Geophysical Research Abstracts
Vol. 12, EGU2010-7963, 2010
EGU General Assembly 2010

Drought interactions with the carbon cycle

Michiel van der Molen, Han Dolman, and the COCOS Drought Meeting Team
Vrije Universiteit Amsterdam, Amsterdam, Netherlands (michiel.van.der.molen@falw.vu.nl, +31 20 598 9940)

Severe droughts occurred in Europe, the Amazon and western North America during the last few decades, and may foreshadow future impacts of climate change on biosphere carbon fluxes and storage. Research interest in the impact of drought on the carbon cycle is increasing rapidly. Drought impacts on the carbon cycle are traditionally studied from different disciplinary perspectives, but an integrated view is urgently needed. While the short-term effects of drought on terrestrial carbon exchange have been relatively well studied, the perception of the importance of longer-term effects emerges. Our knowledge of longer-term effects suffers from the scattered origin of experimental and observational data, which challenges the integration in biogeochemistry and dynamic vegetation models. Here we bring together information from different science disciplines, identify knowledge gaps, and discuss the implications of our findings. Our main message is that short term effects on gross primary production (GPP) and ecosystem respiration (Reco) and longer-term effects (carry-over effects, mortality, species competition, soil carbon dynamics) are fundamentally different, but are connected through differences in species' strategies and soil properties. To understand drought effects on the carbon cycle, vegetation models should be more oriented towards plant strategies than to plant functional types and we need soil models that better address stability and turnover on long time scales.