

## RESEARCH SEMINAR

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

# Monitoring Tree Mortality During Drought using Multi-source Remote Sensing

16 Nov 2023 (Thu)  
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Understanding the drivers and mechanisms of tree mortality during drought has significant implications for forest management and forest ecosystem monitoring, especially in the context of global climate change with increasing drought frequency and severity. Although tree structures have been identified as an important factor influencing tree mortality during drought, how it functions remained controversial. In this talk, I will use our studies of Sierra Nevada forests in California, USA as examples to demonstrate the influence of canopy structure on tree mortality droughts. Using multi-source remote sensing datasets, we first mapped the location, species, structural features, and health conditions for nearly 1.5 million individual trees during the droughts. Our analyses revealed that drought-induced tree mortality rate has a “negative-positive-negative” piecewise relationship with tree height, but remains a consistent negative relationship with neighborhood canopy structure. We further found that trees in a structurally complex forest and overshadowed by tall neighboring trees experienced lower mortality rates, likely due to reduced exposure to solar radiation and less water demand from evapotranspiration. Our findings suggest establishing complexity in canopy structure could improve forest resistance to drought.

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MA Qin is an associate professor in School of Geography at Nanjing Normal University, China. She has worked as an assistant professor at Mississippi State University and a post-doc researcher in University of California, USA. Her research focuses on using remote sensing technologies to monitor the structural and functional features of forest ecosystems and their responses to climate change and human management. She has been a principal investigator for projects funded by National Natural Science Foundation of China, Ministry of Science and Technology of China, National Institute of Food and Agriculture USA.



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