RESEARCH SEMINAR

Department of Geography and Resource Management
地理與資源管理學系

Sea Level as Earth's Integrator: Ice Sheets, Earthquakes, Ecosystems, and the Future of Coastal Risk

15 OCT 2026 (THU) | **CKB 109 16:30-18:00**

Sea level is often treated as a single global number, yet it varies across space and time in response to interactions among the cryosphere, ocean-atmosphere system, solid Earth, and biosphere. In this Lecture, I argue that sea level is Earth's integrator, linking disciplines across AOGS from paleoclimate and geodesy to ecology, hazards, and societal risk. Reconstructing past sea level provides the context needed to distinguish natural variability from human-driven change and to understand regional patterns. My research uses geological archives preserved in tidal marshes, mangroves, and coral reefs. Combined with instrumental observations, statistical analyses, and quantitative models, these records reveal how and why sea level has changed. Standardized methods enabled regional databases spanning Africa, Asia, Europe, the Americas, the Pacific, and beyond, culminating in a global atlas that improved understanding of processes such as glacial isostatic adjustment and land subsidence. Focusing on the last 2,000 years, I show how high-resolution reconstructions demonstrate that modern sea-level rise is unprecedented in the Common Era and strongly influenced by anthropogenic climate change. Finally, I explore how sea level rise affects the resilience of coastal ecosystems, identifying thresholds beyond which tidal marshes and mangroves are more likely to retreat. Sea level history provides a powerful tool for anticipating future coastal risks and adaptation challenges.

Benjamin P. Horton

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Professor Benjamin Horton is Dean of the School of Energy and Environment at City University of Hong Kong and President's Chair of Earth Science. He is an internationally recognised expert on sea-level change, coastal flood risk, ice-sheet dynamics, vertical land motion, and nature-based adaptation. His research combines field evidence, geochronology, and quantitative modelling to reconstruct past sea levels and project future coastal hazards. Formerly at NTU, Rutgers, and University of Pennsylvania, he has contributed to IPCC and COP processes, advised governments and global institutions, and published over 300 peer-reviewed articles worldwide, with major honours from AOGS AGU, GSA, and EGU.

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