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Flow estimation using radar-estimated precipitation to assess extreme flood events in a semi-arid/tropical watershed

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Overbank floods results from historical high flows, has been the cause of severe damages and important socio-economic issues around the world. A non-dense network of daily rainfall measurements may be unable to track the spatial and temporal heterogeneities which can drive flooding and stormwater generation. Thus, high-resolution radar rainfall data may allow advances in order to improve short-term flood forecasting in watersheds with historical flash floods (short-time resolution). Therefore, this study aims to assess extreme flood events in a semi-arid/tropical watershed located in Eastern Northeast Brazil (ENEB) using radar-estimated precipitation. The ENEB is one of the most socially vulnerable regions in Brazil, and frequently affected by extreme flooding events during the rainy season. The Radar-estimated precipitation data consist in 1 hour time resolution with a grid of 1 x 1 km of spatial distribution over the river basin. Automatic rainfall gauge stations were used to validate radar-estimated precipitation. Both radar-estimated precipitation and the observed rainfall were applied as input to MGB-IPH hydrological model, and then observed and estimated river outflow were compared in order to evaluate the uncertainties regarding runoff prediction. The results presented a good performance of the model in to represent extreme events, showing Nash-Sutcliffe coefficient of 0.85 during the calibration process, suggesting be capable of predict the magnitude of peak discharge. The knowledge obtained in this work is a first step toward the improvement of a rainfall-runoff modelling to mapping flood-prone areas.