



Global comparison of scatterometer derived soil moisture time series with runoff

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Relative soil moisture information can be derived from ERS scatterometer on global scale with data records available since 1992. This hydrological parameter plays an important role for runoff generation. Its impact differs for varying climate regions. Within this study scatterometer measurements and daily runoff data have been averaged over ten days and the overall upstream area for comparison. The analyses has been carried out for a range of basins which represent arid to humid environments in the subtropical, temperate, boreal and subarctic regions in Africa, Asia, Europe, Australia and northern America.

The investigated time period for all basins is 1992 – 2000. The source for the soil water index (SWI) is the ERS1 scatterometer which is an active microwave sensor operating in C-Band. Although that this study is applied to a limited time period, data are currently available from the ERS2 and will soon be followed by METOP ASCAT what ensures continuity. The spatial resolution of data from such sensors is rather coarse (25-50km) but temporal sampling is in the range of days.

The correlation between ten day averaged soil moisture and runoff is calculated for several temporal offsets. The chosen time step is also ten days. The results confirm the suitability of C-band scatterometer for soil moisture retrieval as they reflect contributing area and climatic conditions. In subtropical climates soil moisture peaks before runoff with an offset strongly depending on catchment size. Larger rivers such as Okavango, Zambezi and Darling have their source in more humid environments as found in the lower catchment area, what is also reflected in the observed soil moisture – runoff relationship. Correlations range from 0.76 (Murray) to 0.89 (Okavango). This

relationship differs for boreal/subarctic environments. As the Lena flows through several climate zones the SWI peaks on average 30 days before (as the snowmelt starts earlier in the southern upper catchment) the runoff peak near the delta with a correlation of 0.93.