W. Ni-Meister, J.P. Walker, P.R. Houser, and R.H. Reichle (2004), **Soil moisture initialization for climate prediction: Assimilating SMMR into a land surface model**, in *Proceedings of the 2nd international CAHMDA workshop on: The Terrestrial Water Cycle: Modelling and Data Assimilation Across Catchment Scales*, edited by A.J. Teuling, H. Leijnse, P.A. Troch, J. Sheffield and E.F. Wood, pp. 180, Princeton, NJ, October 25–27

Soil moisture initialization for climate prediction: Assimilating SMMR into a land surface model

W. Ni-Meister[1], **J.P. Walker**[2], **P.R. Houser**[3], **and R.H. Reichle**[4]

[1]*Dept. of Geography, Hunter College of City University of New York, New York, USA*
[2]*Dept. of Civil and Environmental Engineering, University of Melbourne, Parkville, Australia*
[3]*Hydrological Sciences Branch, NASA Goddard Space Flight Center, Greenbelt, USA*
[4]*UMBC-GEST/NASA-GSFC Hydrological Sciences Branch, Greenbelt, Maryland, USA*

Current climate models for seasonal prediction or water resource management are limited due to poor initialization of land surface soil moisture states. Passive microwave remote sensing provides quantitative information on soil moisture in a very thin near-surface soil layer at large scale. This information can be assimilated into a land surface model to retrieve better estimates of the soil moisture states. A Kalman filter-based data assimilation strategy has been implemented in the catchment-based land surface model (CLSM) used by the NASA Seasonal-to-Interannual Prediction Project (NSIPP). In our previous study, we have characterized the model error and the remote sensing measurement error. In this study we assimilated Scanning Multifrequency Microwave Radiometer (SMMR) data for the period of 1979–1987 and compared the resulting soil moisture with in-situ measurements collected in Russia, Mongolia and China. Two data assimilation methods are used, one is to adjust the data assimilation parameters so that the model error and measurement error is consistent with the true values from our previous study, the other is to use one consistent data assimilation parameters. Our comparison results indicate that the first approach improves our soil moisture estimation over either by model or remote sensing alone and the second approach improves at least the rootzone soil moisture estimation. We discuss the possible reasons for the above results and investigate an operational approach to apply the ensemble Kalman filter to initialize soil moisture content for seasonal climate prediction.