

TC GIS data comparison: NHC and Kinetic Analysis RTFS

Storm and storm-hazard GIS data layers are available from the National Hurricane Center for active storms [www.nhc.noaa.gov/gis]. This document provides a comparison of those data sets with the tropical storm results produced from Kinetic Analysis' tropical cyclone real-time impact forecast system (RTFS), starting with general differences across all data layers, followed by a comparison of individual data products.

General differences

Worldwide coverage: Kinetic Analysis consistently tracks and models real-time TC events globally. All Kinetic Analysis tropical cyclone products are available for storms in all tropical storm basins. NHC products are available exclusively for storms in the Atlantic and Eastern Pacific basins; some products are only available in portions of those basins (e.g. storm surge in the US mainland and territories.) In addition to the Official forecast track results, Kinetic Analysis also has available results for INVEST areas and other forecast models.

Integrated modeling: Kinetic Analysis' tropical cyclone hazard layers are produced from a single model run, in which modeling is integrated across perils (e.g. wind, surge, wave, rain), producing final individual hazard layers that are consistent across perils. Modeling integration across hazards is implemented at each time step throughout the storm modeling.

Data resolution: Kinetic Analysis' tropical cyclone modeling results are available at multiple resolutions: global (2-arcminute) and detailed (30 arcseconds.)

GIS data layer comparison

Component	NHC	Kinetic Analysis
Forecast track	Forecast track line and point data, for OFCL forecast track.	Use NHC OFCL forecast as input. GIS data track reflects specific track used in modeling.
All model tracks	Not available.	Past track + current forecast tracks for all model forecasts available in current ATCF file.
Forecast uncertainties	Cone of uncertainty, derived using fixed forecast uncertainty statistics.	'Storm location' probability layer. Calculated using climatology-based forecast uncertainties associated with the storm's location.
NHC watches / warnings ¹	Coastline segments showing areas with declared TS and Hurricane watches / warnings.	Same. Kinetic Analysis ingests / distributes the watch/warning GIS data produced by the NHC.

¹ NHC is the authoritative source for declaring watches / warnings in the Atlantic and East Pacific basins.

Component	NHC	Kinetic Analysis
Wind field	1) Surface wind field for current storm location. 2) Forecast wind <i>radii</i> for forecast points (not continuous wind field).	Continuous wind field for forecast, generated through KAC wind-field modeling of storm forecast. Wind speeds are reported as ASOS-compatible 2-min average winds.
Preliminary best track information	Cumulative wind swath, track, points, wind radii.	Past track line and points. Full hazard footprints for full storm track in post-storm run.
Wind probability	34kt+ wind probability points and polygon.	'Probability of 34kt+ winds' layer. Calculated using climatology-based forecast uncertainties associated with the storm's location, and includes storm asymmetry information.
Storm surge	1) Probabilistic storm surge from pre-generated SLOSH* runs (not modeled using specific storm track.) 2) Deterministic SLOSH results* for forecast track (not publicly available.)	Deterministic storm surge using full 3-dimensional water-column modeling from KAC modeling for specific forecast track. KAC storm surge modeling fully integrated with other hazard layers for storm forecast.
Rainfall	Not available.	Storm-generated cumulative rainfall over storm forecast area. Orographic enhancement based on high-resolution topographic base.

*SLOSH model notes:

- Storm asymmetry is not reflected in SLOSH wind modeling or surges.
- Some boundary conditions apparent at SLOSH basin boundaries.
- SLOSH-based surge results do not include wave setup.
- SLOSH basins not on common vertical datum: newer basins use NAVD88, older basins use NGVD-29.
- Deterministic SLOSH results available where SLOSH basins have been built (generally US Atlantic/Gulf coasts, Puerto Rico and US Virgin Islands).
- Deterministic SLOSH results are “non-public guidance run based upon the official forecast track. Deterministic maps are only made available to WFOs and EMs; their public release would almost certainly negatively impact decision-making.”²

Forecast wind field data comparison

NHC Wind Radii

Kinetic Analysis wind field

² Storm Surge, Inundation and Sea Level Forecast Guidance and Services presentation. NOAA 2010.

