RESEARCH SEMINAR

DEPARTMENT OF GEOGRAPHY AND RESOURCE MANAGEMENT
THE CHINESE UNIVERSITY OF HONG KONG

Sustainability of the Himalayan water tower under climate change: water resources, landscape degradation, and natural hazards

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The Himalayan water tower is the source region of several large Asian rivers (e.g., Indus, Ganges, Yarlung Zangbo, Brahmaputra) and provides freshwater for ~2 billion people downstream, but climate change has led to a series of environmental consequences that severely threaten the sustainability of the water tower, e.g., reduced solid water storage, intensive permafrost degradation, and natural hazards (such as landslides). In this seminar, I will first discuss the hydrology and water resources of the Yarlung Zangbo River, which is the largest river in northern Himalayas, particularly the streamflow composition (i.e., contribution of different water sources to the river flow, e.g., precipitation, glacier/snow melt, groundwater) and regional water budget. Results suggest that the Himalayan water tower is composed of a "surface river tower" and a "groundwater tower", both subject to tremendous impacts of climate change. Then I will show how hydrology and permafrost degradation jointly shape landscape instability in the Himalayas, leading to increasing landslides and glacier lake outburst floods under climate change. Lastly, I will provide some perspectives on how to establish a complete framework of "climate change → permafrost degradation → hydrological response → natural hazards → environmental impacts → social impacts" for this critical transboundary region.

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Dr. Linfeng FAN is currently a Research Assistant Professor in the School of Environmental Science and Engineering, Southern University of Science and Technology (SUSTech). Before joining SUSTech, he obtained his PhD degree from ETH Zurich (Switzerland). His main research interests include: hydrology and water resources in the Tibet-Himalaya region, hydro-thermo-mechanical landslide triggering mechanisms, permafrost degradation and associated environmental impacts (e.g., Greenhouse Gas emission). His work was published in top-tier journals such as Geophysical Research Letters, Water Resources Research, Journal of Geophysical Research.

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