CMIP6 Model Documentation

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Documentation Contents

1 Key Properties

Ocean key properties

1.1 Key Properties

Ocean key properties

1.1.1 Model Overview

Overview of ocean model.

Spec. ID: cmip6.ocean.key_properties.model_overview

Is Required ? TRUE

Enter TEXT value:

1.1.2 Model Name

Name of ocean model code (NEMO 3.6, MOM 5.0,...)

Spec. ID: cmip6.ocean.key_properties.model_name

Is Required ? TRUE

Enter TEXT value:

1.1.3 Model Family

Type of ocean model.

Spec. ID: cmip6.ocean.key_properties.model_family

Is Required ? TRUE

Select value:

☒ OGCM

☐ Slab ocean

☐ Mixed layer ocean

☐ Other - please specify:

1.1.4 Basic Approximations

Basic approximations made in the ocean.

Spec. ID: cmip6.ocean.key_properties.basic_approximations

Is Required ? TRUE

Select value(s):

☒ Primitive equations

☐ Non-hydrostatic

☒ Boussinesq

☐ Other - please specify:

1.1.5 Prognostic Variables

List of prognostic variables in the ocean component.

Spec. ID: cmip6.ocean.key_properties.prognostic_variables

Is Required ? TRUE

Select value(s):

☒ Potential temperature

☐ Conservative temperature

☒ Salinity

☒ U-velocity

☒ V-velocity

☒ W-velocity

☒ SSH - Sea Surface Height

☐ Other - please specify:

1.2 Seawater Properties

Physical properties of seawater in ocean

1.2.1 Eos Type

Type of EOS for sea water

Spec. ID: cmip6.ocean.key_properties.seawater_properties.eos_type

Is Required ? TRUE

Select value:

☐ Linear

☐ Wright, 1997

☐ Mc Dougall et al.

☒ Jackett et al. 2006

☐ TEOS 2010

☐ Other - please specify:

1.2.2 Eos Functional Temp

Temperature used in EOS for sea water

Spec. ID: cmip6.ocean.key_properties.seawater_properties.eos_functional_temp

Is Required ? TRUE

Select value:

☐ Potential temperature

☐ Conservative temperature

1.2.3 Eos Functional Salt

Salinity used in EOS for sea water

Spec. ID: cmip6.ocean.key_properties.seawater_properties.eos_functional_salt

Is Required ? TRUE

Select value:

☐ Practical salinity Sp

☐ Absolute salinity Sa

1.2.4 Eos Functional Depth

Depth or pressure used in EOS for sea water xxx?

Spec. ID: cmip6.ocean.key_properties.seawater_properties.eos_functional_depth

Is Required ? TRUE

Select value:

☐ Pressure (dbars)

☐ Depth (meters)

1.2.5 Ocean Freezing Point

Equation used to compute the freezing point (in deg C) of seawater, as a function of salinity and pressure

Spec. ID: cmip6.ocean.key_properties.seawater_properties.ocean_freezing_point

Is Required ? TRUE

Select value:

☐ TEOS 2010

☐ Other - please specify:

1.2.6 Ocean Specific Heat

Specific heat in ocean (cpocean) in J/(kg K)

Spec. ID: cmip6.ocean.key_properties.seawater_properties.ocean_specific_heat

Is Required ? TRUE

Enter FLOAT value:

1.2.7 Ocean Reference Density

Boussinesq reference density (rhozero) in kg / m3

Spec. ID: cmip6.ocean.key_properties.seawater_properties.ocean_reference_density

Is Required ? TRUE

Enter FLOAT value:

1.3 Bathymetry

Properties of bathymetry in ocean

1.3.1 Reference Dates

Reference date of bathymetry

Spec. ID: cmip6.ocean.key_properties.bathymetry.reference_dates

Is Required ? TRUE

Select value:

- ☒ Present day
- ☐ 21000 years BP
- ☐ 6000 years BP
- ☐ LGM - Last Glacial Maximum
- ☐ Pliocene
- ☐ Other - please specify:

1.3.2 Type

Is the bathymetry fixed in time in the ocean xxx?

