



Data assimilation course

Date: May 6-8, 2019

Location: University of Neuchâtel

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Simulations by different types of hydrological models are affected by uncertainty, for example because input parameter values and meteorological input data are uncertain. In addition, the equations which are solved by the hydrological model are only an imperfect representation of reality. Predictions with hydrological models like river discharge, the transport of contaminants in the groundwater or the evapotranspiration of an agricultural field are therefore prone to errors. Data assimilation methods use measurement data to update model states so that the hydrological model prediction stays closer to reality. This course provides an introduction to data assimilation and the two most popular data assimilation methods, the Ensemble Kalman Filter and the Particle Filter. It will also be illustrated how these methods can be used for parameter estimation. An overview will be given of the most important application areas of data assimilation methods. Computer exercises will help to understand the material and get acquainted with the basics of data assimilation methods.

Course contents (one block is 2 course hours):

- Block 1: General introduction to data assimilation and Bayes Law
- Block 2: Ensemble Kalman Filter
- Block 3: Special topics Ensemble Kalman Filter: Localization, inflation and transformation
- Block 4: Particle Filter
- Block 5: Data assimilation including parameter estimation
- Block 6: Application subsurface hydrology: data assimilation and parameter estimation
- Block 7: Application land surface modelling: satellite soil moisture assimilation
- Block 8: Integrated modelling: Coupled data assimilation
- Mixed with four blocks with computer exercises

People wishing to participate have to register online:

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<https://www.unine.ch/phdschool-wes/home/programme.html>

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Participation and registration are free of charge for PhD school WES members.

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