

## Abstract

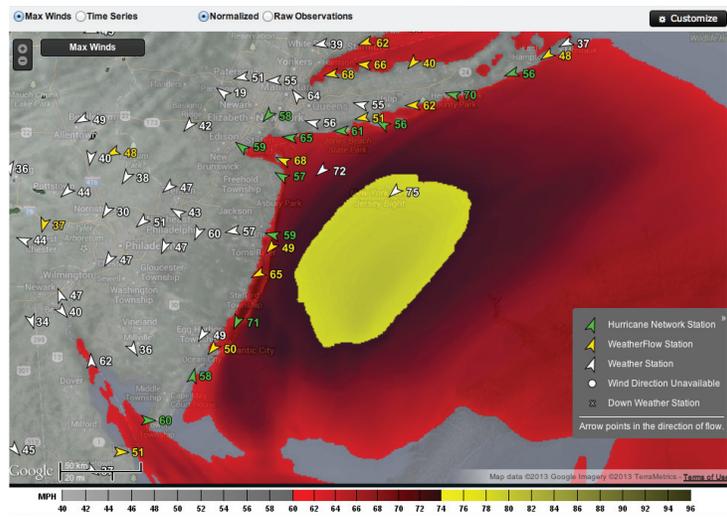
*StormPrint* is a high-resolution reconstruction of the surface wind field experienced during severe storms such as hurricanes and nor'easters. Observational and model data are quality-assured and processed for integration into *StormPrint* within hours of the event. This data is presented via a graphical user interface in both raw and standardized forms and can be downloaded by users in custom formats for use in their specific applications.

## Background

There are often insufficient observations during severe weather events to accurately depict what has occurred during the event. In addition, public forecasting agencies do not focus on the fine scales where variations in storm damage are often found. Moreover, during normal weather conditions, the observational network often appears sufficiently dense to provide adequate data coverage during storm passage. In actuality this is rarely the case as many observational sites are poorly located, return low quality data, do not report frequently enough, or sample the winds in ways that are not useful. These limitations are further exacerbated during storm passage as sites go down due to utility and communication outages and poorly sited stations are often damaged by debris. In response to the demand for an accurate, high resolution, post-event reconstruction, WeatherFlow has created *StormPrint* from reliable observations and model analysis to capture, normalize, and report the wind "footprint" of significant weather events.

## Observations

Observations collected real-time during storm passage are at the core of all *StormPrint* products. *StormPrint* focuses on the evolution over time and storm maximums of clean fetch 1-minute sustained winds and 3-second gusts recorded at 10 meters above ground level. To ensure storm maximums are captured, emphasis is placed on stations reporting at high frequencies throughout the storm's duration. The value of each observation is also critically dependent on an exclusive array of detailed metadata that WeatherFlow has collected for each observational site. The most important data contributions are from the NWS ASOS network and WeatherFlow's hurricane hardened "HURRNET" mesonet, founded in 2007 with 100 stations along the Gulf and Atlantic coasts. HURRNET stations are specifically designed to withstand and accurately report conditions throughout a land-falling hurricane. As a partner in the NWS National Mesonet Program Alliance WeatherFlow aggregates data from numerous public and private mesonets. WeatherFlow also partners with data providers who deploy temporary networks in the path of an approaching hurricane.



## Normalization

For stations that report both wind speeds and gusts, the station's basic descriptive metadata plus metadata derived from the station's long term wind record are used to normalize observations that do not conform to *StormPrint's* prescribed clean fetch, 10 meter, 1-minute sustained, 3-second gust standard. This process removes many of the local environmental and station hardware biases, enabling observational data from as many stations as possible to be directly compared to data from stations that physically meet the prescribed standards.

## Modeling

*StormPrint* includes a high resolution reanalysis generated from WeatherFlow's mesoscale numerical weather modeling capability. The modeling product is generated in a forecast process that begins 48 hours pre-storm and continues through to a full post-storm reanalysis within 48 hours of storm passage. The final product assimilates the normalized observations and is generated at 15 minute intervals at grid spacings of 500 to 1500 meters. Similar to the normalized observed winds, the modeled winds over land are post-processed to represent clean fetch, 10 meter, 1-minute sustained, 3-second gust conditions. The modeled footprint provides crucial missing details on the conditions experienced between observations (both in time and space) during these storms. The modeled output can be formatted for input into secondary modeling systems such as storm surge and CAT response models.

## StormTrack

*StormTrack* is a graphical user interface based on *DataScope*, WeatherFlow's professional data viewer, which is used to monitor active storm events in real-time. For each named storm event, a special version of *DataScope* is created and made public for the duration of the event. Forecast storm tracks, real-time observations, regional forecast models, and other storm specific datasets are available in real time on these *StormTrack* pages.

Where *StormPrint* is a post-storm product created only for those events that end up having a significant impact on the Gulf and Atlantic coasts, *StormTrack* is created real-time for every storm event the threatens either coast. Both products can be found at <http://ds.weatherflow.com/storm>.

