Max- Planck-Institut für Biogeochemie
Hans-Knoell-Strasse 10, D-07745 Jena
Beutenberg Campus Jena; Lecture Hall
http://www.bgc-jena.mpg.de/

Institute Colloquium

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Scaling land-atmosphere interactions using observational and modeling frameworks

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Anthropogenic modification of the atmosphere is causing significant changes to the climate system. Understanding how will these alterations impact specific regions of the globe remains unclear. This is made problematic by non-linear, multi-scale interactions governing the responses of surface-atmosphere feedbacks, extreme events etc. Here, I will examine several aspects of these multi-scale interactions through both observational and modeling frameworks. Data from eddy covariance and large aperture scintillometry are used to assess the potential of scaling tower measurements to the satellite pixel for quantifying areal average fluxes. The impact of spatial scale on local vegetation and soil moisture influence on mass and energy exchange is shown to vary depending upon the spatial scale of the observation as well as the phenological stage of the vegetation. Modeling studies ranging from large eddy simulations to regional climate models are used to illustrate the role of land surface heterogeneity on atmospheric dynamics at multiple scales, including feedbacks and the potential response to global climate change. Understanding the fundamental processes of land-atmosphere interactions across scales will potentially help develop robust quantifications of the local to regional scale responses to climate change.