MARINE MODELING AND ANALYSIS BRANCH
NOAA NWS NCEP ENVIRONMENTAL MODELING CENTER

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WAVEWATCH III® Production Multigrid: July 2013 to present

Summary

The multigrid production uses the multi-grid spectral wave model WAVEWATCH III® version 4.15, with operational NCEP winds and ice fields as input forcing fields. No wave data assimilation is performed. The model is run four times a day, with all available data.

Multigrid Model Setup

- Physics: The model was run with the Ardhuin et al (2010) source term package (ST4), which includes the flux computation in the sources (FLX0, STAB0).
- Propagation scheme: Third-order propagation scheme (UQ) with Tolman (2002a) averaging technique (PR3).
- Linear input: Cavaleri and Malanotte-Rizzoli with filter (LN1)
- Nonlinear interactions: Discrete interaction approximation (NL1)
- Bottom friction: JONSWAP bottom friction formulation (BT1)
- Depth induced breaking: Battjes-Janssen (DB1)
- Use Miche-style shallow water limiter in equation for maximum wave energy (MLIM)
- No damping or scattering by sea ice (IC0, IS0), and no reflection (REF0).

Model Grid Descriptions

The wave model suite consists of 9 rectilinear global and regional nested grids. These grids were developed using ETOPO-1 bathymetry (Amante and Eakins, 2009), together with v1.10 of the Global Self-Consistent Hierarchical High Resolution Shoreline (GSHHS) Database. The higher-resolution grids have been masked to improve model efficiency, and only provide data near shore. See Chawla and Tolman (2007,2008) for details on the software used for developing these grids.

Name (click for map)	ID	Nx	Ny	dx	dy	Lon0	Lat0
Global 30 min	glo_30m	720	336	1/2	1/2	0	-77.5
Arctic Ocean 30 min	ao_30m	720	51	1/2	1/2	0	65.0
NW Atlantic 10 min	at_10m	301	331	1/6	1/6	260	0.0
US West Coast 10 min	wc_10m	241	151	1/6	1/6	210	25
East Pacific 10 min	ep_10m	511	301	1/6	1/6	130	-20
Alaskan 10 min	ak_10m	401	187	1.5/6	1/6	140	44
Gulf of Mexico and NW Atlantic 4 min	at_4m	586	481	1/15	1/15	261	15
US West Coast 4 min	wc_4m	736	526	1/15	1/15	195	15
Alaskan 4 min	ak_4m	548	391	2/15	1/15	165	48

Model Input

- Wind input is from the operational Global Forecast System or GFS. The wind fields used are at 10m height, 1/2 degree resolution at 1 hour intervals.
- Ice concentrations are obtained from passive microwave sea ice concentration from the SMMR and SSMI, using the NCEP high resolution algorithm based on NASA Team2. The ice fields used are daily with 1/12 degree resolution.

Model output

- **Field output in grib2 format, available every 3 hours**
  .wind. = U-component of 10m wind, V-component of 10m wind (m/s)
  .hs. = significant height of combined wind waves and swell (m)
  .tp. = primary wave mean period (s)
  .dp. = primary wave direction (degrees true, i.e. 0 deg => coming from North; 90 deg => coming from East)

Validation

Validation data is available from July 2013 through to the present.

- Multigrid Model Validation