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Improving the vegetation parametrization in the ASCAT soil moisture retrieval

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The TU Wien soil moisture retrieval algorithm is based upon a backscatter model designed to exploit the multi-angle viewing capabilities of space-borne fan-beam scatterometers. In the beginning the backscatter model has been developed for the scatterometers on-board ERS-1 and ERS-2 and later successfully applied on the successor instrument ASCAT (Advanced Scatterometer) on-board the series of Metop satellites. The soil moisture retrieval algorithm represents a physically motivated change detection method, which requires model parameters derived along the way to the final soil moisture estimates. The computation of the model parameters needs to be done in the time domain and is computationally expensive. However, not all model parameters are computationally estimated from the backscatter measurements, but rather defined by empirical observations. The cross-over angles belong to this group of model parameters, which unlike other model parameters, remain spatially and temporally constant on a global scale. This study investigates the possibility to optimize the cross-over angles, which are important parameters for the vegetation correction in the TU Wien soil moisture retrieval algorithm. The optimization is carried out with various cost functions and compared against soil moisture values from land surface models. First results indicate that spatially varying cross-over angles help to improve the mean annual cycle of soil moisture.