Geophysical Research Abstracts
Vol. 19, EGU2017-373, 2017
EGU General Assembly 2017

A Framework for Validation of Remotely Sensed Precipitation and Evapotranspiration Without the Use of Ground-Based Measurements

Akash Koppa and Mekonnen Gebremichael
University of California Los Angeles, Los Angeles, United States (akashkoppa@ucla.edu)

Uncertainties in hydrologic studies of data-scarce catchments arise primarily from unreliable estimates of precipitation (P) and evapotranspiration (E). Despite offering spatially and temporally continuous measurements, the use of remotely-sensed P and E in such catchments is hindered by the lack of ground-based measurements that enable comprehensive validation. This study proposes a novel validation framework that characterizes the combined error in the long-term average estimates of remotely sensed P and E by making use of the Budyko hypothesis. A Root Mean Square Error (RMSE) based error metric that is capable of translating individual biases in P and E estimates onto the Budyko space is developed. A controlled sensitivity experiment using the Model Parameter Estimation Experiment (MOPEX) catchment data showed that error metric is more sensitive to biases in P compared to biases in estimates of E. Validating the framework using combinations of different satellite-based estimates of P and E revealed that the framework succeeds in arriving at the same conclusions as a traditional validation method as regards to the quality of P and E datasets. The framework offers a physically consistent, parametrically efficient basis for the selection of remotely sensed P and E datasets for hydrologic studies.