Monitoring and data assimilation: predicting states and fluxes

Conveners: Harrie-Jan Hendricks-Franssen and Volker Wulfmeyer

Invited speaker: Rolf Reichle, Nasa, Maryland, USA

Session description:

Monitoring of environmental variables and fluxes like soil moisture content, evapotranspiration and carbon dioxide exchange between the land surface and the atmosphere supplies important but incomplete information on the governing processes. Only for a limited number of points in space and time data are available. Interpolation/extrapolation is needed to estimate states and fluxes on a dense grid in space and time. Data assimilation methods (for example sequential data assimilation or inverse modeling) allow for interpolation and extrapolation of the data consistent with physical, chemical and biological processes as implemented in a numerical simulation model. DA merges the information content of observations with the simulated fields, which are based on the current state of process understanding ingested in the model system. Consequently, the results can be used for model verification, 3D simulations of transport processes in the soil-vegetation-atmosphere continuum, and improved forecasting of key components of the water and matter cycles.

We are interested in data assimilation studies focusing on real-world case studies and use of new data types. Of special interest are contributions focusing on a thorough verification of data assimilation procedures with real-world data, for example supplied by observations from the TERENO network. Methodological data assimilation contributions are also appreciated. Further topics are the optimization of monitoring networks and the assessment of data information content. Contributions from soil science, hydrology, biogeochemistry, and atmospheric sciences, and other study areas are welcome.