Geophysical Research Abstracts
Vol. 21, EGU2019-4307, 2019
EGU General Assembly 2019

Integration of Satellite Soil Moisture Observations for Numerical Weather and Water Predictions

Xiwu Zhan (1), Jicheng Liu (1), Limin Zhao (1), Jifu Yin (1), Li Fang (1), Nai-Yu Wang (1), Mitch Schull (1), Tomislava Vukicevic (2), and Ralph Ferraro (1)

(1) NOAA-NESDIS Center for Satellite Applications and Research, College Park, Maryland, USA (xiwu.zhan@noaa.gov), (2) NOAA-NWS Office for Water Prediction, Tuscoulosa, Alabama, USA (tomislava.vukicevic@noaa.gov)

Soil moisture is a critical land surface state variable that control the water, energy and even trace gas exchanges between land surface and the atmosphere. Numerical weather and water prediction models have been using simulated soil moisture data to initialize their forecasts. In the past decades, global or regional observational soil moisture data products have been generated from several satellite missions and could be used for the validation and assimilation of these models. To meet the operational needs of near real time soil moisture observations, NOAA NESDIS has developed a Soil Moisture Operational Product System (SMOPS) to integrate all available satellite soil moisture observations into one data layer. The current Version 3.1 of SMOPS ingests observations from L-band sensors on NASA's Soil Moisture Active/Passive (SMAP) and ESA's Soil Moisture Ocean Salinity (SMOS), C-band Advanced Microwave Scanning Radiometer (AMSR2) on JAXA's GCOM-W1 and Advanced Scatterometers (ASCAT-A and ASCAT-B) on EUMETSAT's MetOp-A and B satellites. The blended SMOPS soil moisture data product has larger spatial coverage and is available to NCEP numerical weather prediction (NWP) users within 3-6 hours from acquisition time. In this presentation, a new algorithm for blending the multiple satellite retrievals and the blended soil moisture products are evaluated against in situ soil moisture measurements and other independent data sets such as European's Climate Change Initiative soil moisture product. Intercomparison of SMOPS data with National Water Model (NWM) simulations indicated satellite retrievals contain independent information and have the potential to improve NWM performance. Assimilation of SMOPS product into global and regional numerical weather models demonstrated the advantage of the blended satellite soil moisture product over the individual sensor retrievals