Geophysical Research Abstracts
Vol. 18, EGU2016-3743-1, 2016
EGU General Assembly 2016

Estimating river discharges using multiple remote sensing data sets: an initial attempt for continental river basins

Sichangi Arthur (1,3), Lei Wang (1,2), Kun Yang (1,2), and Deliang Chen (4)

(1) Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing, China (wanglei@itpcas.ac.cn), (3) University of Chinese Academy of Sciences, Beijing, China, (2) CAS Center for Excellence in Tibetan Plateau Earth Sciences, Beijing, China, (4) Department of Earth Sciences, University of Gothenburg, Gothenburg, Sweden

Rivers act as a source of fresh water for terrestrial life, yet the discharges are poorly known since the existing direct observations are inadequate and some of them were interrupted or discontinued. Discharge estimates using remote sensing thus has a great potential to supplement the ground observations. There are remote sensing methods established to estimate discharge based on single parameter derived relationship; however, they are limited to specific sections due to its empirical nature. In this study, we propose an innovative method to estimate daily discharges for continental rivers (with at least river channel widths greater than 800m) using two satellite derived parameters. Envisat satellite altimetry and Moderate Resolution Imaging Spectro radiometer (MODIS) data have been used to provide a time series of river stage and effective river width. The derived MODIS and altimetry data are then used to optimize unknown parameters in a modified manning's equation. The in situ measurements are used to derive rating curves and to provide assessments of the estimated results. The Nash–Sutcliffe efficiency values for the estimates are between 0.55 and 0.99, indicating the power of the method and accuracy of the estimations. A comparison with a previously developed empirical multi-variate equation for estimating river discharge shows that this method performs better, especially for large rivers. Further, it is found that discharge estimates using both river effective river width and stage information consistently outperform those using only stage data.