Hurricane 2017 Season Data at NCEI Water Level Data Archive

The 2017 Atlantic hurricane season was one of the most intense in U.S. history. Three Category 4 and 5 hurricanes — **Harvey, Irma and Maria** — severely impacted most of the Caribbean islands and made landfall in the continental United States between August 16 and September 28.

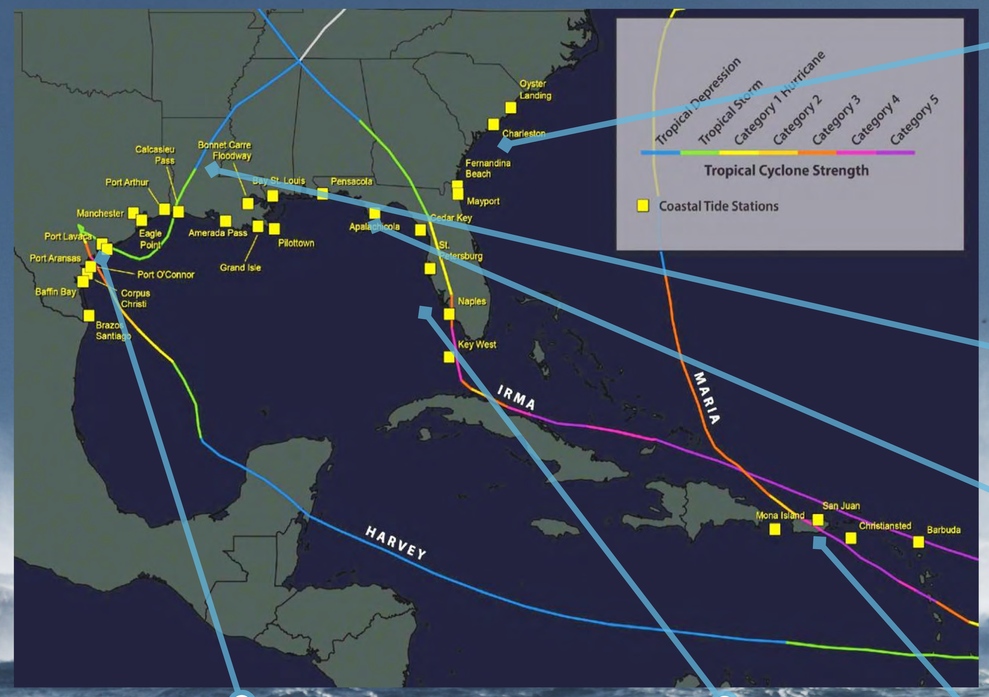
Hurricane **Harvey** made its way through the central Caribbean Sea, crossed the Yucatan Peninsula, turned to the north, and made landfall approximately five miles east of Rockport, Texas, on August 25. Harvey then turned east, weakened to tropical storm level, and made a second landfall west of Cameron, Louisiana, on August 30. Estimated damages were $125 billion dollars according to NOAA Office for Coastal Management.

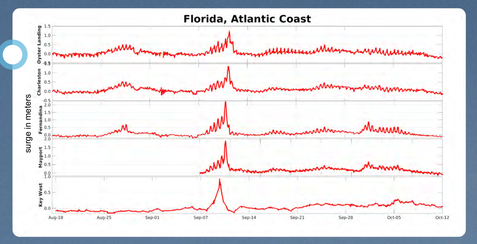
Hurricane **Irma** was a Category 5 when it made landfall on Barbuda on September 6, 2017. After that, Irma made its way up the north side of the Caribbean islands, destroying Haiti and Puerto Rico, and flooding Havana, Cuba. It then turned northwest, moved over the Florida Straits, and as a downgraded Category 4, made landfall 20 miles north of Key West. It then headed to Naples and quickly downgraded to a Category 1. Losses due to Irma were estimated to be $50 billion.

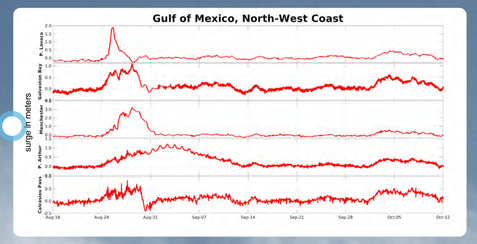
Hurricane **Maria** started as a tropical storm on September 16, east of the Lesser Antilles. Maria underwent explosive intensification and reached Category 5 on September 18, when it made landfall on Dominica and then severely destroyed Haiti. On September 20, Maria weakened to a Category 4 and reached Puerto Rico. Maria was downgraded to a tropical storm on September 28 and quickly dissipated after that. Losses caused by Hurricane Maria were estimated to be $90 billion.

