



Soil moisture from the recent AMSR2 and FY3B multi-frequency passive microwave sensors

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Over the years several different multi-frequency passive microwave sensors were used to estimate surface soil moisture. An historical multi-frequency passive microwave database from these satellite platforms was already used to generate a long term (32 years) surface soil moisture dataset. The Land Parameter Retrieval Algorithm (LPRM) was applied to this historical multi-frequency passive microwave database, including the Advanced Microwave Scanning Radiometer – Earth Observing System (AMSR-E), that plays a dominant role in the 2002-2011 period. The Advanced Microwave Scanning Radiometer 2 (AMSR2) shares a similar design with its predecessor, it was improved based on general technical development as well as the valuable heritage that AMSR-E left behind. Most recently, the Japanese Aerospace Exploration Agency (JAXA) started offering brightness temperature observations from the AMSR2 radiometer. In the recent years, China's National Satellite Meteorological Center (NSMC) developed meteorological satellites. The NSMC has polar orbiting sun-synchronized meteorological satellites in operation since 1988 in the so-called FengYun (FY) satellite series. FY3 is China's 2nd generation polar orbiting satellite series, its design was based on the previous polar orbiting satellite series and FY3 will ultimately become series of four satellites (FY3A to FY3D). The FY3B satellite is the 2nd satellite of the FY3 series and it's the 1st in the series to carry a microwave imager (MWRI) onboard observing the Earth's surface in 10 microwave channels. Brightness temperature observations of these recently developed sensors were compared to the existing database. An inter-calibration step was performed in order to overcome small difference in brightness temperature observations as a result of the different sensor calibration procedures. The LPRM was applied to observations made by the FY3B and AMSR2 sensors resulting in global soil moisture products. After the implementation of the inter-calibration procedure, the newly derived products show a high degree of consistency compared to several different soil moisture products. These new products were also compared to the existing LPRM soil moisture database and their added value in relation to other satellite sensors is discussed. Ultimately, these newly derived products might be integrated into the existing (long-term) data products and together with data from other satellite missions they will provide the opportunity to study diurnal soil moisture patterns.