An Overview of Recent Algorithmic Research on the H-SAF ASCAT Surface Soil Moisture Product

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The Advanced Scatterometer (ASCAT) on board of the METOP-A and METOP-B satellites is currently one of the main microwave remote sensing instruments used for retrieving soil moisture on a global scale. Both operational near-real-time and reprocessed ASCAT soil moisture data are available through EUMETSAT's Satellite Application Facility in Support to Operational Hydrology and Water Management (H-SAF). Several extensive validation studies that used both in-situ and modeled soil moisture data as reference have shown that the quality of ASCAT soil moisture data compares in general quite favorably with other satellite soil moisture data such as the ones derived from the Soil Moisture and Ocean Salinity (SMOS) mission and multi-frequency radiometers such as AMSR-E, Windsat, or TMI (Wagner et al. 2013). Nonetheless, these studies have of course also established some

weaknesses of the ASCAT soil moisture product which are either related to the specifications of the instrument, shortcomings in the retrieval algorithm, or a combination thereof. Currently, the largest soil moisture errors are observed over arid environments. Our analysis of these errors suggests that they are caused by several independent phenomena, potentially including but not limited to azimuthal effects, Bragg scattering, volume scattering in dry soil, movement of sand dunes and temporary flooding. Recent research has also suggested that the vegetation correction as currently applied in the ASCAT retrieval scheme is not working optimally in some climatic regions. In this presentation we will provide an overview of our current knowledge of the strength and weaknesses of the ASCAT soil moisture product. Based on this understanding we will make some recommendations for further validation studies and potential algorithmic improvements. Wagner, W., Hahn, S., Kidd, R., Melzer, T., Bartalis, Z., Hasenauer, S., Figa, J., De Rosnay, P., Jann, A., Schneider, S., Komma, J., Kubu, G., Brugger, K., Aubrecht, C., Zuger, C., Gangkofer, U., Kienberger, S., Brocca, L., Wang, Y., Bolschl, G., Eitzinger, J., Steinnocher, K., Zeil, P., & Rubel, F. (2013). The ASCAT soil moisture product: A review of its specifications, validation results, and emerging applications. Meteorologische Zeitschrift, in press