Geophysical Research Abstracts
Vol. 17, EGU2015-14202, 2015
EGU General Assembly 2015

Integrated surface water-groundwater modeling for interpreting ecohydrological processes in large arid and semi-arid river basins

Yong Tian (1), Yi Zheng (1), Chunmiao Zheng (1,2), Bin Wu (1), and Xin Wu (1)

(1) Institute of Water Science, Peking University, Beijing, China, (2) Department of Geological Sciences, University of Alabama, Tuscaloosa, Alabama, USA

Ecohydrological processes in arid and semi-arid environments are sensitive to both climate conditions and human activities, but the response mechanisms have been rarely explored for large river basins via an integrated modeling approach. In this study, GSFLOW, a USGS model coupling PRMS and MODFLOW, was improved to explicitly simulate flow diversion, groundwater pumping and agricultural irrigation. The improved GSFLOW was then applied in the Heihe River Basin (HRB), the second largest inland river basin in China, to characterize ecohydrological processes at different spatial and temporal scales. The integrated model is grid-based for both its surface and subsurface domains. It assimilated multiple types of data including classic hydrological observations and remote sensing-based evapotranspiration (ET) and leaf area index (LAI) products, and eventually produced a coherent understanding on the regional water cycle at different spatial and temporal scales. Complicated multi-scale features of both ET and vegetation growth processes in the study area were unraveled, and insights on tackling the existing water conflicts were achieved.