Atmospheric Forcing

COAMPS analysis and 72 hour forecast fields, received from `ftp.nrlmry.navy.mil` on a twice daily basis, were used to generate atmospheric forcings for the AOSN-II HOPS simulations. The COAMPS fields were available on four different resolution lambert conformal projection COAMPS grids. The nominal 0.03° resolution fields were used to generate forcings for the Data Domain. The nominal 0.1° fields were used to generate forcings for the Offshore domain.

The wind stress fields from COAMPS were bi-cubically interpolated to the HOPS grids, rescaled from (N/m^2) to ($dyne/cm^2$) and decomposed in terms of the direction vectors aligned with the HOPS grids. Special care was taken to resolve the mismatch of HOPS and COAMPS land masks. COAMPS wind stress values are, on average, an order of magnitude higher over the land than over the sea. Hence, discrepancies in the land masks could lead to excessive values of the wind stress on the HOPS grids near the coasts. To control this problem, wind stress values from COAMPS sea-points were extrapolated to COAMPS land-points prior to interpolation.

The surface net heat flux into the ocean (W/m^2) was composed as the sum of the shortwave radiation, the longwave radiation, the sensible heat flux and the latent heat flux; all of which were directly available from the COAMPS output. The resultant net heat flux was then bi-cubically interpolated to the HOPS grids. Similarly, the shortwave radiation was also bi-cubically interpolated to the HOPS grids, for use in biological simulations.

The net surface water flux out of the ocean (cm/day) was calculated as the difference of evaporation minus precipitation. Evaporation was calculated as the latent heat flux divided by the latent heat of evaporation. The latent heat of evaporation was computed from the formula $2.5008(10^6) - 2.3(10^3)\mathrm{T}_{\mathrm{air}}$, where $\mathrm{T}_{\mathrm{air}}$ was the air temperature obtained from COAMPS. The resulting evaporation was then converted from ($kg/(m^2s)$) to (cm/day). The total precipitation was obtained directly from COAMPS, merely needing a conversion from (mm in 12 hours) to (cm/day). The net water flux was bi-cubically interpolated to the HOPS grids.