

Soil moisture variations in remotely sensed and reanalysis datasets during weak monsoon conditions over central India and central Myanmar

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Abstract: Variation of soil moisture during active and weak phases of summer monsoon JJAS (June, July, August, and September) is very important for sustenance of the crop and subsequent crop yield. As in situ observations of soil moisture are few or not available, researchers use data derived from remote sensing satellites of global reanalysis. This study documents the intercomparison of soil moisture from remotely sensed and reanalyses during dry spells within monsoon seasons in the central India and central Myanmar. Soil moisture data from the European Space Agency (ESA)-Climate Change Initiative (CCI) has been treated as observed data and was compared against soil moisture data from the ECMWF reanalysis-Interim (ERA-I) and the climate forecast system reanalysis (CFSR) for the period of 2002-2011. The ESA soil moisture correlates rather well with observed gridded rainfall. The ESA data indicates that soil moisture increases over India from west to east and from north to south during monsoon season. The ERA-I overestimates the soil moisture over India, while the CFSR soil moisture agrees well with the remotely sensed observation (ESA). Over Myanmar, both the reanalysis overestimate soil moisture values and the ERA-I soil moisture does not show much variability from year to year. Day-to-day variations of soil moisture in central India and central Myanmar during weak monsoon conditions indicate that, because of the rainfall deficiency, the observed (ESA) and the CFSR soil moisture values are reduced up to $0.1 \text{ m}^3/\text{m}^3$ compared to climatological values of more than $0.35 \text{ m}^3/\text{m}^3$. This reduction is not seen in the ERA-I data. Therefore, soil moisture from the CFSR is closer to the ESA observed soil moisture than that from the ERA-I during the weak phases of monsoon in the study region.