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Update on NASA's Real-time Global Flood Monitoring System: Recent Improvements and Examples

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The increasing availability of remotely-sensed precipitation estimates and geospatial datasets covering the globe at scales useful for hydrologic applications increase the possibility of establishing global flood monitoring systems. Our group recently developed a global flood monitoring system (GFMS) that utilizes precipitation estimates from the TRMM Multi-satellite Precipitation Analysis (TMPA) and other geospatial datasets as input to a hydrological model. In this presentation we will provide an overview of the recent updates to our GFMS. Our initial GFMS uses a relatively simple hydrologic model, based on the runoff curve number method, to transform TMPA-based precipitation into runoff every 3 hour at 0.250 spatial scale within 50oN-S latitude band. An in-depth evaluation of this initial GFMS was carried out including a regional evaluation of the TMPA precipitation estimates and evaluation of the simulated runoff using a global flood archive and with observed streamflow at selected watersheds in the globe. This evaluation effort pointed out the limitations of the initial GFMS including the hydrologic model structure and its routing component. The evaluation results also indicated that the GFMS suffered from region-dependent bias. Based on these results, we recently developed a second generation GFMS (GFMS-2) that operates at a higher spatial resolution (0.125o) and contains a new hydrologic model with an improved physical representation and an improved routing component. Sub-grid variability of soil moisture capacity and coupled runoff generation and routing mechanisms are among the distinguishing features of the GFMS-2. We will outline the calibration, evaluation and parameter regionalization procedures developed for GFMS-2 together with examples from its application to selected watersheds in different continents.