Geophysical Research Abstracts
Vol. 19, EGU2017-83-1, 2017
EGU General Assembly 2017

Modeling evapotranspiration over China's landmass from 1979-2012 using three surface models

Shaobo Sun, Baozhang Chen, Huifang Zhang, and Xiaofeng Lin

Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing, China (sunshaobo@lreis.ac.cn)

Land surface models (LSMs) are useful tools to estimate land evapotranspiration at a grid scale and for a long-term applications. Here, the Community Land Model 4.0 (CLM4.0), Dynamic Land Model (DLM) and Variable Infiltration Capacity (VIC) model were driven with observation-based forcing data sets, and a multiple LSM ensemble-averaged evapotranspiration (ET) product (LSMs-ET) was developed and its spatial-temporal variations were analyzed for the China landmass over the period 1979-2012. Evaluations against measurements from nine flux towers at site scale and surface water budget based ET at regional scale showed that the LSMs-ET had good performance in most areas of China's landmass. The inter-comparisons between the ET estimates and the independent ET products from remote sensing and upscaling methods suggested that there were a fairly consistent patterns between each data sets. The LSMs-ET produced a mean annual ET of 351.24±10.7 mm yr-1 over 1979-2012, and its spatial-temporal variation analyses showed that (i) there was an overall significant ET increasing trend, with a value of 0.72 mm yr-1 ($p < 0.01$); (ii) 36.01% of Chinese land had significant increasing trends, ranging from 1 to 9 mm yr-1, while only 6.41% of the area showed significant decreasing trends, ranging from -6.28 to -0.08 mm yr-1. Analyses of ET variations in each climate region clearly showed that the Tibetan Plateau areas were the main contributors to the overall increasing ET trends of China.