



Analysis of Long-term Terrestrial Water Storage Variations in the Yangtze River Basin

Bob Su (1), Ying Huang (1,2), Lichun Wang (1), Suhyb Salama (1), Maaten Krol (2), Arjen Hoekstra (2), Yunxuan Zhou (3), and Rogier van der Velde (1)

(1) University of Twente, ITC, Department of Water Resources, Enschede, Netherlands (z.su@utwente.nl), (2) Faculty of Engineering Technology, Department of Water Engineering and Management (WEM), University of Twente, Enschede, The Netherlands, (3) State Key Lab of Estuarine and Coastal Research (SKLEC), East China Normal University, Shanghai, P.R.China

In this study, we analyze 32 years of TWS data obtained from Interim Reanalysis Data (ERA-Interim) and Noah model from Global Land Data Assimilation System (GLDAS-Noah) for the period between 1979 and 2010. The accuracy of these datasets is validated against 26 years (1979-2004) of runoff dataset from Yichang gauging station and compared to 32 years of independent precipitation data obtained from Global Precipitation Climatology Centre Full Data Reanalysis Version 6 (GPCC) and NOAA's PRECipitation REConstruction over Land (PREC/L). Spatial and temporal analysis of the TWS data shows that TWS in the Yangtze River basin is decreasing significantly since the year 1998. The driest period of the basin is noted from 2005 to 2010, especially in the middle and lower Yangtze reaches.

The TWS changed abruptly into persistently high negative anomalies in the middle and lower Yangtze Reaches in 2004. From both basin and annual perspectives, 2006 is detected as the major inflection point at which the system exhibits a persistent decrease in TWS. Comparing these TWS trends to independent precipitation datasets shows that the recent decrease in TWS can mainly be attributed to a decrease in precipitation amount. Our finding is based on observation and modeling data sets and confirms previous results based on gauging station datasets.

Reference:

Huang, Y., Salama, M.S., Krol, M.S., van der Velde, R., Hoekstra, A.Y., Zhou, Y. and Su, Z. (2013) Analysis of long - term terrestrial water storage variations in the Yangtze River basin. In: Hydrology and earth system sciences (HESS): 17 (2013)5 pp. 1985-2000.