Spec. ID: cmip6.ocean.key_properties.bathymetry.type

Is Required ? TRUE

Select value:

☒ True ☐ False

1.3.3 Ocean Smoothing

Describe any smoothing or hand editing of bathymetry in ocean

Spec. ID: cmip6.ocean.key_properties.bathymetry.ocean_smoothing

Is Required ? TRUE

Enter TEXT value:

1.3.4 Source

Describe source of bathymetry in ocean

Spec. ID: cmip6.ocean.key_properties.bathymetry.source

Is Required ? TRUE

Enter TEXT value:

1.4 Nonoceanic Waters

Non oceanic waters treatement in ocean

1.4.1 Isolated Seas

Describe if/how isolated seas is performed

Spec. ID: cmip6.ocean.key_properties.nonoceanic_waters.isolated_seas

Is Required ? FALSE

Enter TEXT value: Yes

1.4.2 River Mouth

Describe if/how river mouth mixing or estuaries specific treatment is performed

Spec. ID: cmip6.ocean.key_properties.nonoceanic_waters.river_mouth

Is Required ? FALSE

Enter TEXT value: Mix over top 40 m

1.5 Software Properties

Software properties of ocean code

1.5.1 Repository

Location of code for this component.

Spec. ID: cmip6.ocean.key_properties.software_properties.repository

Is Required ? FALSE

Enter TEXT value:

1.5.2 Code Version

Code version identifier.

Spec. ID: cmip6.ocean.key_properties.software_properties.code_version

Is Required ? FALSE

Enter TEXT value:

1.5.3 Code Languages

Code language(s).

Spec. ID: cmip6.ocean.key_properties.software_properties.code_languages

Is Required ? FALSE

Enter TEXT value(s):

1.6 Resolution

Resolution in the ocean grid

1.6.1 Name

This is a string usually used by the modelling group to describe the resolution of this grid, e.g. ORCA025, N512L180, T512L70 etc.

Spec. ID: cmip6.ocean.key_properties.resolution.name

Is Required ? TRUE

Enter TEXT value:

1.6.2 Canonical Horizontal Resolution

Expression quoted for gross comparisons of resolution, eg. 50km or 0.1 degrees etc.

Spec. ID: cmip6.ocean.key_properties.resolution.canonical_horizontal_resolution

Is Required ? TRUE

Enter TEXT value:

1.6.3 Range Horizontal Resolution

Range of horizontal resolution with spatial details, eg. 50(Equator)-100km or 0.1-0.5 degrees etc.

Spec. ID: cmip6.ocean.key_properties.resolution.range_horizontal_resolution

Is Required ? TRUE

Enter TEXT value:

1.6.4 Number Of Horizontal Gridpoints

Total number of horizontal (XY) points (or degrees of freedom) on computational grid.

Spec. ID: cmip6.ocean.key_properties.resolution.number_of_horizontal_gridpoints

Is Required ? TRUE

Enter INTEGER value:

1.6.5 Number Of Vertical Levels

Number of vertical levels resolved on computational grid.

Spec. ID: cmip6.ocean.key_properties.resolution.number_of_vertical_levels

Is Required ? TRUE

Enter INTEGER value:

1.6.6 Is Adaptive Grid

Default is False. Set true if grid resolution changes during execution.

Spec. ID: cmip6.ocean.key_properties.resolution.is_adaptive_grid

Is Required ? TRUE

Select value:

☐ True ☐ False

1.6.7 Thickness Level 1

Thickness of first surface ocean level (in meters)

Spec. ID: cmip6.ocean.key_properties.resolution.thickness_level_1

Is Required ? TRUE

Enter FLOAT value:

1.7 Tuning Applied

Tuning methodology for ocean component

1.7.1 Description

General overview description of tuning: explain and motivate the main targets and metrics retained. andDocument the relative weight given to climate performance metrics versus process oriented metrics, andand on the possible conflicts with parameterization level tuning. In particular describe any struggle andwith a parameter value that required pushing it to its limits to solve a particular model deficiency.

