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Assimilating scatterometer data into conceptual hydrologic models at the regional scale

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Soil moisture has an important influence on hydrological and meteorological processes. Soil moisture is important in processes that partition rainfall into runoff and infiltration. Extreme hydrological events (floods and droughts) often have a large socio-economical impact. Depending on the catchment soil moisture state, the runoff response to a given rain storm may be vastly different. A realistic representation of such events by hydrologic models is therefore essential. Traditionally, the soil moisture state of catchments has been estimated from rainfall and evaporation, based on soil moisture accounting schemes (SMAS). However, there are difficulties with accurately estimating the parameters for this type of model, particularly in catchments where no stream flow observations are available. In this paper we examine the potential of using ERS scatterometer data to better constrain the hydrological models. The rationale behind this combination is that even though both approaches (SMAS and scatterometer analyses) have clear limitations and are associated with significant uncertainty it is their combination that helps reduce the uncertainty of the integrated estimates. The main hypothesis of this is that the error structures of the estimates from these two methods are likely different, so one would expect a combination of the two approaches to be less biased and exhibit less random error than any of the two methods individually. The estimates come from completely different instruments, ground based instruments and spaceborne sensors, so one would also expect their errors to be different. Also, the models that estimate soil moisture in these two approaches have a different structure and they are calibrated in different ways. Based on this general idea, we will examine potential methods of estimating the space-time dynamics of soil moisture more accurately than has been possible in the past with either of the two sources of information. The focus is on ungauged catchments, i.e. catchments without

stream flow measurements, where the potential of using the spaceborne data, probably, is particularly large. Specifically, we are interested in methods capable of representing the spatial and temporal distribution of hydrologically relevant soil moisture for Austrian conditions.