Geophysical Research Abstracts
Vol. 18, EGU2016-9762, 2016
EGU General Assembly 2016

Value of Available Global Soil Moisture Products for Agricultural Monitoring

Iliana Mladenova (1), John Bolten (1), Wade Crow (2), and Richard de Jeu (3)

(1) NASA-GSFC, Greenbelt, MD, USA., (2) ARS-USDA, Beltsville, MD, USA., (3) Transmissivity, Noordwijk, The Netherlands.

The first operationally derived and publicly distributed global soil moil moisture product was initiated with the launch of the Advanced Scanning Microwave Mission on the NASA's Earth Observing System Aqua satellite (AMSR-E). AMSR-E failed in late 2011, but its legacy is continued by AMSR2, launched in 2012 on the JAXA Global Change Observation Mission–Water (GCOM-W) mission. AMSR is a multi-frequency dual-polarization instrument, where the lowest two frequencies (C- and X-band) were used for soil moisture retrieval. Theoretical research and small-/field-scale airborne campaigns, however, have demonstrated that soil moisture would be best monitored using L-band-based observations. This consequently led to the development and launch of the first L-band-based mission–the ESA's Soil Moisture Ocean Salinity (SMOS) mission (2009). In early 2015 NASA launched the second L-band-based mission, the Soil Moisture Active Passive (SMAP). These satellite-based soil moisture products have been demonstrated to be invaluable sources of information for mapping water stress areas, crop monitoring and yield forecasting. Thus, a number of agricultural agencies routinely utilize and rely on global soil moisture products for improving their decision making activities, determining global crop production and crop prices, identifying food restricted areas, etc. The basic premise of applying soil moisture observations for vegetation monitoring is that the change in soil moisture conditions will precede the change in vegetation status, suggesting that soil moisture can be used as an early indicator of expected crop condition change. Here this relationship was evaluated across multiple microwave frequencies by examining the lag rank cross-correlation coefficient between the soil moisture observations and the Normalized Difference Vegetation Index (NDVI). A main goal of our analysis is to evaluate and inter-compare the value of the different soil moisture products derived using L-band (SMOS) versus C-/X-band (AMSR2) observations. The soil moisture products analyzed here were derived using the Land Parameter Retrieval Model.