

SIDEBAR 4.1: HURRICANE IRMA: REWRITING THE RECORD BOOKS—P. J. KLOTZBACH

Hurricane Irma generated the highest ACE values (Bell et al. 2000) of any Atlantic hurricane during the extremely active 2017 season. Irma developed from a tropical wave in the eastern Atlantic, reaching tropical storm status on 30 August. Over the next several days, Irma intensified into a major hurricane in an environment of anomalously weak vertical wind shear and anomalously high SSTs.

On 5 September, Irma reached category 5 intensity as it bore down on the northern Leeward Islands. Over the next several days, Irma devastated many islands in the eastern and central Caribbean, then went on to make landfall in Cuba before making two landfalls in Florida. It finally weakened to a tropical depression early on 12 September near the Georgia/Alabama border. In this sidebar, several of Hurricane Irma's most notable meteorological records are highlighted. All statistics for Irma listed in this sidebar are from the formal National Hurricane Center report on Hurricane Irma (Cangialosi et al. 2018). Historical statistics are calculated from the HURDAT2 database,

which provides six-hourly estimates of historical Atlantic tropical cyclone wind speeds, pressures, and locations since 1851 (Landsea and Franklin 2013).

Irma began to set records as it approached the northern Leeward Islands. It intensified into a 155-kt (80-m s^{-1}) category 5 hurricane late on 5 September, making it the strongest Atlantic hurricane outside of the Gulf of Mexico and Caribbean on record. Irma also shattered the old record for strongest hurricane to impact the northern Leeward Islands (defined as $15^{\circ}\text{--}19^{\circ}\text{N}$, $65^{\circ}\text{--}60^{\circ}\text{W}$), breaking the old record of 140 kt (72 m s^{-1}) set by the Lake Okeechobee Hurricane of 1928 and Hurricane David (1979). Irma brought devastation to Barbuda (Fig. SB4.1), Anguilla, and portions of the U.S. and British Virgin Islands and then passed north of Puerto Rico. During its track across the Caribbean, Irma made four category 5 landfalls at: Barbuda, St. Martin, Virgin Gorda (British Virgin Islands), and Little Inagua (Bahamas).

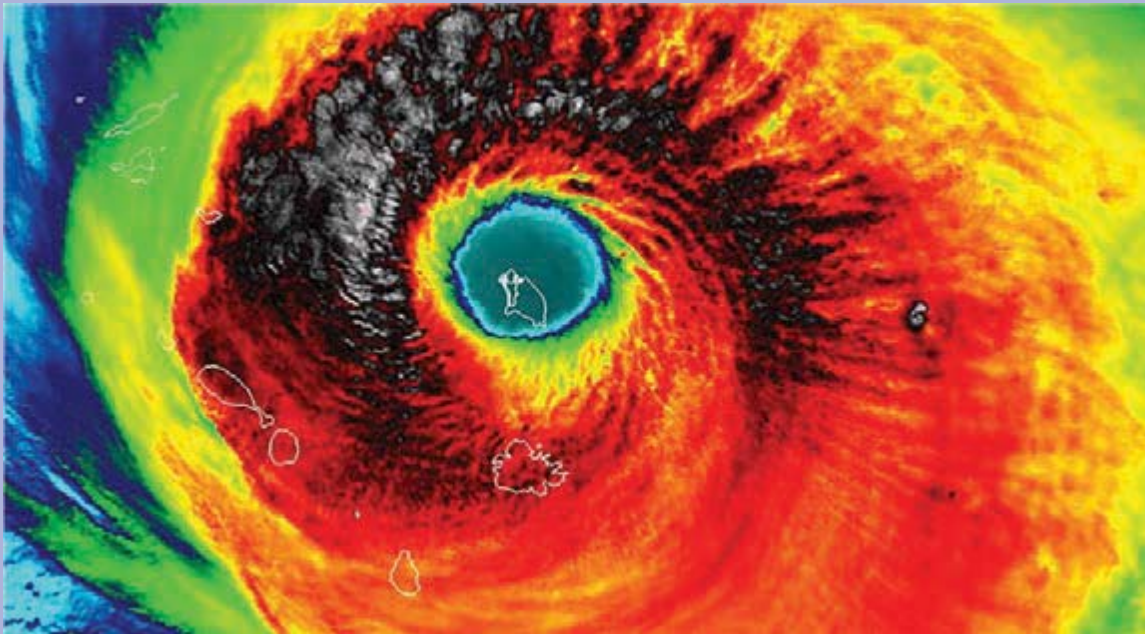


FIG. SB4.1. GOES-16 infrared satellite image of Hurricane Irma as it made landfall over Barbuda at 0600 UTC on 6 Sep 2017.

