand-plain morphology of Kelantan Delta

AP Dr Edlic Sathiamurthy, Faculty of Science and Marine Environment, UMT, Malaysia

Beach ridges and strand-plains feature, and their spatial sequence are found along the coastline of Patani (south Thailand), Kelantan, Terengganu, Pahang and Johor (east coast of Peninsular Malaysia). Strand-plains topography suggest periods of stable sea level and gradual sea level drop. These landforms are mostly observable using satellite imagery. In Kelantan, a more detailed examination was conducted using LiDAR. The earliest beach ridges were isolated ones and then followed by several sets of strand-plains with swales in between. The topography of the strand plains implied a stepwise sea level drop.

15:00–15:20

Building stakeholder partnerships for social license in sustainable river sand mining in the Mekong Delta

Thuy Thi Thanh Hoang, Ho Chi Minh City University of Natural Resources and Environment, Vietnam

Sand mining is a dominant geomorphic disturbance in Vietnam's Mekong Delta (VMD), driving riverbank erosion and destabilizing fluvial systems. Despite its critical geomorphic and hydrological impacts, community acceptance remains low, with a Social License to Operate (SLO) score of 2.51 ± 0.88 (four-point scale), far below the global average. Our study, based on 163 participants, highlights the necessity of integrating geomorphic assessments into governance frameworks. Strong community engagement, regulatory oversight, and sustainable extraction methods are essential to mitigating erosion and stabilizing river morphology while curbing illegal mining.

15:20–15:40

How landscape morphology in Northern Thailand responds to variations in tectonics, climate, and erosion

Dr. Pichawut Manopkawee, Department of Geological Sciences, Chiang Mai University, Thailand

Landscape morphology in tectonically active regions reflects the interaction between tectonics, climate, and bedrock erodibility. Northern Thailand represents the basin and range province where the landscape adjustment is related to the variations in geomorphic processes. Here, the high terrain and intermontane valley along the Mae Chan Fault experience the processes on Earth's surface, including active tectonics, landslides, and fluvial erosion. The terrain's susceptibility to disasters is analyzed using remote sensing, GIS techniques, field observations, and statistical models. The study reveals remarkable results and explains how geomorphic variability causes landscape-prone natural disasters.

15:40–16:00

Particle morphology changes associated with landslide movement

Dr. Sérgio Lourenço, The University of Hong Kong, Hong Kong SAR

Limited evidence suggests that soils under shear undergo changes not only of size but also of shape and surface roughness. However, the particle morphology descriptors used are frequently qualitative so that information on how the soil particles are damaged during landsliding remains incomplete. This presentation uses quantitative particle morphology descriptors for particle size, shape, and particle surface roughness to investigate particle damage during landslide-induced shearing. Their evolution and implications for landslide dynamics is presented and discussed for three case studies: (1) A series of ring shear tests in completely decomposed volcanic rocks from Hong Kong; (2) Samples crossing mass transport deposits from offshore Nankai (SE Japan); (3) Granite gravel subjected to experimental abrasion.

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Statistical analysis of depth to bedrock and terrain attributes using DEMs in Japan

Junko Iwahashi, Geospatial Information Authority, Japan

Depth to bedrock (DTP) is an important indicator for landslide prediction, land development etc. However, measurements are sparsely scattered, making it difficult to determine their actual state. In this study, DTB values were estimated using about 30,000 borehole logs in Japan, and the results were compared with terrain attributes derived from Digital Elevation Models. As a result, relationships between medians of DTB and lithological conditions, slope gradient across different terrain categories are becoming clear. While the relationship between topography and DTB exhibits considerable variability at individual sites, further statistical characterization will enhance future modeling efforts.

16:20–16:40

Determining the boundaries of major ranges and subranges of the Altai Mountains using morphometric analysis in Western Mongolia

Bayanjargal Bumtsend, Physical Geography and Environmental Study, IGG, MAS, Mongolia

This study addresses the long-standing controversy surrounding the boundary, length, and internal naming of the Altai Mountains, one of the major mountain systems in Western Mongolia. To resolve these issues, we systematically defined the borders, length, and internal divisions of the mountain range. The determination of the borders was based on a two-step approach: first, the geomorphon classification was employed, followed by the topographic position index, to provide a detailed determination of the mountain system. This method considered surrounding large hollow depressions, plains, and variations in mountain topography.

16:40–17:00

General Discussion