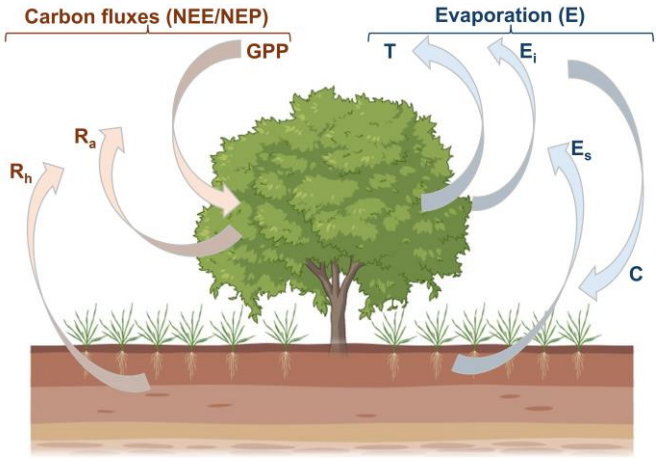

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Mingjuan Xie

Variations in carbon fluxes and evaporation in Eurasian terrestrial ecosystems and their driving mechanisms

Date: Thursday, 24 April 2025 at 09:00 AM (Brussels time)

Location: Sterre gebouw S8, grote vergaderzaal vakgroep geografie

Alternatively, you can follow the livestream here: https://tinyurl.com/nhfevj7h

About the Author

Mingjuan Xie (1997, China) is a joint PhD candidate at the Department of Geography at Ghent University and the University of Chinese Academy of Sciences. In 2019, she graduated from the School of Geoscience and Technology at Southwest Petroleum University and subsequently began her academic education at the University of Chinese Academy of Sciences. In 2021, she was recommended for a transfer from a master's student to a PhD student at the Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, and began pursuing her doctorate at Ghent University. During her doctoral program, she primarily focused on simulating carbon fluxes and evaporation in Eurasian terrestrial ecosystems using flux observations and machine learning methods, and on exploring the dynamics and driving mechanisms of carbon fluxes and evaporation across Eurasia.

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Supervisors

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Prof. Dr. Amaury Frankl (Ghent University)
Prof. Dr. Philippe De Maeyer (Ghent University)
Prof. Dr. Geping Luo (Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences)

Summary

Accurate analysis of carbon fluxes (NEE/NEP) and evaporation (E) in terrestrial ecosystems, along with their driving factors, is essential for understanding land–atmosphere feedbacks. However, sparse eddy-covariance (EC) observations, uncertainties in existing flux datasets, and pronounced land surface heterogeneity introduce large challenges for related research. Based on EC flux station data, this dissertation employed a random forest algorithm combined with a model applicability assessment method to generate NEE and E datasets for Eurasian meteorological stations, as well as gridded E datasets. Using these datasets, we analyzed the spatiotemporal dynamics of Eurasian carbon fluxes and evaporation, and further explored the impacts of compound heatwaves and droughts (CHD) on carbon-water dynamics across the region. The results indicate that the growth of Eurasian NEP slowed between 2003 and 2018, while E exhibited a significant increase from 2003 to 2023. CHD generally exerted negative impacts on both NEE and E, varying across land cover types. These findings provide valuable insights for improving carbon and water resource management under climate change.

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