Comparison between NCEP/DOE Reanalysis-2 soil moisture and Global Soil Moisture Data Bank observations

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Recent modeling studies have demonstrated that a prior knowledge of land soil moisture state could, under certain circumstances, contribute significantly to the atmospheric predictability. Long-term consistent soil moisture datasets, however, are still very limited and, consequently, extreme or idealized soil moisture conditions are often employed in modeling studies.

Such limitation has been addressed by various ongoing land data assimilation efforts, in which land surface model estimates soil moisture indirectly through their integration of observed precipitation and other forcing data. One such example is the NCEP/DOE Reanalysis (R-2) soil moisture analysis. The soil moisture evolution in the data assimilation cycle is determined by precipitation constructed from rain gauge and satellite observations, radiation forcing computed from atmospheric analysis, and near surface atmospheric analyses.

In this study, R-2 soil moisture data set is compared with soil moisture observations from the Global Soil Moisture Data Bank. There are three data sets from Eurasia (50 stations in Russia, 78 stations over China, and 40 stations in Mongolia), and two data sets from US (18 stations network in Illinois and 2 catchments at Iowa). Results of R-2 soil moisture (full field and anomaly) as compared to observations will be presented. The persistency decay of soil moisture derived from R-2 and observation datasets will be discussed as well.