

New Definitions for the Rapid Intensification of Hurricanes

Amanda Silver and Greg M. McFarquhar

The rapid intensification of Atlantic Basin hurricanes is studied using data from the National Hurricane Center (NHC) Best Track HURDAT (Hurricane Database) file and from the output of the Statistical Hurricane Intensity Prediction Scheme (SHIPs) for the years between 1989 and 2011. Previously, hurricanes have been defined as rapidly intensifying when maximum surface wind speeds increase by 30 knots or the minimum central pressure decreases by 42 hPa over a 24 hour period. The thresholds used in these definitions were originally determined as the 95th percentile of all wind speed increases and the 75th percentile of the maximum pressure drop over 24 hour periods, respectively. In this study, new definitions of rapid intensification are developed by determining these 95th and 75th percentiles of wind speed increases and pressure decreases for 6, 12, and 24 hour intervals. It is shown that a greater percentage of hurricanes rapidly intensified according to these new definitions as more storms intensified for the smaller time intervals, but not necessarily for the entire 24 hour period. Rapid intensification over shorter time periods might be caused by storm-internal processes that act on shorter time scales than influences from environmental factors. Additional analysis compares how environmental parameters differed for hurricanes that did and did not rapidly intensify.