

AN OVERVIEW OF THE ASCAT SOIL MOISTURE PRODUCTS AND THEIR APPLICATIONS

ABSTRACT

Wolfgang Wagner

Technische Universität Wien

The Advanced Scatterometer (ASCAT) on board of the METOP satellite series is a C band active microwave sensor that was originally designed for monitoring winds over the oceans. Research with its successor instrument, the scatterometer on board of ERS-1 and ERS-2, has however demonstrated that it can also be used for measuring soil moisture over the land surface thanks to its comparably long wavelength (5.8 cm), sampling characteristics (almost daily sampling at 25 km), multiple-viewing capabilities (three measurements with three antennas) and high radiometric stability and accuracy. The soil moisture content in a thin surface soil layer (<2 cm) can be retrieved from the ASCAT backscatter measurements using a change detection approach that indirectly accounts for the roughness and land cover. Seasonal vegetation effects are corrected for by linking the seasonal change in the backscatter-incidence angle relationship (which can be measured thanks to the capability of ASCAT to make quasi-instantaneous backscatter measurements at different incidence angles) to backscatter itself.

Based on this 25 km ASCAT surface soil moisture product, which has been operationally produced by EUMETSAT since December 2008, higher-level soil moisture products can be derived. One of these higher level products is the Soil Moisture Index (SWI) which is an indicator of the profile soil moisture content obtained by filtering the surface soil moisture time series with an exponential filter. This product is currently under development within the geoland2 project and will soon be implemented operationally. Another one is a surface soil moisture product at 1 km scale which is obtained by disaggregating the 25 km ASCAT surface soil moisture product with soil moisture scaling parameters derived from Synthetic Aperture Radar (SAR) time series. This product is under development in the Hydrology SAF and has been produced on a pre-operational level since 2009. This presentation provides an overview over these three ASCAT soil moisture products focusing on product quality and primary application areas. Also, an attempt is made to summarize open science questions and technical challenges