Séminaire Jeudi 8 Oct 10h30 / Seminar Thursday Oct 8th, 10:30 AM

Conférencier/Lecturer: Rolf Reichle (NASA/GSFC)

Sujet/Subject: Assimilation of satellite-derived land skin temperature retrievals into land surface models

Présentation/Presentation: Anglais / English

Lieu/Room: Grande salle du premier étage CMC

Résumé / Abstract:

Land surface (or "skin") temperature (LST) is at the heart of the surface energy balance and a key variable in weather and climate models. We assimilated LST retrievals from the International Satellite Cloud Climatology Project (ISCCP) with an ensemble-based, off-line land data assimilation system into the Noah and Catchment (CLSM) land surface models. LST is described very differently in the two models. A priori scaling and dynamic bias estimation approaches are applied because satellite and model LST typically exhibit different mean values and variability. Performance is measured against in situ measurements from the Coordinated Energy and Water Cycle Observations Project at 48 stations.

LST estimates from Noah and CLSM without data assimilation ("open loop") are comparable and superior to that of ISCCP retrievals. Raw RMSE for LST is 4.9 K for CLSM, 5.5 K for Noah, and 7.6 K for ISCCP. Anomaly RMSE is 3.3 K for CLSM and Noah, and 4.5 K for ISCCP. Assimilation of ISCCP retrievals provides modest yet statistically significant improvements (over open loop) of 0.5-0.7 K in terms of raw RMSE and of 0.3 K in terms of anomaly RMSE. Surface turbulent flux estimates from the CLSM and Noah assimilation integrations are essentially identical to open loop estimates. Noah assimilation estimates of ground heat flux, however, are significantly worse (by 10-27 W/m2 for raw RMSE and by 11-18 W/m2 for anomaly RMSE). Provided the assimilation system is properly adapted to each land model, the benefits from the assimilation of LST retrievals are comparable for both land models.