P65 Impact of soil moisture assimilation on land surface model spinup and coupled land-atmosphere prediction.

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Advances in satellite monitoring of the terrestrial water cycle have led to a concerted effort to assimilate soil moisture observations from various platforms into offline land surface models (LSMs). One principal but still open question is that of the ability of land data assimilation (LDA) to improve LSM initial conditions for coupled short-term weather prediction. In this study, the impact of assimilating Advanced Microwave Scanning Radiometer for EOS (AMSR-E) soil moisture retrievals on coupled WRF forecasts is examined during the summers of dry (2006) and wet (2007) surface conditions in the U.S. Southern Great Plains. LDA is carried out using NASA's Land Information System (LIS) and the Noah LSM using an Ensemble Kalman Filter (EnKF) approach. The impacts of LDA on the a) soil moisture and soil temperature initial conditions for WRF, b) land-atmosphere coupling characteristics, and c) ambient weather of the coupled LIS-WRF simulations are then assessed. Results show that impacts of soil moisture LDA during the spinup can significantly modify LSM states and fluxes, depending on regime and season. Results also indicate that the use of seasonal CDFs is more advantageous compared to the traditional annual CDF bias correction strategies. LDA performs consistently regardless of atmospheric forcing applied, with greater improvements seen when using coarser, global forcing products. Downstream impacts on coupled simulations vary according to the strength of the LDA impact at the initialization, where significant modifications to the soil moisture-flux-PBL-ambient weather process chain are observed. Overall, this study demonstrates potential for future, higher-resolution soil moisture assimilation applications in weather and climate research.