NOAA Marine Weather Models

The marine weather model data available at NOAA is divided into atmospheric and ocean wave model outputs. Models in each of these two categories will be detailed below in terms of their purpose in the operational suite, their spatial and temporal resolution and frequency of availability. All data presented is available from NOAA's National Centers for Environmental Prediction at ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/ (see details below) or via OpenDAP/THREDDS at http://nomads.ncep.noaa.gov. The data format for all of these datasets is the World Meteorological Organization's Gridded Binary (GRIB2). Links to parameter definitions and decoding programs are provided below.

1. Atmospheric Models

North American Mesoscale

The North American Mesoscale (NAM) model is the baseline high-resolution atmospheric model over the North American continent. It covers the greater continent at a spatial resolution of 12 km, with higher-resolution nests over various regions of interest, including the Contiguous United States (CONUS), Alaska and Hawaii and Puerto Rico all at 3km. Key output parameters available from this model include temperature, humidity, wind speed, wind gusts, pressure, precipitation and lightning threat. Forecasts are refreshed with current global observations 4 times a day, and produce 3-hourly output out to 84 hours (60 hours for nests).
Data available at: ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/nam/prod/

Rapid Refresh and High-Resolution Rapid Refresh

The Rapid Refresh (RAP) and High-Resolution Rapid Refresh (HRRR) models are updated hourly with the most recent observations to capture rapidly-evolving weather conditions over the US continent. The RAP model provides a mesoscale view of these evolving conditions, covering the North American Continent at a spatial resolution of 13 km at an hourly interval, out to 18 hours. The HRRR model gives a storm-scale view of these conditions, covering the CONUS at a resolution of 3 km at an hourly interval, out to 18 hours. Key output parameters available from this model include temperature, humidity, wind speed, wind gusts, pressure, precipitation and lightning threat. *Data at: ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/rap/prod/ and ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/hrrr/prod/*

Hurricane WRF

The operational Hurricane implementation of the Weather Research and Forecasting model (HWRF) provides high-resolution, storm-following model output on active tropical storms. The model is configured over three spatial scales, with grids covering the ocean basin (18 km), an intermediate nest (6 km) and a storm-following inner-most nest (2 km). The model is run every 6 hours, producing output at 3 h intervals out to 126 hours, for a maximum of 8 simultaneous storms. Key output parameters include hurricane wind speed, pressure and rainfall. Data available at: *ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/hur/prod/*

2. Ocean Wave Models

WAVEWATCH III (Multi_1)

The global WAVEWATCH III model (WW3 Multi_1) simulates ocean waves that are generated by global winds. The model determines the sea states in the global ocean, as well as provide information on swell waves at the coast generated by distant storms. This wave model has a global resolution of 0.5 deg, with higher-resolution two-way nests over coastal areas, down to 4 arc-min. The model is run 4 times a day, and provides 3-hourly output out to 180 hours. Key output parameters include significant wave height, peak wave direction and peak wave period. This information is provided for the total sea state, as well as the wind sea, and primary and secondary swells individually.
Data available at: ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/wave/prod/

Nearshore Wave Prediction System

The Nearshore Wave Prediction System (NWPS) provides a high-resolution downscaling of the global ocean wave conditions in coastal regions. The model is run on-demand, being triggered by individual Weather Forecast Offices for their domain, using their official marine forecast wind fields as forcing. Run cycles are triggered as needed, typically occurring 1-8 times. Data is provided hourly out to 144 hours. The model resolution ranges between 1.8 km and 200 m, depending on the location and required detail. Environmental factors such as ocean surface currents and tide and surge water levels are included. Key output parameters include significant wave height, peak wave direction, peak wave period, as well as the full collection of wave systems (wind sea and various swells). Data available at:
ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/nwps/prod/

3. Data Format

The operational weather data listed above are all available in the World Meteorological Organisation's Gridded Binary (GRIB2) format. Details on freeware codes available for decoding GRIB2 files can be found at: http://www.nco.ncep.noaa.gov/pmb/codes/GRIB2/.
Of these, wgrib2 is one of the most commonly used decoders. In the GRIB2 format, all parameters are predefined. A full listing can be found at:
http://www.nco.ncep.noaa.gov/pmb/docs/grib2/grib2_doc.shtml

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