

School of Earth and Environmental Sciences Fall 2024 Colloquium Series

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Science Building C-207

Mousong Wu, PhD

Associate Professor, International Institute for Earth System Science,
Nanjing University

Using a new data assimilation system to understand how ecosystems cycle water and carbon: Integrating multiple observations with NUCAS v1.0

Terrestrial ecosystems are critical for mitigating climate change by absorbing atmospheric CO₂ and storing it in vegetation and soil carbon pools. However, accurate modelling of the spatial and temporal variations in ecosystem carbon fluxes remains challenging due to substantial parameter uncertainties. These limitations impede our understanding of ecosystem responses to climate change and hinder effective management strategies to meet global and regional climate targets. Advances in observational data on terrestrial carbon and water cycles provide unprecedented opportunities to improve ecosystem models through data assimilation techniques. I will present our work on (1) utilizing diverse observations to advance understanding of carbon cycles across regional and global scales, and (2) developing a novel data assimilation system for integrating multiple observational datasets. Our ultimate goal is to deliver an open-access carbon cycle data assimilation system for researchers and policymakers, supporting evidence-based climate action.

