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Disaggregation of Active/Passive Microwave Soil Moisture Under All-sky Condition Using Machine learning approach

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Remotely sensed soil moisture products measured from the active/passive microwave sensors on-board satellite platforms have a great impact on many hydro-meteorological analyses at a global scale. However, its coarse spatial resolution interrupts local scale soil moisture applications. Moreover, most downscaling methods using optical and thermal dataset, are applicable only in cloud-free conditions; thus developed downscaling method under all sky condition is essential for the construction of spatio-temporal continuity of datasets at fine resolution. In present study Support Vector Machine (SVM) regression model was utilized to downscale the satellite-based soil moisture retrievals. The 12.5 km spatial resolution of active microwave soil moisture datasets from the Advanced Scatterometer (ASCAT) and the 40 km resolution of passive microwave soil moisture datasets from the Soil Moisture Active Passive (SMAP) passive soil moisture were disaggregated to 1 km high resolution products over Northeast Asia in 2016. Optically derived estimates of surface temperature (LST), normalized difference vegetation index (NDVI), and its cloud products were obtained from MODerate Resolution Imaging Spectroradiometer (MODIS) for the purpose of downscaling soil moisture in finer resolution under all sky condition. Furthermore, a comparison analysis between in situ and downscaled soil moisture products was also conducted for quantitatively assessing its accuracy.