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Runoff-generating soil moisture patterns in subtropical regions

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Multi-temporal change detection methods with scatterometer data has shown their potential for soil moisture mapping at least on a global or continental scale. But the spatial resolution of scatterometer derived soil moisture is in the range of 25-50 km and thus too coarse for many hydrological applications like runoff modelling, which require data with spatial resolution in the order of 1 km or less. ScanSAR systems provide such medium resolutions but with decreased sampling rate. The ASAR sensor on board ENVISAT is such a ScanSAR system. In Global Mode, 1 km resolution data are acquired. Within the first two years of data acquisition (starting from December 2004) more than 100 images are available for most of southern Africa. Catchments in subtropical environments usually span areas of different aridity levels. The main source areas are located in more humid regions while other parts are characterised by drier conditions with negligible contribution to runoff. Examples are the Okavango and Orange rivers. The source of the Okavango River is located in a mountainous area in Angola and most of the water is lost due to evaporation in the Okavango inland delta. Similarly, the Orange River receives most input from the mountainous Vaal catchment and runs through the dry semi-desert of Karoo before it reaches the Atlantic. Relative soil moisture can be derived using the ASAR Global mode data. Spatial patterns have been analysed by means of relationship between local and regional trends as well as fraction of saturated catchment area. Based on ScanSAR data, this method allows the determination of runoff-relevant soil moisture patterns in subtropical environments.