Spec. ID: cmip6.ocean.key_properties.tuning_applied.description

Is Required ? TRUE

Enter TEXT value:

1.7.2 Global Mean Metrics Used

List set of metrics of the global mean state used in tuning model/component

Spec. ID: cmip6.ocean.key_properties.tuning_applied.global_mean_metrics_used

Is Required ? FALSE

Enter TEXT value(s):

1.7.3 Regional Metrics Used

List of regional metrics of mean state (e.g THC, AABW, regional means etc) used in tuning model/component

Spec. ID: cmip6.ocean.key_properties.tuning_applied.regional_metrics_used

Is Required ? FALSE

Enter TEXT value(s):

1.7.4 Trend Metrics Used

List observed trend metrics used in tuning model/component

Spec. ID: cmip6.ocean.key_properties.tuning_applied.trend_metrics_used

Is Required ? FALSE

Enter TEXT value(s):

1.8 Conservation

Conservation in the ocean component

1.8.1 Description

Brief description of conservation methodology

Spec. ID: cmip6.ocean.key_properties.conservation.description

Is Required ? TRUE

Enter TEXT value:

1.8.2 Scheme

Properties conserved in the ocean by the numerical schemes

Spec. ID: cmip6.ocean.key_properties.conservation.scheme

Is Required ? TRUE

Select value(s):

- ☐ Energy
- ☐ Enstrophy
- ☐ Salt
- ☐ Volume of ocean
- ☐ Momentum
- ☐ Other - please specify:

1.8.3 Consistency Properties

Any additional consistency properties (energy conversion, pressure gradient discretisation, ...)xxx?

Spec. ID: cmip6.ocean.key_properties.conservation.consistency_properties

Is Required ? FALSE

Enter TEXT value:

1.8.4 Corrected Conserved Prognostic Variables

*Set of variables which are conserved by *more* than the numerical scheme alone.*

Spec. ID: cmip6.ocean.key_properties.conservation.corrected_conserved_prognostic_variables

Is Required ? FALSE

Enter TEXT value:

1.8.5 Was Flux Correction Used

Does conservation involve flux correction xxx?

Spec. ID: cmip6.ocean.key_properties.conservation.was_flux_correction_used

Is Required ? FALSE

Select value:

☐ True ☐ False

2 Grid

Ocean grid

2.1 Grid

Ocean grid

2.1.1 Overview

Overview of grid in ocean

Spec. ID: cmip6.ocean.grid.overview

Is Required ? TRUE

Enter TEXT value:

2.2 Vertical

Properties of vertical discretisation in ocean

2.2.1 Coordinates

Type of vertical coordinates in ocean

Spec. ID: cmip6.ocean.grid.discretisation.vertical.coordinates

Is Required ? TRUE

Select value:

- ☐ Z-coordinate
- ☐ Z*-coordinate
- ☐ S-coordinate
- ☐ Isopycnic - sigma 0 - Density referenced to the surface
- ☐ Isopycnic - sigma 2 - Density referenced to 2000 m
- ☐ Isopycnic - sigma 4 - Density referenced to 4000 m
- ☐ Isopycnic - other - Other density-based coordinate
- ☐ Hybrid / Z+S
- ☐ Hybrid / Z+isopycnic
- ☐ Hybrid / other
- ☐ Pressure referenced (P)
- ☐ P*
- ☐ Z**

☐ Other - please specify:

2.2.2 Partial Steps

Using partial steps with Z or Z vertical coordinate in ocean xxx?*

Spec. ID: cmip6.ocean.grid.discretisation.vertical.partial_steps

Is Required ? TRUE

Select value:

☐ True ☐ False

2.3 Horizontal

Type of horizontal discretisation scheme in ocean

2.3.1 Type

Horizontal grid type

Spec. ID: cmip6.ocean.grid.discretisation.horizontal.type

Is Required ? TRUE

Select value:

☐ Lat-lon

☐ Rotated north pole

☐ Two north poles (ORCA-style)

☐ Other - please specify:

2.3.2 Staggering

Horizontal grid staggering type

Spec. ID: cmip6.ocean.grid.discretisation.horizontal.staggering

Is Required ? FALSE

Select value:

☐ Arakawa B-grid

☐ Arakawa C-grid

☐ Arakawa E-grid

☐ N/a

☐ Other - please specify:

2.3.3 Scheme

Horizontal discretisation scheme in ocean

Spec. ID: cmip6.ocean.grid.discretisation.horizontal.scheme

Is Required ? TRUE

Select value:

☐ Finite difference

☐ Finite volumes

☐ Finite elements

☐ Unstructured grid

☐ Other - please specify:

