Jae Young Seo et al., J Aeronaut Aerospace Eng 2018, Volume 7
DOI: 10.4172/2168-9792-C1-023

Discharge estimation in ungauged regions using satellite-retrieved products and artificial neural network

Jae Young Seo and **Sang-Il Lee**
Dongguk University, Republic of Korea

Understanding the variations of water cycle is crucial in an accelerated climate change environment. In regions with limited ground observations, remote sensing can be a useful tool to obtain continuous hydrological data over large areas. Here, we present two approaches for estimating discharge in ungauged regions; 1) Water budget method based on multi-satellite data, 2) Artificial neural network (ANN) model combined with satellites data. Water budget components like precipitation (P), evapotranspiration (ET), and terrestrial water storage changes ($\Delta S/\Delta t$) was calculated from Tropical Rainfall Measuring Mission (TRMM), Moderate-Resolution Imaging Spectroradiometer (MODIS) and Gravity Recovery and Climate Experiment (GRACE) satellites, respectively. An ANN model using P, temperature and $\Delta S/\Delta t$ as input variables was developed. Discharge estimation was made for the northern region of the Korean peninsula. Results from two approaches were compared with four model (CLM, Noah, Mosaic, and VIC) data sets of Global Land Data Assimilation System (GLDAS). Estimated discharge showed good agreement with GLDAS in terms of correlation, bias, and root-mean-square errors. The spatial distribution of estimated discharge showed evidence for seasonality, which provides additional basis that satellite-based approaches studied here can serve as reliable and useful tools for efficient water management.

Recent Publications

1. Buma W G, S I Lee and J Y Seo (2016) Hydrological evaluation of Lake Chad Basin using space borne and hydrological model observation. Water. 8(5):205.
2. Seo J Y and S I Lee (2016) Integration of GRACE, ground observation, and land-surface models for groundwater storage variations in South Korea. International Journal of Remote Sensing. 37(24):5786-5801.
3. Seo J Y and S I Lee (2017) Total discharge estimation in the Korean Peninsula using multi-satellite products. Water. 9(7):532-540.

Biography

Jae Young Seo is a PhD student at Civil and Environmental Engineering of Dongguk University in South Korea. She is interested in applications of remote sensing to hydrology. Sang-Il Lee is a Professor of Civil and Environmental Engineering, Dongguk University. His research interests are estimation and optimization in water resources problems.

dabbi2011@naver.com