

**BLUElink> Ocean Model, Analysis and Prediction System version 1.0
(OceanMAPSv1.0)**

Technical Specification

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Ocean General Circulation Model:

Modular Ocean Model version4p0d
(http://www.gfdl.noaa.gov/~lat/webpages/om/om_webpage.html)

Hybrid mixed layer scheme (Chen et al., 1994)

State variables:

Potential Temperature (T, °C)

Salinity (S, psu)

Sea level anomaly (η , m)

Momentum variables:

Zonal velocity (u, ms^{-1})

Meridional velocity (v, ms^{-1})

Diagnostic variables:

Density (ρ , kgm^{-3})

Vertical velocity (w, ms^{-1})

Domain:

Longitude range: 0-360E

Latitude range: 75S-74N

Depth range: 0-5000m

Resolution:

$\Delta x =$ 0.9° - (12E-90E)
0.1° - (90E-180E)
0.9° - (180E-67W)
2.0° otherwise

$\Delta y =$ 0.1° - (75S-16N)
0.9° - (16N-38N)
2.0° otherwise

$\Delta z =$ 10m - (0-200m)
>10m - otherwise

Timestep:

$\Delta t = 720\text{s}$

Bathymetry:

US Navy 2 minute global bathymetry

NOAA General Bathymetric Chart of the Oceans, 1 minute global bathymetry

Geoscience Australia 1km regional bathymetry

Real-time observations:

Autonomous profiling floats (Argo, <http://www.per.marine.csiro.au/argo/index.html>)
 expendible bathythermograph (XBT, <http://www.bom.gov.au/bmrc/ocean/JAFOOS/>)
 Conductivity Temperature Depth (CTD)
 TAO/TRITON array, (<http://www.pmel.noaa.gov/tao/>)
 Jason-1, IGDR (<http://podaac-www.jpl.nasa.gov/products/product168.html>)
 Envisat, IGDR (http://www.jason.oceanobs.com/html/missions/envisat_uk.html)
 AMSR-E, (http://www.remss.com/amsr/amsr_browse.html)

Ocean data assimilation system:

BLUElink Ocean Data Assimilation System (BODAS, Oke et al., 2005)
 Ensemble optimal interpolation
 Analysed variables, T, S, η
 Background - daily average
 Localisation - $8^{\circ} \times 8^{\circ}$

Initialisation:

Nudging variables: T, S, η
 Nudging period: 24 hours

Atmospheric fluxes:

Global Assimilation and Prediction System (GASP, Seaman et al., 1995)
 6hr average
 Surface wind stress (τ^x, τ^y , Pa)
 Shortwave radiation (Q_{SW} , Wm^{-2})
 Longwave radiation (Q_{LW} , Wm^{-2})
 Sensible heat flux (Q_{sens} , Wm^{-2})
 Rate of evaporation ($kgm^{-2}s^{-1}$)
 Rate of precipitation ($kgm^{-2}s^{-1}$)

Forecast cycle:

Base dates: Monday and Thursday
 Forecast period: 7 days

Near real-time analysis cycle:

Base dates: Wednesday and Saturday (5 days behind real-time (BRT))
 Simulation period: 5 days
 Observations window: -5 days to +1day

Analysis cycle:

Base dates: Saturday (9 days BRT) and Wednesday (8 days BRT)
 Simulation period: 5days/4days
 Observation window: -5 days to +5 days

Data products:

Format: netCDF CF1.0
 OGCM, daily average, 3D:

temp, potential temperature, ($^{\circ}\text{C}$)

salt, salinity, (psu)

u, zonal current, (ms^{-1})

v, meridional current, (ms^{-1})

OGCM, daily average, 2D:

eta_t, surface height on T cells, (m)

tau_x, i-directed wind stress, (Nm^{-2})

tau_y, j-directed wind stress, (Nm^{-2})

sfc_hflux, surface heat flux, (Wm^{-2})

sfc_salt_flux, sfc_salt_flux, ($\text{kgm}^{-2}\text{s}^{-1}$)

swflx, shortwave flux into ocean, (Wm^{-2})

pme, precip-evap (liquid, frozen, evaporation), (ms^{-1})

hbl, Kraus mixed layer depth, (m)

BODAS, 3D:

temp, temperature analysis, ($^{\circ}\text{C}$)

temp_inc, temperature increment, ($^{\circ}\text{C}$)

salt, salinity analysis, (psu)

salt_inc, salinity increment, (psu)

BODAS, 2D:

eta_t, Surface Height Analysis, (m)

eta_inc, Surface Height Increment, (m)

References

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- Chen, D., L. M. Rothstein and A. J. Busalacchi**, 1994: A hybrid vertical mixing scheme and its application to tropical ocean models. *J. Phys. Oceanogr.*, 24, 2156-2179.
- Oke, P. R., A. Schiller, D. A. Griffin and G. B. Brassington**, 2005: Ensemble data assimilation for an eddy-resolving ocean model of the Australian region, *Q. J. R. Meteorol. Soc.*, 131, 3301-3311
- Seaman, R., W. Bourke, P. Steinle, T. Hart, G. Embery, M. Naughton and L. Rikus**, 1995. Evolution of the Bureau of Meteorology's Global Assimilation and Prediction System, Part 1: Analyses and Initialization, *Aust. Met. Mag.*, 44, 1-18