

Estimation of Soil Moisture using FY-3 MWRI observations

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Soil moisture is a key parameter in the study of land surface water and energy budget. FY-3 is a new-generation polar orbit meteorology satellite of China, with Microwave Radiometer Imager (MWRI) on board. MWRI observes the surface microwave emission from 10GHz-89GHz and can be used to monitor the spatial and temporal distribution of global soil moisture. The study developed a soil moisture inversion algorithm for FY-3 MWRI using observations at H and V channels of X-band. The algorithm works in three steps: data preprocess, vegetation effects correction for both V and H channels, and soil moisture inversion for bare soil. Data preprocess includes terrain effects correction and excludes situations that are not applicable for soil moisture inversion. Vegetation correction is based on zero-order radiative transfer model and optical observations. The soil moisture inversion is based on Qp model, which can correctly simulate the emission of bare surface at both V and H polarizations. The global soil moisture map was then generated by the algorithm and showed a reasonable spatial distribution pattern of soil moisture. A quantitative validation using one-year field observations in Tibet and Mongolia was also conducted and indicated a good accuracy of the algorithm in moderately and low vegetated area.

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