3 Timestepping Framework

Ocean Timestepping Framework

3.1 Timestepping Framework

Ocean Timestepping Framework

3.1.1 Overview

Overview of time stepping in ocean

Spec. ID: cmip6.ocean.timestepping_framework.overview

Is Required ? TRUE

Enter TEXT value:

3.1.2 Diurnal Cycle

Diurnal cycle type

Spec. ID: cmip6.ocean.timestepping_framework.diurnal_cycle

Is Required ? TRUE

Select value:

- ☐ None - No diurnal cycle in ocean
- ☐ Via coupling - Diurnal cycle via coupling frequency
- ☐ Specific treatment - Specific treament
- ☐ Other - please specify:

3.2 Tracers

Properties of tracers time stepping in ocean

3.2.1 Scheme

Tracers time stepping scheme

Spec. ID: cmip6.ocean.timestepping_framework.tracers.scheme

Is Required ? TRUE

Select value:

- ☐ Leap-frog + Asselin filter - Leap-frog scheme with Asselin filter
- ☐ Leap-frog + Periodic Euler - Leap-frog scheme with Periodic Euler
- ☐ Predictor-corrector - Predictor-corrector scheme
- ☐ Runge-Kutta 2 - Runge-Kutta 2 scheme

☐ AM3-LF - AM3-LF such as used in ROMS

☒ Forward-backward - Forward-backward scheme

☐ Forward operator - Forward operator scheme

☐ Other - please specify:

3.2.2 Time Step

Tracers time step (in seconds)

Spec. ID: cmip6.ocean.timestepping_framework.tracers.time_step

Is Required ? TRUE

Enter INTEGER value:

3.3 Baroclinic Dynamics

Baroclinic dynamics in ocean

3.3.1 Type

Baroclinic dynamics type

Spec. ID: cmip6.ocean.timestepping_framework.baroclinic_dynamics.type

Is Required ? TRUE

Select value:

☐ Preconditioned conjugate gradient

☐ Sub cyling - Sub cycling relative to tracers

☐ Other - please specify:

3.3.2 Scheme

Baroclinic dynamics scheme

Spec. ID: cmip6.ocean.timestepping_framework.baroclinic_dynamics.scheme

Is Required ? TRUE

Select value:

☐ Leap-frog + Asselin filter - Leap-frog scheme with Asselin filter

☐ Leap-frog + Periodic Euler - Leap-frog scheme with Periodic Euler

☐ Predictor-corrector - Predictor-corrector scheme

☐ Runge-Kutta 2 - Runge-Kutta 2 scheme

☐ AM3-LF - AM3-LF such as used in ROMS

☐ Forward-backward - Forward-backward scheme

☐ Forward operator - Forward operator scheme

☐ Other - please specify:

3.3.3 Time Step

Baroclinic time step (in seconds)

Spec. ID: cmip6.ocean.timestepping_framework.baroclinic_dynamics.time_step

Is Required ? FALSE

Enter INTEGER value:

3.4 Barotropic

Barotropic time stepping in ocean

3.4.1 Splitting

Time splitting method

Spec. ID: cmip6.ocean.timestepping_framework.barotropic.splitting

Is Required ? TRUE

Select value:

☐ None

☐ Split explicit

☐ Implicit

☐ Other - please specify:

3.4.2 Time Step

Barotropic time step (in seconds)

Spec. ID: cmip6.ocean.timestepping_framework.barotropic.time_step

Is Required ? FALSE

Enter INTEGER value:

3.5 Vertical Physics

Vertical physics time stepping in ocean

3.5.1 Method

Details of vertical time stepping in ocean

Spec. ID: cmip6.ocean.timestepping_framework.vertical_physics.method

Is Required ? TRUE

Enter TEXT value:

4 Advection

Ocean advection

4.1 Advection

Ocean advection

4.1.1 Overview

Overview of advection in ocean

Spec. ID: cmip6.ocean.advection.overview

Is Required ? TRUE

Enter TEXT value:

4.2 Momentum

Properties of lateral momemtum advection scheme in ocean

4.2.1 Type

Type of lateral momemtum advection scheme in ocean

Spec. ID: cmip6.ocean.advection.momentum.type

Is Required ? TRUE

Select value:

