IAG Webinar South and West Asia

02 March 2024 at 6.00-8.10 UTC(11.30–13:40 IST)

11:35-11:40: Welcome Address by *Prof. Sunil Kumar De,* IAG President

Coordinators:
Dr. Sayantan DAS, India
Dr. Kapil GHOSH, India
Dr. Narges KARIMINEJAD, Iran
Prof. Cengiz YILDIRIM, Türkiye

INTERNATIONAL GEOMORPHOLOGY WEEK 2024

Extreme Hydrological Events in South Asia: Key Observations and Critical Issues

11:40–12:00

Prof. Viswas S. Kale, Savitribai Phule Pune University, India

In the context of human-induced climate change, there is growing concern over the escalation in extreme hydrological events in South Asia. The severity and frequency of hydro-climatic extremes are expected to increase under warming conditions through the 21st century. Available gauge data indicate that remarkably high daily rainfall (500-1500 mm/day) and large flood (~30,000-100,000 m^3/s) events have been recorded at several sites in South Asia since mid-20th century. Due to spatio-temporal variations in the monsoon rainfall and flood magnitude, limited availability of long-term records, and paucity of data on geomorphic/societal impacts, identifying extremes with their trends and patterns in modern era and historical events remains a challenging proposition. This presentation touches on issues concerning the diagnosis of extremes, and emphasizes the importance of a multi-attribute classification for extreme hydrological events in South Asia.

Geoheritage and Geodiversity of Iran, with the Emphasis on Desert Areas

12:00–12:20

Prof. Mehran Maghsoudi, University of Tehran , Iran

Iran as a country located in the southwest Asia is mainly covered by arid, semiarid, and hyper-arid climatic conditions. The country has high geological, climatologic, biologic, and cultural diversities. Geodiversity of Iran is so high that the country not only includes desert landscapes and landforms but also contains other landforms in different morpho-climatic regions. The diversity in landforms and landscapes in the country is related to regional differences in geology, tectonic activities, climate, and hydrological systems. In fact, different erosional processes including weathering, gravity, fluvial factors, karst, glacier, wind, and coastal agents along with rock types and structural systems made a variety of landforms in the country with geoheritage values especially in desert areas such as Lut Desert World Heritage.

Gully dynamics and its management: A geomorphological investigation of Yamuna Chambal Badlands

12:20–12:40

Prof. Padmini Pani, Jawaharlal Nehru University, India

The formation of gullies is a complex biophysical process and affect vast areas with different morphological, pedological and climatic characteristics. The amount of soil and fertile agricultural land loss due to gullying has become a serious threat to environment and food security at the present world. Therefore, the study carried out on longitudinal field investigation on gully morphology and its development processes in Yamuna-Chambal Badlands, a largest Badlands in India. The study also involved assessing the sustainable gully control measures for the last fifty years. Results show that a large part of Badlands in the study area have been levelled within five decades. The levelling rate increases exponentially during the observation years with seasonal variability. However, the gully head erosion and catchment area are continuously expanding and caused severe onsite and off-site implications in the study region.

Geological Background and Socioeconomic Impact of February 6, 2023 Mw 7.8 and 7.7 Earthquake Douplet in Türkiye

12:40–13:00

Prof. Cengiz Yildirim, Istanbul Technical University, Türkiye

Central Turkey experienced a seismic doublet on February 6, 2023. The impact of these earthquakes was immense, affecting 11 million people and causing over 50,000 fatalities, and inflicting an economic loss exceeding 100 billion USD. The earthquake epicenter is situated within the plate boundary, extending along the Dead Sea and East Anatolian Fault zones. The initial earthquake, registering Mw 7.8, occurred within a 500-year seismic gap, generated maximum displacements of 7.4 m along a 375 km surface rupture. The second earthquake (Mw 7.7) took place on the left-lateral strike-slip Sürgü-Çardak Fault, resulting in a 150 km surface rupture with maximum displacements of 11 m. This presentation shares insights derived from field observations and data, shedding light on the socio-economic impacts of these earthquakes.

Monitoring of Himalayan Glaciers and Associated Hazards using Ground and Space Observations

13:00–13:20

Dr. Rakesh Bhambri, Wadia Institute of Himalayan Geology, India

The Himalaya-Karakoram region has one of the largest glacier concentrations outside the poles. It plays a critical role in providing meltwater for drinking and irrigation while posing hazards such as glacier lake outburst floods (GLOFs) to downstream areas. Monitoring these glaciers is essential for water resource management and hazard mitigation. Notably, Karakoram glaciers exhibit irregular behavior compared to those in the central and eastern Himalaya, with some showing stable or slightly increasing ice mass, contrary to the mass loss observed in other parts. This anomaly has been studied through the mapping of surge-type glaciers and their role in GLOFs. Case studies, including the Gangotri Glacier in the central Himalaya and the Kumdan Group glaciers in the Karakoram, exhibit the distinct mechanisms of hazards in each region, highlighting the importance of continuous monitoring to assess the impacts of climate change.

Shoreline Change Analyses by using Multi-temporal Satellite Images along the Patara Beach: A Case Study from Southwestern Coast of Turkey

13:20–13:40

Dr. Hatce Kilar, Sakarya University, Türkiye

Patara Beach is one of Turkey's most important ecologically rich area due to its sand dunes and Caretta caretta nesting sites. In this study, spatial and temporal shoreline change of Patara Beach was evaluated by using End Point Rate (EPR), Net Shoreline Movement (NSM) and Linear Regression (LRR) statistics of the Digital Shoreline Analysis System (DSAS) and Landsat images. The long-term shoreline statistics show that between 1980 and 2023, the eastern part of Patara Beach was eroded more than the western part, which has a higher nesting density. Furthermore, the maximum shoreline erosion during this period was -182 m (NSM), -4.3 m/yr^{-1} (EPR) and -3.7 m/yr^{-1} (LRR), while the maximum shoreline progression was 96.2 m (NSM), 2.3 m/yr^{-1} (EPR), 1.8 m/yr^{-1} (LRR). The short-term shoreline statistics indicates that the maximum shoreline regression was observed during 1980–1990 with analyzed values of -124.9 m (NSM) and -12.5 m/yr^{-1} (EPR).