

BUNGENER Rachel (2018): Estimating the discharge of large rivers using remotely sensed information

Abstract

Water is the most important resource on earth as it is necessary to every living system. A lot of populated areas are near rivers and human activities are strongly linked to rivers. River discharge is a key value for water management and water monitoring. However, their values are not known in many parts of the world due to rare, non-existent or proprietary river gauge measurements (Gleason and Smith, 2014). Remotely sensed information offer an important alternative to obtaining river discharges, as they are accessible and provide a better temporal and spatial overview. Different methods exist but they often depend on in-situ measurements and apply on very large rivers. In this study, a new approach is developed. It combines knowledge from three different disciplines. An image analysis is done to estimate the river width. Then, relations from open-channel hydraulics are used with a probabilistic inversion. Probabilistic inversion is a method widely used for example in Geophysics. It has been proved that it is a very efficient way to analyze *highly nonlinear problems with complex a priori information and data with an arbitrary noise distribution* (Mosegaard and Tarantola, 1995). The method is tested on the Nyong River located in Cameroon which is a relatively small river comparing to usual case studies in the field of interest. Width is obtained from WorldView-3 and Landsat 7 images and the method is implemented in Matlab. The results obtained are very promising which prove that probabilistic inversion is a powerful tool to estimate river discharge using remotely sensed information. It should be the object of further research and interesting developments.