☒ Flux form

☐ Vector form

4.2.2 Scheme Name

Name of ocean momemtum advection scheme

Spec. ID: cmip6.ocean.advection.momentum.scheme_name

Is Required ? TRUE

Enter TEXT value: 2nd order centered

4.2.3 ALE

Using ALE for vertical advection xxx? (if vertical coordinates are sigma)

Spec. ID: cmip6.ocean.advection.momentum.ale

Is Required ? FALSE

Select value:

☐ True ☐ False

4.3 Lateral Tracers

Properties of lateral tracer advection scheme in ocean

4.3.1 Order

Order of lateral tracer advection scheme in ocean

Spec. ID: cmip6.ocean.advection.lateral_tracers.order

Is Required ? TRUE

Enter INTEGER value:

4.3.2 Flux Limiter

Monotonic flux limiter for lateral tracer advection scheme in ocean xxx?

Spec. ID: cmip6.ocean.advection.lateral_tracers.flux_limiter

Is Required ? TRUE

Select value:

☒ True ☐ False

4.3.3 Effective Order

Effective order of limited lateral tracer advection scheme in ocean

Spec. ID: cmip6.ocean.advection.lateral_tracers.effective_order

Is Required ? TRUE

Enter FLOAT value:

4.3.4 Name

Descriptive text for lateral tracer advection scheme in ocean (e.g. MUSCL, PPM-H5, PRATHER,...)

Spec. ID: cmip6.ocean.advection.lateral_tracers.name

Is Required ? TRUE

Enter TEXT value:

4.3.5 Passive Tracers

Passive tracers advected

Spec. ID: cmip6.ocean.advection.lateral_tracers.passive_tracers

Is Required ? FALSE

Select value(s):

☐ Ideal age

☐ CFC 11

☐ CFC 12

☐ SF6

☐ Other - please specify:

4.3.6 Passive Tracers Advection

Is advection of passive tracers different than active xxx? if so, describe.

Spec. ID: cmip6.ocean.advection.lateral_tracers.passive_tracers_advection

Is Required ? FALSE

Enter TEXT value:

4.4 Vertical Tracers

Properties of vertical tracer advection scheme in ocean

4.4.1 Name

Descriptive text for vertical tracer advection scheme in ocean (e.g. MUSCL, PPM-H5, PRATHER,...)

Spec. ID: cmip6.ocean.advection.vertical_tracers.name

Is Required ? TRUE

Enter TEXT value:

4.4.2 Flux Limiter

Monotonic flux limiter for vertical tracer advection scheme in ocean xxx?

Spec. ID: cmip6.ocean.advection.vertical_tracers.flux_limiter

Is Required ? TRUE

Select value:

☒ True ☐ False

5 Lateral Physics

Ocean lateral physics

5.1 Lateral Physics

Ocean lateral physics

5.1.1 Overview

Overview of lateral physics in ocean

Spec. ID: cmip6.ocean.lateral_physics.overview

Is Required ? TRUE

Enter TEXT value:

5.1.2 Scheme

Type of transient eddy representation in ocean

Spec. ID: cmip6.ocean.lateral_physics.scheme

Is Required ? TRUE

Select value:

☐ None - No transient eddies in ocean

☐ Eddy active - Full resolution of eddies

☐ Eddy admitting - Some eddy activity permitted by resolution

5.2 Operator

Properties of lateral physics operator for momentum in ocean

5.2.1 Direction

Direction of lateral physics momemtum scheme in the ocean

Spec. ID: cmip6.ocean.lateral_physics.momentum.operator.direction

Is Required ? TRUE

Select value:

☐ Horizontal

☐ Isopycnal

☐ Isoneutral

☐ Geopotential

☒ Iso-level

☐ Other - please specify:

5.2.2 Order

Order of lateral physics momemtum scheme in the ocean

Spec. ID: cmip6.ocean.lateral_physics.momentum.operator.order

Is Required ? TRUE

Select value:

☐ Harmonic - Second order

☒ Bi-harmonic - Fourth order

☐ Other - please specify:

5.2.3 Discretisation

Discretisation of lateral physics momemtum scheme in the ocean

Spec. ID: cmip6.ocean.lateral_physics.momentum.operator.discretisation

Is Required ? TRUE

Select value:

