



## **Urban Flood Modeling Driven by IMERG Satellite Products**

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A physically-based, distributed-parameter hydrologic model was used to simulate a recent flood event in the city of Hafr Al Batin, Saudi Arabia to gain a better understanding of the runoff generation and spatial distribution of flooding. The city is located in a very arid catchment. Flooding of the city is influenced by the presence of three major tributaries that join the main channel in and around the heavily urbanized area. The Integrated Multi-satellite Retrievals for Global Precipitation Measurement Mission (IMERG) rainfall product was used due to lack of detailed ground observations. To overcome the heavy computational demand, the catchment was divided into three sub-catchments with a variable model grid resolution. The model was run on three sub-catchments separately, without losing hydrologic connectivity among the sub-catchments. The uncalibrated satellite products underestimated the event rainfall resulting in amplified underestimation of predicted runoff. Additional model simulations were performed to understand the roles of the unique channel network in the city flooding. The simulations provided insights into the best options for flood mitigation efforts. The variable model grid size approach allowed using physically-based, distributed models such as GSSHA on large basins that include urban centers that need to be modeled at very high resolutions.