Geophysical Research Abstracts
Vol. 19, EGU2017-3979, 2017
EGU General Assembly 2017

A comparison of two satellite-based evapotranspiration models in the Nagqu river basin of the Tibetan Plateau

Mijun Zou (1), Lei Zhong (1), Yaoming Ma (2), Bob Su (3), and Weiqiang Ma (2)

(1) Laboratory of Atmosphere Observation and Water Cycle, School of Earth and Space Sciences, University of Science and Technology of China, Hefei, China, (2) Key Laboratory of Tibetan Environment Changes and Land Surface Processes, Institute of Tibetan Plateau Research, the Chinese Academy of Sciences, CAS Center for Excellence in Tibetan Plateau Earth Sciences Beijing, China, (3) Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente, Enschede 7500 AA, the Netherlands

Evapotranspiration (ET), the combination of surface evaporation and vegetation transpiration, is the most uncertain component of eco-hydrological systems because it is constrained by large number of controlling factors. The measurements obtained from some eddy-flux towers which have been set-up in the Tibetan Plateau are still insufficient for providing accurate estimations of ET over a heterogeneous area, while satellite-based ET approaches have become more feasible for determining ET at multi-scale. In this study, the estimated ET using two satellite-based models: topographical enhanced surface energy balance system (TESEBS) and Priestley-Taylor (PT) based approaches, were validated and inter-compared in the Nagqu river basin under cloudless conditions. Remote sensing data (SPOT Vegetation data and TERRA MODIS data) and meteorological data in 2003 were used for 10-day ET estimation. As input parameters for ET calculation, broadband albedo and downward shortwave radiation flux (SWD) were improved. NDVI was reconstructed before coupled into models. The ET determined by the combinatory method, which is based on the surface layer gradient measurements, was treated as the actual ET and used for validation with model results. The results showed that: (1) ET determined from both TESEBS and PT models corresponded well with the actual ET with correlation coefficient of 0.882 and 0.817. (2) However, TESEBS showed better performance than PT model with lower mean bias error (-0.021 mm/h) and root mean square error (0.079 mm/h). (3) Although PT approach is simple in computation and fewer parameters are required, the high weight of NDVI would lead to some overestimations especially in monsoon season.