

## RESEARCH SEMINAR

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

# The influences of remote anthropogenic aerosols on winter weather and monsoon climate over southern China

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Atmospheric aerosols not only reduce atmospheric visibility and pose severe threats to public health but also represent the largest uncertainty in quantifying the total anthropogenic forcing on climate since the pre-industrial era. Overall, aerosols have a cooling impact on the global mean temperature by absorbing and scattering solar radiation and by modifying cloud and precipitation processes. Unlike greenhouse gases, the short residence of atmospheric aerosols translates into a very heterogenous three-dimensional spatial distribution and associated climate forcing, resulting in marked changes in regional climate. This talk is about two pathways how remote aerosols will affect local weather and climate over southern China. In the first half, the contribution of local and remote anthropogenic aerosols to a record-breaking torrential rainfall event in winter is investigated using a regional numerical model. The second half will discuss the response of the East Asian winter monsoon circulation to aerosols using a coupled atmosphere-slab ocean general circulation model. These findings highlight the underlying physical pathways of aerosols in generating remote climate anomalies through transport and large-scale circulation changes.

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Dr. Zhen Liu is an assistant professor in the Earth, Ocean and Atmospheric Sciences Thrust, the Hong Kong University of Science and Technology (Guangzhou). He received his Ph.D. degree in 2018 from the Institute of Space and Earth Information Science at The Chinese University of Hong Kong. Before joining HKUST (GZ) in 2023, he conducted postdoctoral research at the IBS Center for Climate Physics and the University of Edinburgh. His primary research interests include anthropogenic-induced changes in monsoon circulation and climate extremes. The relevant research results have been published in 25 peer-reviewed papers such as Geophysical Research Letter and Atmospheric Chemistry and Physics. He also serves as a reviewer for about 20 peer-review journals (e.g., Nature).



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