National Ocean Service
Center for Operational Oceanographic
Products and Services

CORA GLOSSARY

Understanding Terms associated with NOAA's **Coastal Ocean Reanalysis**

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Glossary

*Find more terms in our online **glossary**.*

ADvanced CIRCulation Model (ADCIRC): A system of computer programs for solving time dependent, free surface circulation and transport problems in two and three dimensions. These programs utilize the Finite Element Method to allow for the use of highly flexible, unstructured grids. Typical ADCIRC applications include: predicting storm surge and flooding, modeling tides and wind driven circulation, particle transport, and nearshore marine operations

Centroid: The center point of an object, or the point in which the three medians of a triangle intersect (known as the centroid of a triangle). A centroid is also defined as the point of intersection of three medians. Each centroid has a specific numerical ID, in addition to latitude / longitude coordinates and contains a full modeled time series

Datum: A base elevation used as a reference from which to reckon heights or depths

- **Tidal Datums:** A standard elevation defined by a certain phase of the tide. Locally-derived from observations taken at NOAA's tide gauges, tidal datums are used as references to measure local water levels. They should not be extended into areas having differing oceanographic characteristics without substantiating measurements. Tidal datums are the basis for establishing privately owned land, state-owned land, territorial sea, exclusive economic zone, and high seas boundaries. Referenced to points on land (bench marks), tidal datums must be updated periodically to account for global sea level rise and land uplift / subsidence

European Centre for Medium-range Weather Forecasts (ECMWF): A research institute and an operational service producing global numerical weather predictions and other data for Member and Cooperating States and the broader community. ECMWF operates a world-class supercomputer facility for weather forecasting and holds one of the world's largest meteorological data archives

European Reanalysis v.5 (ERA5): The fifth generation of the European Centre for Medium-Range Weather Forecasts (ECMWF) atmospheric reanalysis of the global climate. ERA5 covers the period from January 1940 to present and is produced by the Copernicus Climate Change Service at ECMWF

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Flood Frequency: The likelihood that a flood of a specific size will occur or be exceeded in a given year. It is a statistical probability that is important for designing engineering structures and managing flood-prone areas. Flood frequency studies relate the magnitude of a flood's discharge, stage, or volume to its probability of occurrence

Gridded Reanalysis: A process that combines several datasets into a regularly spaced grid to create a long-term record of climate, oceanographic, and atmospheric data. The uniformity of gridded datasets can benefit various analyses: evaluating climate model simulations, identifying climate variability and change, investigating extreme weather and climate events, and providing a comprehensive description of the observed climate

High Tide Flooding: Occurs when sea level rise combines with local factors to elevate water levels above the normal high tide. Changes in prevailing winds, shifts in ocean currents, and strong tidal forces (during fall or new moons) can all cause high tide flooding, inundating streets and other infrastructure even on sunny days

Hindcast: A retrospective analysis that uses weather models and historical data to simulate past weather conditions, essentially recreating what likely happened in the past based on available information, as opposed to forecasting future conditions. It often involves running a weather model backward in time using observed data from that period. Hindcasts are typically conducted for seasonal forecast timescales, making them very different from a multi-decade reanalysis

Mean Higher High Water (MHHW): The average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch (NTDE). For NOAA tide stations with shorter series, comparison of simultaneous observations with a control tide station is made in order to derive the equivalent datum of the NTDE

Mean Lower Low Water (MLLW): The average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch (NTDE). For NOAA tide stations with shorter series, comparison of simultaneous observations with a control tide station is made in order to derive the equivalent datum of the NTDE

Model Mesh: A series of centroids linked into irregular triangles that forms the structure data for modeling with ADCIRC and SWAN. This irregular, triangular mesh is also the same structure for modeled results and is sometimes referred to as the native grid or native mesh in the modeling community

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Mean Sea Level (MSL): The arithmetic mean of hourly heights observed over the National Tidal Datum Epoch (NTDE). Shorter series are specified in the name; e.g. monthly mean sea level and yearly mean sea level. The term Mean Sea Level can also refer to a tidal datum. Tidal datums are defined under the Datums entry above

NOAA Open Data Dissemination (NODD): The NODD Program provides public access to NOAA's open data on commercial cloud platforms through public-private partnerships. These partnerships remove obstacles to the public use of NOAA data, help avoid costs and risks associated with federal data access services, and leverage operational public-private partnerships with the cloud computing and information services industries

National Water Level Observation Network (NWLON): A comprehensive coastal system for observing, communicating, and assessing the impact of changing water levels nationwide. NWLON stations also measure other oceanographic parameters in addition to water levels, including meteorological parameters

Reanalysis: A process that uses data synthesis methods to create a long-term record of historical variables. Reanalysis combines observations and model forecasts and hind casts to create a coherent picture of historical variables to analyze things like climate trends, and flood frequencies; even individual events like tropical storms and hurricanes. In this case, CORA harnesses models to reanalyze historical water levels to increase the amount of historical water level information between observation stations

Spatial Resolution: The smallest unit of an image that can distinguish objects, or the smallest distance between two objects that can be identified in an image. It's also a measure of an imaging system's ability to record details of objects. CORA datasets are available in its native mesh with resolution between 100 and 300 meters. Gridded datasets have a 500 meter resolution

Simulating WAves Nearshore (SWAN): SWAN is a third-generation wave model, developed at Delft University of Technology, that computes random, short-crested wind-generated waves in coastal regions and inland waters. For more information about SWAN, see a short overview of model features. This list reflects on the scientific relevance of the development of SWAN