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Disaggregation of Coarser Resolution Radiometer Derived Soil Moisture to Finer Scales

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Abstract : Soil moisture is a key hydrologic state variable and is intrinsically linked to the Earth's water, climate and carbon cycles. On ecological point of view, the soil moisture is a fundamental natural resource providing the transpirable water for plants. Soil moisture varies both temporally and spatially due to spatiotemporal variation in rainfall, vegetation cover, soil properties and topography. Satellite derived soil moisture provides spatio-temporal extensive data. However, the spatial resolution of a typical satellite (L-band radiometry) is of the order of tens of kilometers, which is not good enough for developing efficient agricultural water management schemes at the field scale. In the present study, the soil moisture from radiometer data has been disaggregated using blending approach to achieve higher resolution soil moisture data. The radiometer estimates of soil moisture at a 40 km resolution have been disaggregated to 10 km, 5 km and 1 km resolutions. The disaggregated soil moisture was compared with the observed data, consisting of continuous sensor based soil moisture profile measurements, at three monitoring sites and extensive spatial near-surface soil moisture measurements, concurrent with satellite monitoring in the 500 km2 study watershed in the Eastern India. The estimated soil moisture status at different spatial scales can help in developing efficient agricultural water management schemes to increase the crop production and water use efficiency.

Keywords : disaggregation, eastern India, radiometers, soil moisture, water use efficiency
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