Geophysical Research Abstracts
Vol. 18, EGU2016-4656, 2016
EGU General Assembly 2016

Soil moisture downscaling using a simple thermal based proxy

Jian Peng (1), Alexander Loew (1,2), and Jonathan Niesel (1)

(1) Max Planck Institute for Meteorology, Hamburg, Germany (jian.peng@mpimet.mpg.de), (2) Department of Geography, University of Munich (LMU), Munich, Germany

Microwave remote sensing has been largely applied to retrieve soil moisture (SM) from active and passive sensors. The obvious advantage of microwave sensor is that SM can be obtained regardless of atmospheric conditions. However, existing global SM products only provide observations at coarse spatial resolutions, which often hamper their applications in regional hydrological studies. Therefore, various downscaling methods have been proposed to enhance the spatial resolution of satellite soil moisture products. The aim of this study is to investigate the validity and robustness of a simple Vegetation Temperature Condition Index (VTCI) downscaling scheme over different climates and regions. Both polar orbiting (MODIS) and geostationary (MSG SEVIRI) satellite data are used to improve the spatial resolution of the European Space Agency's Water Cycle Multi-mission Observation Strategy and Climate Change Initiative (ESA CCI) soil moisture, which is a merged product based on both active and passive microwave observations. The results from direct validation against soil moisture in-situ measurements, spatial pattern comparison, as well as seasonal and land use analyses show that the downscaling method can significantly improve the spatial details of CCI soil moisture while maintain the accuracy of CCI soil moisture. The application of the scheme with different satellite platforms and over different regions further demonstrate the robustness and effectiveness of the proposed method. Therefore, the VTCI downscaling method has the potential to facilitate relevant hydrological applications that require high spatial and temporal resolution soil moisture.