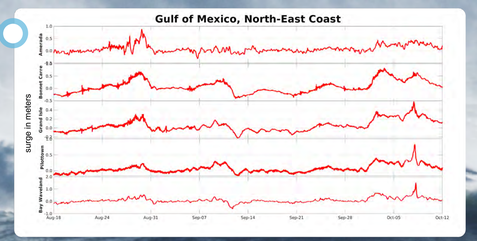
Depending on the position of a hurricane's path, landfall location, and coastline features, we can see positive or negative storm surges with different intensity and duration. For example, when landfall is on the Atlantic coast of Florida, strong positive storm surges are observed, but landfall on the Gulf coast of Florida produces negative storm surges. The same is seen along the coast of Texas, where negative storm surges are observed in the navigational channels parallel to the coastline. Along the open Gulf coasts, we see strong positive storm surges.

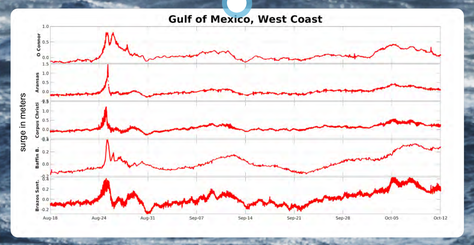
NOAA National Centers for Environmental Information (NCEI) archives and processes water level data from the Deep-ocean Assessment and Reporting of Tsunami (DART®) network and select coastal tide gauge stations. The data are quality controlled, de-tided, and used to estimate the parameters of tsunamis, storm surges, and other extreme events. Here we present storm surge data from the 2017 hurricane season when the U.S. Gulf of Mexico and South Atlantic coasts were hit by three hurricanes in less than two months.

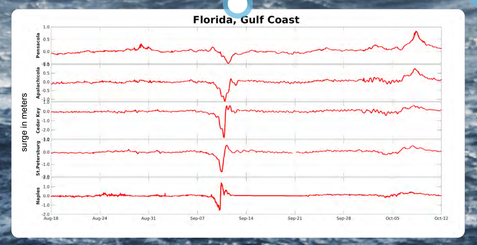


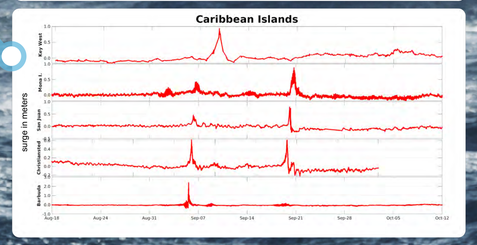


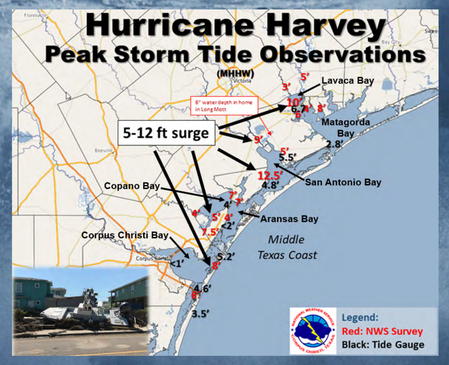


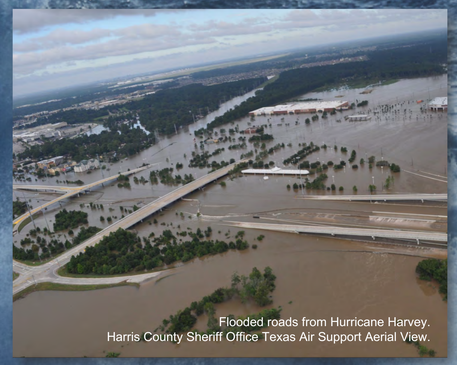




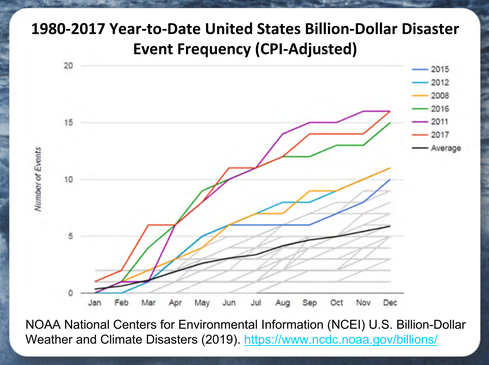








Flooded roads from Hurricane Harvey.
Harris County Sheriff Office Texas Air Support Aerial View.



NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2019). https://www.ncdc.noaa.gov/billions/

NOAA National Centers for Environmental information partners with:

- National Tsunami Hazard Mitigation Program (NTHMP)
- NOAA National Weather Service (NWS)
- NOAA National Ocean Service (NOS)
- NOAA Office of Oceanic and Atmospheric Research (OAR)
- National Meteorological and Hydrographic Services worldwide

Providers of water level data are: NOS/Center for Operational Oceanographic Products and Services (CO-OPS) for coastal tide gauge data, NWS/National Data Buoy Center (NDBC) for DART® data, NWS/Tsunami Warning Centers (TWCs) for tide gauge data from regional networks, and OAR/PMEL for bottom pressure and coastal tide gauge data. All ingested records are quality controlled, processed and provided to the public at https://ngdc.noaa.gov/hazard/tsu.shtml. The contribution of our partners is greatly appreciated.

National Environmental Satellite, Data, and Information Service | National Centers for Environmental Information

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