

WARP6: LATEST IMPROVEMENTS IN THE GLOBAL SOIL MOISTURE RETRIEVAL PACKAGE FOR METOP ASCAT SCATTEROMETER DATA

ABSTRACT

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WARP (WATER Retrieval Package) is a software package developed for producing surface soil moisture products from the ERS-1/2 AMI and the Metop ASCAT scatterometer data on a global basis. WARP was originally conceived and developed in the mid 1990's and by 2002 was used to provide the first, scatterometer derived, global surface soil moisture dataset. With a stream of scatterometer data available from the ERS instruments since 1991 and further envisaged with the continuation of the Metop series, WARP will persist in providing surface soil moisture products well into the 2020's. The soil moisture retrieval within WARP follows the TU-Wien (Vienna University of Technology) change detection method, where reference backscatter values representing backscatter from the vegetated land surface under dry soil conditions are subtracted from the actual backscatter measurements to account for roughness and heterogeneous

land cover. In order to account for vegetation effects, the vegetation-sensitive signatures of the multi-incidence angle observations are exploited. Finally, soil moisture is retrieved by relating the actual backscatter measurements to dry/wet references, resulting in a relative measure of soil moisture. To enable the soil moisture retrieval, WARP requires a global parameter database, describing scattering characteristics for each point of the Earth's land surface, derived from a multi-annual analysis. This work gives an overview of the main functionalities of WARP, the processing elements of the WARP package and its algorithmic implementation. It introduces the global backscattering characteristics on Earth's surface and highlights the available soil moisture products. New implementations improving product reliability are introduced, including an enhanced method for freeze-thaw identification and flagging.