



Variations in Forest Water-Use Efficiency in the Anthropocene: From Leaf to Global Analyses

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Message from the Guest Editors

Forests play a central role in controlling Earth's climate, hydrology and biogeochemical cycles. Understanding how global change drivers (including intensification of extreme climate events, increase in atmospheric CO₂, land use change and nitrogen deposition) influence the trade-off between photosynthesis and transpiration is paramount for a holistic perspective on future forest function and climate mitigation potential. Water-use efficiency (WUE)—the ratio of photosynthesis to transpiration—is a key physiological metric that lies at the core of ecosystem functioning, as it explicitly links the water and carbon cycles. This special issue aims to collect original papers exploring variations in WUE and their underlying mechanisms in response to global change drivers across scales (tree, ecosystem, biome and global), using multiple tools (leaf gas exchanges, stable carbon isotopes in plant materials, sap flow, eddy covariance, remote sensing data and modelling) and approaches, including manipulation experiments, long-term cross-site monitoring approaches or meta-analyses. Contributions in the form of reviews or perspectives are also welcome.





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