SPoRT Seminar Series Presents:

Soil Moisture Data Assimilation in the Land Information System

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Date: Thursday, May 17, 2012
Time: 1:00 P.M.

Location: NSSTC Conference Room 2096

Abstract:

The use of satellite observations of soil moisture is potentially of great benefit to land surface hydrology modeling, allowing many observations per day with global coverage. Modeled soil moisture fields are used in agriculture and to supply boundary conditions for weather forecasts. X-band (10.65 GHz) soil moisture retrievals from the Advanced Microwave Scanning Radiometer-EOS (AMSR-E) on the NASA Aqua satellite have been assimilated into the Simulator for Hydrology and Energy Exchange at the Land Surface (SHEELS) land surface model using an Ensemble Kalman Filter. This was implemented within the Land Information System (LIS) software. To alleviate discrepancies between modeled and observed distributions, a bias correction is done using a cumulative density function (CDF) matching technique with different corrections based on vegetation type and for day and night. Validation against in situ measurements proved problematic due to discrepancies in observation scale and in the characterization of soil properties. Results from synthetic experiments with intentionally poor precipitation forcing will be presented, showing that in this case the assimilation of AMSR-E data improves the soil moisture fields by comparison against the model run with the best available forcing data. A brief overview of some work on rain and cloud profile retrievals using the Microwave Integrated Retrieval System (MIRS) to perform a one-dimensional variational retrieval from microwave satellite radiances will also be presented, illustrating how this problem relates to data assimilation in three dimensions.