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## Influence of Urbanization on Precipitation and Flooding Caused by Landfalling Tropical Cyclones: The Case of Houston

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We examine the impact of urbanization on precipitation and flooding caused by tropical cyclones under a dynamical modeling framework, using Hurricane Harvey (2017) and Tropical Storms Allison (2001) and Imelda (2019) as case studies. Hurricane Harvey poured more than a metre of rainfall across the heavily populated Houston area, leading to unprecedented flooding and damage. Although studies have focused on the contribution of anthropogenic climate change to this extreme rainfall event, limited attention has been paid to the potential effects of urbanization on the hydrometeorology associated with this hurricane. Here we find that urbanization exacerbated not only the flood response but also the storm total rainfall. Using the Weather Research and Forecast model—a numerical model for simulating weather and climate at regional scales—and statistical models, we quantify the contribution of urbanization to rainfall and flooding. We expand these analyses to examine the impacts of urbanization on Tropical Storms Allison and Imelda, two other storms that affected the Houston area causing widespread heavy rainfall and flooding.