

BLUElink> Ocean Model, Analysis and Prediction System (OceanMAPSv4.0i)

Technical Specification

Ocean General Circulation Model:

Modular Ocean Model version 5

Ocean Forecasting Australis Model (OFAM)

State variables:

Potential Temperature (T, °C)

Salinity (S, psu)

Sea surface height (η , m)

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

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

Domain:

Longitude range: 0-360°E

Latitude range: 75°S-75°N

Depth range: 0-5000m

Resolution:

$\Delta x = 0.1^\circ$

$\Delta y = 0.1^\circ - (75\text{S}-75\text{N})$

$\Delta z = 5\text{m (0-20m)}$
 $5\text{ to }10\text{m (20-90m)}$
 $\geq 10\text{m (100-5000m)}$; total 51 levels

Topography:

The topography is derived from the 30 arc-second GEBCO 08 topography (www.bodc.ac.uk/data/online_delivery/gebco/) for most of the world, and a 9 arc-second topography produced by Geoscience Australia (Whiteway, 2009).

River runoff:

Based on the global monthly climatology (Dai, 2009)

Observations:

In situ profiles:

Argo profiling floats from the Global Telecommunications System (GTS) and the ARGO profile data repositories run by GODAE and Coriolis.

Other profiles (expendable bathythermograph (XBT), Conductivity Temperature Depth (CTD), Moored and drifting buoys, Marine mammals, Gliders etc. from the GTS.

Altimetry:

Jason-3, CryoSat-2, SARAL, Sentinel 3A, Sentinel 3B and Sentinel 6A

SLA obtained from RADS

Satellite SST:

MTB GAC AVHRR L2P SST from NAVOCEANO

GCOM-W AMSR2 L2P SST from JAXA

Suomi-NPP VIIRS and NOAA-20 VIIRS L3U SST from NOAA

Ocean data assimilation (DA) system:

Hybrid-EnKF (<https://github.com/sakov/enkf-c>)

48 dynamic members, 144 static members

3-day cycle, every 3 days and not every day

DA analysis time: 3 days behind forecast base date on DA day

Asynchronous DA with observation window -6 to -3 days from forecast base time

DA analysed variables: T, S, η , u, v

Background

SST: 6hr average

η : 12hr average

T, S: 24hr average

Initialisation:

Instantaneous initialisation of increments with background restart

Initialised variables: T, S, η , u, v

Atmospheric Inputs:

Global Australian Community Climate and Earth-System Simulator version 3 (ACCESS-G3)

Net shortwave radiation (Wm^{-2})

Downward Longwave radiation (Wm^{-2})

Rate of precipitation ($kgm^{-2}s^{-1}$)

10m meridional and zonal wind (ms^{-1})

Model first level air temperature (K)

Model first level specific humidity ($kg\ kg^{-1}$)

The forcing fields are randomly scaled for each hindcast member. The scaling coefficients are normally distributed numbers with the average of one and the following standard deviations for:

air temperature – 0.001

shortwave radiation – 0.075

total precipitation – 0.15

surface wind components – 0.05

relative humidity – 0.075

Forecast cycle:

Base date: every day

Base time: 12UTC

Products available: about 22UTC

Forecast period: 7 days

1 deterministic forecast run and adding 3 synchronous forecasts

Near real-time analysis cycle (NRT):

Start date: 1 or 2 days behind forecast base date for no data assimilation (DA) day

Simulation period: 1 or 2 days

No NRT for DA day.

1 deterministic hindcast run and adding 3 synchronous hindcast run on no DA run.

Behind real-time analysis cycle (BRT):

16 members of each day

Simulation period: 3 days from DA day

BRT start date: 3 days behind forecast base date for DA day and 4 to 5 days behind forecast base date for no DA run.

48-member ensemble 3-day hindcast includes random perturbations

Registered products:

Format: netcdf4

Products available: about 2230UTC

OFAM, daily average, 3D:

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

salt, salinity, (psu)

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

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

OFAM, daily average, 2D:

eta_t, surface height, (m)

OFAM, 3hrs average, 2D:

eta_t, surface height, (m)

SST, sea surface temperature, ($^{\circ}\text{C}$)

SSS, sea surface salinity, (psu)

usurf, zonal surface current, (ms^{-1})

vsurf, surface meridional current, (ms^{-1})

Unregistered products:

3-member synchronous STD

7-member asynchronous STD

48-member analysis mean and STD