Assessing the Suitability of Satellite Precipitation Products for Flood Modeling in the Tonle Sap Lake Basin, Cambodia

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Abstract

The Tonle Sap is the richest and diverseness of freshwater ecosystem in Southeast Asia, receiving nurturing water flows from the Mekong and its immediate basin. In addition, the rapid development in the Tonle Sap Lake (TSL) Basin, and flood inundation may threaten the natural diversities and characteristics. The impacts of flood inundation in 11 sub-basins contributing to the Tonle Sap Lake were assessed using the Rainfall-Runoff-Inundation (RRI) model to quantify the potential magnitude and extent of the flooding. The RRI model is set up by using gauged rainfall data to simulate the information of river discharge and flood inundation of huge possible flood events. Moreover, two satellite precipitation products (SPPs), CHIRPS and GSMaP, within respectively spatial resolutions of 0.05° and 0.1°, are utilized as an input for the RRI model to simulate river discharge, flood depth, and flood extent for the great TSL Basin of Cambodia. This study used statistical indicators such as NSE, PBIAS, RSR, and R2 as crucial indices to evaluate the performance of the RRI model. Therefore, the findings of this study could provide promising guidance in hydrological modeling and the significant implications for flood risk management and disaster preparedness in the region.

Keywords: Rainfall-Runoff-Inundation (RRI) Model, Satellite Precipitation Products, Tonle Sap Lake (TSL) Basin

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