



The response of terrestrial ecosystems to drought extremes

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The carbon balance of terrestrial ecosystems appears to be particularly sensitive to interannual climate variability; in many regions of the globe, water availability and drought represent the key limiting factor and can explain a large proportion of the observed variability.

Drought affects several processes both at plant and ecosystem level. Apart from the effects on stomatal closure and gross primary production, water availability modulates resource allocation between tissues (and therefore C residence time) and, to a certain extent, autotrophic respiration. Moreover, soil organic matter decomposition and heterotrophic respiration are also hampered by drought, with potential feedbacks on plants through nutrient availability. Of particular relevance appears the time frame of the processes involved, since the effects of short-term, extreme events could differ profoundly from those of long-term drought, which could stimulate plant and ecosystem acclimation, so reducing ecosystem vulnerability.

A proper understanding of the net effects at the ecosystem level over different time scales is crucial in order to predict future dynamics of C sequestration. Over the last few years, experimental data from ecosystem manipulation studies have provided new information needed for the validation of biogeochemical models. The talk will assess available knowledge and critical issues for future research.