



# LSGI RESEARCH SEMINAR

## Glacial Isostatic Adjustment and Sea-level Change in Singapore and Southeast Asia: Implications from past to future

 **18 MAR 2024 (MON)**

 **3:00 AM - 4:00 PM**

 **Z211, POLYU**

 **ENGLISH**

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### Abstract

Over 400 million people in Southeast Asia live in low elevation coastal zones and are susceptible to future relative sea-level (RSL) rise. Accurate projections of future RSL rely on a good understanding of its history and driving mechanisms such as Glacial Isostatic Adjustment (GIA). Here we apply GIA models, paleo RSL records and instrumental data to demonstrate the evolution of RSL changes in Singapore and Southeast Asia and the associated impacts. We reconstructed RSL since the Last Glacial Maximum (LGM) to quantify magnitudes and rates of RSL changes through time and used GIA model to assess paleotopography changes and impacts to human populations. We applied the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report RSL projections and used the geological past to provide probability perspectives when IPCC future projections were last exceeded in Singapore. Future projections under a moderate emissions scenario show RSL rising 0.95 m at a rate of 7.3 mm/yr by 2150 which was only exceeded (> 99% probability) during rapid ice melting events (MWPs) ~14.5 and ~9 ka BP. We inferred the human population history using 763 high-coverage whole-genome datasets. Integrated paleotopographic and population genomic analysis demonstrates the earliest documented instance of forced human migration driven by rapid sea-level rise (e.g., WMPs). We investigated the sensitivity of the mid-Holocene sea-level highstand to Earth and ice model parameters, revealing that Earth model variation affects the magnitude and ice model variation changes both the timing and magnitude of the highstand. Lastly, we produced a highstand “treasure map” to guide future highstand data collection efforts as the highstand is poorly constrained currently.

### Biography

Dr Tanghua Li is a Senior Research Fellow at the Earth Observatory of Singapore (EOS) Nanyang Technological University (NTU). Prior to joining EOS, NTU as a Research Fellow in 2019, he obtained his PhD in Geophysics from the University of Hong Kong in 2018 and received his BSc in Geophysics from the China University of Geosciences in 2013. Dr Li's research interests include interactions of ice sheets, ocean and solid Earth, and their lasting impact on the Earth system, with a specific focus on modelling the Glacial Isostatic Adjustment (GIA) process with 3D (laterally heterogeneous) model and associated sea-level/ice sheet evolution, vertical land movement, gravity field change during the last glacial cycle.

**All are welcome! Limited seats are available, please register now to join us on-site!**

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