Geophysical Research Abstracts
Vol. 15, EGU2013-7068, 2013
EGU General Assembly 2013

Effect of land use change on stream flow in Yanqi Basin, Xinjiang, northeastern China

Mamattursun Eziz (1,2), Hamid Yimit (1,2), Li Xinguo (1,2), and Zupliya Mamat (3)

(1) College of Geographic Sciences and Tourism, Xinjiang Normal University, Urumqi, China (oasiseco@126.com), (2) Xinjiang Laboratory of Lake Environment and Resources in Arid Zone, Urumqi, China (hyimit@yahoo.com.cn), (3) Key Laboratory of Oasis Ecology, Ministry of Education, Xinjiang University, Urumqi, China (lijingjing428@yahoo.com.cn)

Abstract: Analyzing land use changes and their effects on hydrological processes at the watershed level are essential in land use and water resource planning and management in arid zone oasis. The oases in Yanqi Basin, a representative ecologically sensitive area, have experienced rapid agricultural development since 1970s. There is therefore an urgent need to evaluate the impact of human activities on stream flows to serve better the water resource management in this region. In this study, remote Sensing images of 1978, 1990, 2000 and 2011 were combined with the hydrologic and meteorological data in the Yanqi basin from 1956 to 2011 to quantify the effects of land-use change on stream flow in this area. The proposed models were applied to assess the impacts of different land use scenarios that include various spatial and non-spatial policies in the Yanqi Basin. The stream flow and runoff were successfully simulated using a lumped hydrological model that can assess the impact of land use change in the watershed. Results indicated that, future land use patterns differed between spatial policies; the variability and magnitude of future hydrological components were significantly and cumulatively influenced by land use changes during the simulation period, particularly runoff. The study suggests that human activities in this area should be cautious. Results of the study provided a novel approach that combines a land use change model and a watershed hydrological model with an analysis of impacts of future land use scenarios on hydrology in oases in arid zone.

Keywords: Land use change; hydrological process; modeling; Yanqi Basin