Estimating the root-layer soil moisture from the multiple data source of remote sensing, processed-based model and ground-based measurement for Baiyangdian Catchment of the North China

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Root-layer soil moisture is one of the most important components for surface water budgets. It is especially critical for the Baiyangdian Catchment of the North China where there has been a serious conflict between agriculture and water availability. The information of the spatial and temporal variability of the root-layer soil moisture will help the decision makers to soundly manage soil and water and do water-saving agriculture. Multiple data source was used to estimate the root-layer soil moisture over the basin. It includes the remotely sensed surface soil moisture data retrieved from European Remote Sensing Satellite-2 (ERS-2) scatterometer (SCAT) processed by Vienna University of Technology (TU Wien) from 1992 to 2007, VIP processed-based eco-hydrological model simulation results from 1956 to 2008, and ground-measured in situ data from 2006 to 2007 in the typical stations. Preliminary results showed that through the application of effective recursive exponential filter to satellite derived surface soil moisture data, good agreement can be reached between SCAT data and model simulation, and in situ observation respectively, which underlies the potential of the utilization of scatterometer data for long-term monitoring surface and root-layer soil moisture, where local calibration of model (e.g. site-specific irrigation etc.) were difficult, and in situ measurement were sparse. The Mann-Kendall analysis of the long-term series of root-soil moisture data shows that the area is in dry trend. The value of Sen-slope however varies over the basin.