Estimating water budget components in Upper Blue Nile basin with JGrass-NewAge system

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The Upper Blue Nile (UBN) river basin is the main sources of water resources for millions of peoples in Ethiopia, and downstream countries, Sudan and Egypt. Due to the importance of the basin for water supply for the growing populations in the region, a series of significant regional and international political discussion and dialogues on the use of waters in the basin has been conducted between the three countries. The basin, however, is one of the most data scarce region in the world, and hence hydrological information on which informed decision is made is limited. Due to the lack of hydrometerological data and its hydrological complexities, most hydrological studies in the region is limited to small basin where there are relatively better hydrometeorological data, or at the whole basin scale, in which case information on spatial variability is usually ignored. In this study, using the available sparse hydrometerological data and satellite products, we show a methodology that can improve the state-of-art. To this scope, we use the JGrass-NewAGE system to estimates the water budget components (rainfall J, Evapotranspiration ET, discharge Q, and storage S). JGrass-NewAGE simulation is done at reasonable small scales (in space and time), and it can aggregate if needed. The simulation is conducted at daily time-step for a duration between 1994-2014 (20 years). The results can be used as reference for any water resource development activities in the region.

Keywords: water budget , JGrass-NewAge, Upper Blue Nile basin, simulation