

# Coastal Emergency Risks Assessment – CERA

## Real-Time Storm Surge and Wave Guidance

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The **Coastal Emergency Risks Assessment (CERA)** Group at Louisiana State University provides real-time and historical storm surge and wave information through its interactive online portal [cera.coastalrisk.live](http://cera.coastalrisk.live).

One of the CERA products is a comprehensive **historical storm surge archive (hindcasts)** that includes numerous tropical systems that impacted the coastlines of the United States in the previous two decades.

The modelling data is generated by the ADCIRC Surge Guidance System (ASGS) based on the ADCIRC model for surge and the coupled Simulating Waves Nearshore (SWAN) model for waves. The storm track and associated wind information is obtained from the National Hurricane Center (NHC), using their “best track”. Output data shown on the CERA website includes maxima, time series, and monitoring stations observations, among others.

The CERA website provides the generated data in various data formats for download. This document explains the structure of the downloadable maximum and time series layers in the **Shapefile Polygons** format compatible with GIS software.

**By accessing and using the GIS data, you agree to the CERA Terms & Conditions.**

The CERA Terms & conditions PDF document is included in each CERA download package.

### Download a CERA maximum or time series layer as a SHP Polygons:

Go to the CERA online portal at [cera.coastalrisk.live](http://cera.coastalrisk.live) and login with your user name. Use the ‘model select’ box at the top right of the website to choose the “**Best Tracks - Historical Storm Archive**”. Use the select boxes at the upper part of the website to select the CERA storm run that you are interested in. The map sections along the right hand side of the website let you choose a desired map layer.

The Shapefile Polygons file download is available for maximum and time series data sets except the inundation map layers. Please select a map layer in the CERA legend for access.



Use the 'Download Data' button at the top-right corner of the screen and select the link 'Download Shapefile Polygons'.

**The shapefile polygons download link always downloads the CERA layer that is currently displayed on the screen.** The downloaded file contains the entire dataset; current zoom levels are ignored. No overlaid features like water level stations, barriers etc. are included.

### ZIP file structure:

The CERA download is provided as a ZIP file which contains

- the shapefile
- a supporting .lyr file with the associated colors for the contour levels
- the CERA Terms & Conditions
- the CERA Download File Description (this document)

### ZIP and SHAPE file names:

The provided shapefile is related to the specific ADCIRC or ADCIRC/SWAN model run layer that is currently displayed on the CERA website. The specifics of the used model parameters are encoded in the **ZIP** file name and the **unpacked shapefile subfolder**. Each model layer itself has a naming convention. The files within the shapefile subfolder are named with this naming convention.

### Example:

- CERA\_MaxWaterElevation\_TimeRange-2021082612-2021083018\_Storm-IDA\_Hindcast\_BestTrack\_ADCIRCMesh-LAv20a\_shp-polygons.zip

**MaxWaterElevation:** maximum water height above the vertical datum of the ADCIRC mesh (the highest water level during the model time range)

**MaxWindSpeed:** maximum wind speed (the highest wind speed during the model time range)

**MaxWaveHeight:** maximum significant wave height (the highest significant wave height for each node during the model time range)

**MaxWavePeriod:** maximum peak wave period (the highest peak wave period during the model time range)

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**WaterElevation:** water height above the vertical datum of the ADCIRC mesh (the water level at a specific time during the model time range)

**WindSpeed:** wind speed (the wind speed at a specific time during the model time range)

**WaveHeight:** significant wave height (the significant wave height at a specific time during the model time range)

**WavePeriod:** peak wave period (the highest peak wave period at a specific time during the model time range)

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**TimeRange:** All dates and times are in **UTC**. The model run started on Aug 26, 2021 12:00 UTC and ended on Aug 30, 2021 18:00 UTC.

**Storm:** name IDA, hindcast (=historical storm), National Hurricane Center (NHC) best track for track path and wind information

**ADCIRCMesh:** The underlying model mesh used for the model run, here: LAv20a - ADCIRC mesh developed by Coastal Protection and Restoration Authority for the region of Louisiana 2020

<i>ADCIRC mesh name</i>	<i>vertical datum</i>	<i>geographic region</i>
LAv20a, LAERDCv5k	NAVD88	LA
EGOMv20b	NAVD88	Gulf FL
NGOMv19b	NAVD88	MS, AL, FL Panhandle
HSOFS	MSL	Atlantic/Gulf of Mexico
SABv20b	MSL	Atlantic FL, GA, SC, NC
NAC2014	NAVD88	VI, MD, DE, NJ, CT, RI, ME
TXLA22a	NAVD88	TX, LA

### Shapefile structure and attributes:

Shapefiles store the geometric location and attribute information of geographic features. A shapefile format requires several files with specific file extensions that should be stored in the same project workspace:

- .shp: The main file that stores the feature geometry.
- .shx: The index file that stores the index of the feature geometry.
- .dbf: The dBASE table that stores the attribute information of features.
- .prj: The file that stores the coordinate system information. Used by ArcGIS.

The .dbf file contains the following attributes that describe each contour level:

**(Maximum) Water Elevation, (Maximum) Wave Height** – all values are relative to the vertical datum of the used ADCIRC mesh (NAVD88 or Mean Sea Level)

- min\_ft (minimum value in feet)
- max\_ft (maximum value in feet)

**(Maximum) Wind Speed**

- min\_mph (minimum value in miles per hour)
- max\_mph (maximum value in miles per hour)

**(Maximum) Wave Period**

- min\_s (minimum value in seconds)
- max\_s (maximum value in seconds)

The **symbolology files** (.lyr) use the max\_\* attribute and 30 levels of classification.

[Coordinate reference system:](#)

Geographic Coordinate System: GCS\_WGS\_1984

Datum: D\_WGS\_1984

Prime Meridian: Greenwich

Angular Unit: Degree



*Data servers are maintained by the Center for Computation and Technology, Louisiana State University.*