☒ Second order - Second order

☐ Higher order - Higher order

☐ Flux limiter

☐ Other - please specify:

5.3 Eddy Viscosity Coeff

Properties of eddy viscosity coeff in lateral physics momemtum scheme in the ocean

5.3.1 Type

Lateral physics momemtum eddy viscosity coeff type in the ocean

Spec. ID: cmip6.ocean.lateral_physics.momentum.eddy_viscosity_coeff.type

Is Required ? TRUE

Select value:

☐ Constant

☐ Space varying

☒ Time + space varying (Smagorinsky)

☐ Other - please specify:

5.3.2 Constant Coefficient

If constant, value of eddy viscosity coeff in lateral physics momemtum scheme (in m2/s)

Spec. ID: cmip6.ocean.lateral_physics.momentum.eddy_viscosity_coeff.constant_coefficient

Is Required ? FALSE

Enter INTEGER value:

5.3.3 Variable Coefficient

If space-varying, describe variations of eddy viscosity coeff in lateral physics momemtum scheme

Spec. ID: cmip6.ocean.lateral_physics.momentum.eddy_viscosity_coeff.variable_coefficient

Is Required ? FALSE

Enter TEXT value:

5.3.4 Coeff Background

Describe background eddy viscosity coeff in lateral physics momemtum scheme (give values in m2/s)

Spec. ID: cmip6.ocean.lateral_physics.momentum.eddy_viscosity_coeff.coeff_background

Is Required ? TRUE

Enter TEXT value: Western boundary enhanced background plus weak laplacian

5.3.5 Coeff Backscatter

Is there backscatter in eddy viscosity coeff in lateral physics momemtum scheme xxx?

Spec. ID: cmip6.ocean.lateral_physics.momentum.eddy_viscosity_coeff.coeff_backscatter

Is Required ? TRUE

Select value:

☐ True ☐ False

5.4 Tracers

Properties of lateral physics for tracers in ocean

5.4.1 Mesoscale Closure

Is there a mesoscale closure in the lateral physics tracers scheme xxx?

Spec. ID: cmip6.ocean.lateral_physics.tracers.mesoscale_closure

Is Required ? TRUE

Select value:

☒ True ☐ False

5.4.2 Submesoscale Mixing

Is there a submesoscale mixing parameterisation (i.e Fox-Kemper) in the lateral physics tracers scheme xxx?

Spec. ID: cmip6.ocean.lateral_physics.tracers.submesoscale_mixing

Is Required ? TRUE

Select value:

☐ True ☐ False

5.5 Operator

Properties of lateral physics operator for tracers in ocean

5.5.1 Direction

Direction of lateral physics tracers scheme in the ocean

Spec. ID: cmip6.ocean.lateral_physics.tracers.operator.direction

Is Required ? TRUE

Select value:

☐ Horizontal

☐ Isopycnal

☒ Isoneutral

☐ Geopotential

☐ Iso-level

☐ Other - please specify:

5.5.2 Order

Order of lateral physics tracers scheme in the ocean

Spec. ID: cmip6.ocean.lateral_physics.tracers.operator.order

Is Required ? TRUE

Select value:

☒ Harmonic - Second order

☐ Bi-harmonic - Fourth order

☐ Other - please specify:

5.5.3 Discretisation

Discretisation of lateral physics tracers scheme in the ocean

Spec. ID: cmip6.ocean.lateral_physics.tracers.operator.discretisation

Is Required ? TRUE

Select value:

☒ Second order - Second order

☐ Higher order - Higher order

☐ Flux limiter

☐ Other - please specify:

5.6 Eddy Diffusity Coeff

Properties of eddy diffusity coeff in lateral physics tracers scheme in the ocean

5.6.1 Type

Lateral physics tracers eddy diffusity coeff type in the ocean

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_diffusity_coeff.type

Is Required ? TRUE

Select value:

☐ Constant

☐ Space varying

☐ Time + space varying (Smagorinsky)

☐ Other - please specify:

5.6.2 Constant Coefficient

If constant, value of eddy diffusity coeff in lateral physics tracers scheme (in m2/s)

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_diffusity_coeff.constant_coefficient

Is Required ? FALSE

Enter INTEGER value:

5.6.3 Variable Coefficient

If space-varying, describe variations of eddy diffusity coeff in lateral physics tracers scheme

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_diffusity_coeff.variable_coefficient

Is Required ? FALSE

Enter TEXT value:

5.6.4 Coeff Background

Describe background eddy diffusity coeff in lateral physics tracers scheme (give values in m2/s)

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_diffusity_coeff.coeff_background

Is Required ? TRUE

Enter INTEGER value:

5.6.5 Coeff Backscatter

Is there backscatter in eddy diffusity coeff in lateral physics tracers scheme xxx?

