Geophysical Research Abstracts
Vol. 15, EGU2013-3888-1, 2013
EGU General Assembly 2013

Estimation of evapotranspiration and influence on water change in Weihe River basin, China

Zhang Ronghua (1,2,3), Sun Rui (1,2,3), Tang Yao (1,2,3)

(1) State Key Laboratory of Remote Sensing Science, Jointly Sponsored by Beijing Normal University and the Institute of Remote Sensing Applications of Chinese Academy of Sciences, Beijing, China (sunrui@bnu.edu.cn), (2) School of Geography, Beijing Normal University, Beijing, China (sunrui@bnu.edu.cn), (3) Beijing Key Laboratory of Environmental Remote Sensing and City Digitalization, Beijing, China (sunrui@bnu.edu.cn)

Evapotranspiration (ET) plays an important role in global energy exchange and water cycle between the land surface and the atmosphere and it is a key factor in the fields of geography, hydrology, meteorology and ecology. With the decrease trend of the amount of water resources, it has become an urgent issue to tackle for Weihe River basin since 1980s. In this study, through analyzing the precipitation variation characteristics interpolated from 39 meteorological stations in and around Weihe River basin from 1981 to 2010, some years with similar precipitation condition are chosen as the representative years. Using a modified Penman-Monteith approach mainly based on the normalized difference vegetation index (NDVI), MODIS (Moderate Resolution Imaging Spectroradiometer), GIMMS (Global Inventor Modeling and Mapping Studies) and the meteorological data are taken into consideration to calculate ET in the study area in the representative years. The results illustrate that: (1) The average annual ET in Weihe River basin is between 350mm and 400mm in 1987, 1993, 1999, 2001, 2002, 2009, and mainly distributed between June and October in the whole year. Among the representative years, the estimated ET in 2001, 2002, 2009 is close to MODIS ET product (MOD16A2). (2) In the meantime, the estimation results demonstrate the spatial variation of ET, and ET is more than 500mm in the southern plain region, and less than 400mm in the western and northwestern mountainous area. (3) Validation has been made by comparing the estimated ET with the eddy correlation measurements from 19th, April to 30th, September in 2009 at Changwu site, and the coefficient of determination (R2) is 0.618, which shows good agreement between the estimated ET and the observed ET. On the basin scale, the model estimated ET is higher than the annual ET in the view of the principle of surface water balance. (4) In the similar precipitation condition, the topography and vegetation change due to human factor are the main influences on ET, and then result in the change of water quantity to some extent. This method is applicable for Weihe River basin and can meet the basic requirements of water resources research at a basin scale.