Geophysical Research Abstracts
Vol. 12, EGU2010-4211, 2010
EGU General Assembly 2010


# Coupled hydrogeophysical inversion using a particle filtering approach

J. Rings, J.A. Huisman, and H. Vereecken
Forschungszentrum Jülich, ICG 4 - Agrosphere, Jülich, Germany

Coupled hydrogeophysical inversion infers hydrological and petrophysical parameters directly from geophysical measurements. Most inversion methods do not explicitly recognize uncertainty in parameter estimates. We apply a sequential Bayesian framework that provides updates of state, parameters and their uncertainty whenever measurements become available. We have coupled a hydrological and an electrical resistivity tomography (ERT) forward code in a particle filtering framework. First, we analyze a synthetic data set of lysimeter infiltration monitored with ERT. In a second step, we apply the approach to field data measured during an infiltration event on a full-scale dike model. For the synthetic data, the water content distribution and the hydraulic conductivity are accurately estimated after a few time steps. For the field data, hydraulic parameters are successfully estimated from water content measurements made with spatial time domain reflectometry and ERT, and the development of their posterior distributions is shown.