Despite weakening slightly as it tracked across the Caribbean, Irma maintained its category 5 intensity for 2.75 consecutive days—the longest contiguous period that an Atlantic hurricane has spent at category 5 intensity in the satellite era (since 1966). It became the first category 5 hurricane to make landfall in the Bahamas since Hurricane Andrew in 1992. Irma briefly weakened to category 4 strength but then re-intensified to category 5 before making landfall in Cuba on 9 September (Fig. SB4.2). The last category 5 hurricane to hit Cuba was the Cuba Hurricane of 1924.

Land interaction with Cuba caused Irma to weaken to a category 3 hurricane, but it then re-intensified to category 4 over the warm waters of the Florida Straits before mak-

ing landfall near Cudjoe Key, Florida (Fig. SB4.2). Irma's landfall pressure in the Florida Keys of 931 hPa tied with Hurricane Carla (1961) for the tenth lowest on record for a continental U.S. landfalling hurricane. This also marked the first time on record that two category 4 hurricanes (Harvey and Irma) made landfall in the continental U.S. in the same calendar year. Irma made a second landfall near Marco Island as a category 3 hurricane. At the time of its second landfall, Irma had maximum winds of 100 kt (51 m s^{-1}) and a central pressure of 936 hPa—the exact same maximum sustained winds and 4 hPa lower central pressure than Hurricane Wilma had when it made landfall in virtually the exact same location in 2005.

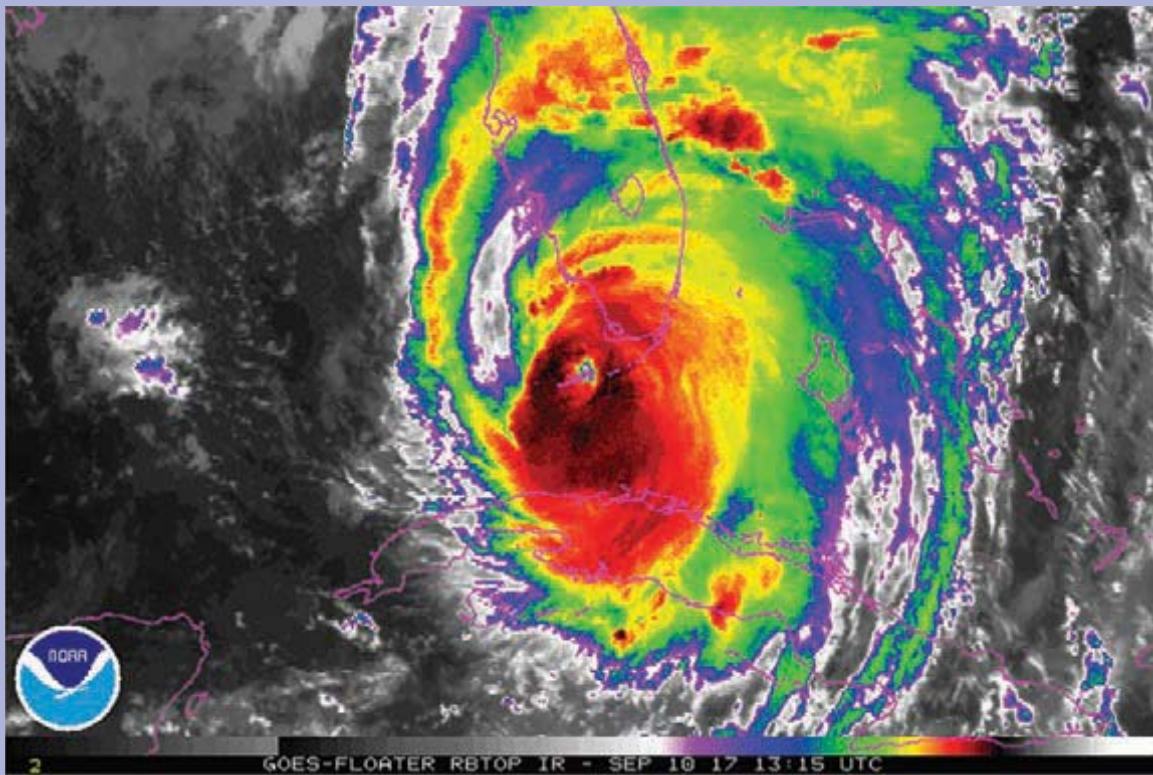


Fig. SB4.2. GOES-16 infrared satellite image of Hurricane Irma making landfall near Cudjoe Key on 1315 UTC on 10 Sep 2017.