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# Regional increases in landfall frequency and intensity of Atlantic hurricanes in a stochastic model forecast

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Atlantic hurricane activity has increased since 1995. However, it is hurricane landfalls which have the greatest impact on coastal populations and the number and location of landfalls is dependent not just on the basin-wide frequency of storms, but also on spatial characteristics of genesis and their subsequent track paths. An experiment using a stochastic model conditioned on historical data and containing predictors in the form of annual main development region (MDR) and tropical Indo-Pacific (IP) sea-surface temperatures (SSTs) is described. The model generates millions of synthetic hurricanes with statistics of activity resembling historical observations. Among these synthetic events are storms with intense, low probability yet physically reasonable events that have not been observed. Two sets of events are produced; a control run, using historical MDR and IP SSTs and a warm run, using warmer MDR and IP SST values close to those observed since 1995, and the regionalization of activity was compared between these event sets.

The most significant change found in genesis location is a shift towards the eastern MDR Cape Verde type storms and a shift away from the formation of storms in the eastern Gulf of Mexico and off the southeastern coast of the United States. The distribution of intensities shifts towards increased intensity, with category 5 hurricanes increasing by the highest percentage. The Caribbean countries, Central America and Atlantic Florida are areas with the highest increase in landfall rate, especially from major hurricanes.