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_diffusity_coeff.coeff_backscatter

Is Required ? TRUE

Select value:

☐ True ☐ False

5.7 Eddy Induced Velocity

Properties of eddy induced velocity (EIV) in lateral physics tracers scheme in the ocean

5.7.1 Type

Type of EIV in lateral physics tracers in the ocean

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_induced_velocity.type

Is Required ? TRUE

Select value:

☒ GM - Gent and McWilliams

☐ Other - please specify:

5.7.2 Constant Val

If EIV scheme for tracers is constant, specify coefficient value (M2/s)

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_induced_velocity.constant_val

Is Required ? FALSE

Enter INTEGER value:

5.7.3 Flux Type

Type of EIV flux (advective or skew)

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_induced_velocity.flux_type

Is Required ? TRUE

Enter TEXT value: Skew flux

5.7.4 Added Diffusivity

Type of EIV added diffusivity (constant, flow dependent or none)

Spec. ID: cmip6.ocean.lateral_physics.tracers.eddy_induced_velocity.added_diffusivity

Is Required ? TRUE

Enter TEXT value: Flow dependent

6 Vertical Physics

Ocean Vertical Physics

6.1 Vertical Physics

Ocean Vertical Physics

6.1.1 Overview

Overview of vertical physics in ocean

Spec. ID: cmip6.ocean.vertical_physics.overview

Is Required ? TRUE

Enter TEXT value:

6.2 Details

Properties of vertical physics in ocean

6.2.1 Langmuir Cells Mixing

Is there Langmuir cells mixing in upper ocean xxx?

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.details.langmuir_cells_mixing

Is Required ? TRUE

Select value:

☐ True ☐ False

6.3 Tracers

Properties of boundary layer (BL) mixing on tracers in the ocean

6.3.1 Type

Type of boundary layer mixing for tracers in ocean

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.tracers.type

Is Required ? TRUE

Select value:

☐ Constant value

☐ Turbulent closure - TKE

☒ Turbulent closure - KPP

☐ Turbulent closure - Mellor-Yamada

☐ Turbulent closure - Bulk Mixed Layer

☐ Richardson number dependent - PP

☐ Richardson number dependent - KT

☐ Imbeded as isopycnic vertical coordinate

☐ Other - please specify:

6.3.2 Closure Order

If turbulent BL mixing of tracers, specific order of closure (0, 1, 2.5, 3)

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.tracers.closure_order

Is Required ? FALSE

Enter FLOAT value:

6.3.3 Constant

If constant BL mixing of tracers, specific coefficient (m2/s)

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.tracers.constant

Is Required ? FALSE

Enter INTEGER value:

6.3.4 Background

Background BL mixing of tracers coefficient, (schema and value in m2/s - may by none)

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.tracers.background

Is Required ? TRUE

Enter TEXT value: Constant 10**-5 m**2/s

6.4 Momentum

Properties of boundary layer (BL) mixing on momentum in the ocean

6.4.1 Type

Type of boundary layer mixing for momentum in ocean

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.momentum.type

Is Required ? TRUE

Select value:

☐ Constant value

☐ Turbulent closure - TKE

☒ Turbulent closure - KPP

☐ Turbulent closure - Mellor-Yamada

☐ Turbulent closure - Bulk Mixed Layer

☐ Richardson number dependent - PP

☐ Richardson number dependent - KT

☐ Imbeded as isopycnic vertical coordinate

☐ Other - please specify:

6.4.2 Closure Order

If turbulent BL mixing of momentum, specific order of closure (0, 1, 2.5, 3)

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.momentum.closure_order

Is Required ? FALSE

Enter FLOAT value:

