Geophysical Research Abstracts
Vol. 17, EGU2015-5196, 2015
EGU General Assembly 2015

Optimal averaging of soil moisture predictions from ensemble land surface model simulations

Wade T. Crow (1), Chun-Hsu Su (2), Dongryeol Ryu (2), and M. Tugrul Yilmaz (3)

(3) Middle East Technical University, Civil Engineering Department, Water Resources Lab., Ankara, Turkey (tuyilmaz@metu.edu.tr), (1) Hydrology and Remote Sensing Laboratory, United States Department of Agriculture, Beltsville, Maryland, USA (wade.crow@ars.usda.gov), (2) Department of Infrastructure Engineering, University of Melbourne, Parkville, Victoria, Australia (csu@unimelb.edu.au, dryu@unimelb.edu.au)

The correct interpretation of ensemble 3 soil moisture information obtained from the parallel implementation of multiple land surface models (LSMs) requires information concerning the LSM ensemble's mutual error covariance. Here we propose a new technique for obtaining such information using an instrumental variable (IV) regression approach and comparisons against a long-term surface soil moisture dataset obtained from satellite remote sensing. Application of the approach to multi-model ensemble soil moisture output from the North American Land Data Assimilation System (NLDAS-2), and multi-satellite European Space Agency (ESA) Soil Moisture (SM) Essential Climate Variable (ECV) dataset, allows for the calculation of optimal weighting coefficients for individual members of a the NLDAS-2 ensemble and a biased-minimized estimate of uncertainty in a deterministic soil moisture analysis derived via such optimal weighted averaging. As such, it provides key information required to accurately condition soil moisture expectations using information gleaned from a multi-model LSM ensemble. However, existing continuity and rescaling concerns surrounding the generation of long-term, satellite-based soil moisture products must likely be resolved before the proposed approach can be applied with full confidence.