TOWARDS GLOBAL RIVER DISCHARGE ASSESSMENT USING A DISTRIBUTED HYDROLOGICAL MODEL AND GLOBAL DATA SETS

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ABSTRACT

To improve global water resource assessment, quantification of the global river discharge while considering the effect of slopes is required. Rainfall patterns need to be transformed into discharge by hydrological models like a distributed hydrological model (DHM). This model is expected to represent the spatial variation in aspects of digital global mapping such as land use, land cover, vegetation and elevation. Particularly, a digital elevation model (DEM) is crucial for tracking the flow direction and defining the river network in a basin. In this study, the performance of a 1-km resolution DHM is compared with that of a 90-m resolution DHM in simulating the discharge of the Meghna River in Bangladesh. The input rainfall was obtained from the Tropical Rainfall Measuring Mission (TRMM). The TRMM raw data was improved using available rain gauges over Bangladesh employing correcting factors. These correction factors were then also extended over India where rain gauge data was not available. In summary, the simulation of river discharge using the 1-km resolution model gave reasonable results even though the condition of the slope was limited. Therefore, the procedure here shows the feasibility of modeling global river discharge using global mapping data set. In future development, after setting thresholds at different control points, the potential flood damage to population centres can be evaluated for sound decision making.