
Grassland carbon and water fluxes under global changes: new insights from the Montpellier European Ecotron

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Abstract

The ability to control environmental conditions while simultaneously measure ecosystem-level carbon and water fluxes, makes controlled environment facilities for ecosystem research (Ecotrons) useful tools for understanding the responses of ecosystems to global changes. Here we present the key findings from two experiments, one investigating the resilience and resistance of an upland grassland under a realistic extreme climatic event with combined droughts and heatwaves as predicted for 2050s (The Validate Experiment), while the other explores the impact of biodiversity loss for ecosystem functioning (The Jena-Ecotron Experiment). We emphasize the importance of high-frequency measurements of carbon and water fluxes for advancing our mechanistic understanding of the processes controlling the resilience and resistance of ecosystems to global changes.

Keywords: biodiversity, ecosystem functioning, water use efficiency, nitrogen use efficiency, elevated CO₂, plant functional traits

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