RSHS18-105
Remote Sensing and Hydrology Symposium (ICRS-IAHS)

An ensemble approach for regional evapotranspiration estimates using remote sensing

Hatim Geli, Christopher Hain, Martha Anderson, and Gabriel Senay
New Mexico State University, United States (hgeli@nmsu.edu)

Regional evapotranspiration (ET) estimates can be obtained using remote sensing data and techniques. Different data sources and models can provide wide range of accuracy of ET estimates. Such wide range of accuracy can affect the use of ET information in regional water management and the corresponding decision-making process, land use management, as well as drought impact analysis. Some of these applications are critically needed to be addressed in the normally dry State of New Mexico (NM), United States (US). The recent prolonged and persistent drought events that have impacted NM put additional pressure on NM available water resources as well as its range land productivity and agricultural activities. ET estimates from the Atmosphere-Land Exchange Invers (ALEXI), the Operational Simplified Surface Energy balance (SSEBop), and the Surface Energy Balance Algorithm for Land (SEBAL) can be obtained at different spatial and temporal scales. This analysis will develop and evaluate an ensemble approach of ET information based on these models for NM. Remote sensing land cover/ land use data along with gridded precipitation from PRISM, NM's water use information, and ground-based ET observations from AmeriFlux eddy covariance (EC) sites will be used to evaluate the ensemble ET approach. ET estimates at scales from 4 km, 1 km, and 375 m will be obtained using data from Geostationary Operational Environmental Satellite (GOES), the Moderate Resolution Imaging Spectroradiometer (MODIS), and Visible Infrared Imaging Radiometer Suite (VIIRS) sensors. Preliminary results from ALEXI and SSEBop showed consistent ET estimates that also reasonably captured the seasonal dynamics of ET. The results also showed that there is a general overestimation of ET estimates when compared with EC data over evergreen forest cover as well as over areas with significant terrain. improved performance was observed over sparsely vegetated and shrubland areas. While these results remain promising, additional effort is needed to properly evaluate these models in terms of their temporal and spatial variability. The results from this analysis will be used to highlight and address some of NM's needs as well as how to properly incorporate ET estimates in regional scale applications.