6.4.3 Constant

If constant BL mixing of momentum, specific coefficient (m2/s)

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.momentum.constant

Is Required ? FALSE

Enter INTEGER value:

6.4.4 Background

Background BL mixing of momentum coefficient, (schema and value in m2/s - may by none)

Spec. ID: cmip6.ocean.vertical_physics.boundary_layer_mixing.momentum.background

Is Required ? TRUE

Enter TEXT value: 1e-4 m**2/s

6.5 Details

Properties of interior mixing in the ocean

6.5.1 Convection Type

Type of vertical convection in ocean

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.details.convection_type

Is Required ? TRUE

Select value:

☐ Non-penetrative convective adjustment

☒ Enhanced vertical diffusion

☐ Included in turbulence closure

☐ Other - please specify:

6.5.2 Tide Induced Mixing

Describe how tide induced mixing is modelled (barotropic, baroclinic, none)

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.details.tide_induced_mixing

Is Required ? TRUE

Enter TEXT value: Baroclinic tides, Barotropic tides

6.5.3 Double Diffusion

Is there double diffusion

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.details.double_diffusion

Is Required ? TRUE

Select value:

☐ True ☐ False

6.5.4 Shear Mixing

Is there interior shear mixing

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.details.shear_mixing

Is Required ? TRUE

Select value:

☐ True ☐ False

6.6 Tracers

Properties of interior mixing on tracers in the ocean

6.6.1 Type

Type of interior mixing for tracers in ocean

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.tracers.type

Is Required ? TRUE

Select value:

☐ Constant value

☐ Turbulent closure / TKE

☐ Turbulent closure - Mellor-Yamada

- ☐ Richardson number dependent - PP
- ☐ Richardson number dependent - KT
- ☐ Imbeded as isopycnic vertical coordinate
- ☐ Other - please specify:

6.6.2 Constant

If constant interior mixing of tracers, specific coefficient (m2/s)

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.tracers.constant

Is Required ? FALSE

Enter INTEGER value:

6.6.3 Profile

Is the background interior mixing using a vertical profile for tracers (i.e is NOT constant) xxx?

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.tracers.profile

Is Required ? TRUE

Enter TEXT value:

6.6.4 Background

Background interior mixing of tracers coefficient, (schema and value in m2/s - may by none)

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.tracers.background

Is Required ? TRUE

Enter TEXT value: 10**-5 m**2/s

6.7 Momentum

Properties of interior mixing on momentum in the ocean

6.7.1 Type

Type of interior mixing for momentum in ocean

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.momentum.type

Is Required ? TRUE

Select value:

- ☐ Constant value
- ☐ Turbulent closure / TKE
- ☐ Turbulent closure - Mellor-Yamada
- ☐ Richardson number dependent - PP

- ☐ Richardson number dependent - KT
- ☐ Imbeded as isopycnic vertical coordinate
- ☐ Other - please specify:

6.7.2 Constant

If constant interior mixing of momentum, specific coefficient (m2/s)

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.momentum.constant

Is Required ? FALSE

Enter INTEGER value:

6.7.3 Profile

Is the background interior mixing using a vertical profile for momentum (i.e is NOT constant) xxx?

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.momentum.profile

Is Required ? TRUE

Enter TEXT value:

6.7.4 Background

Background interior mixing of momentum coefficient, (schema and value in m2/s - may by none)

Spec. ID: cmip6.ocean.vertical_physics.interior_mixing.momentum.background

Is Required ? TRUE

Enter TEXT value: 1e-4 m**2/s

7 Uplow Boundaries

Ocean upper / lower boundaries

7.1 Free Surface

Properties of free surface in ocean

7.1.1 Overview

Overview of free surface in ocean

Spec. ID: cmip6.ocean.uplow_boundaries.free_surface.overview

Is Required ? TRUE

Enter TEXT value:

7.1.2 Scheme

Free surface scheme in ocean

Spec. ID: cmip6.ocean.uplow_boundaries.free_surface.scheme

Is Required ? TRUE

Select value:

- ☐ Linear implicit
- ☐ Linear filtered
- ☐ Linear semi-explicit
- ☐ Non-linear implicit
- ☐ Non-linear filtered
- ☒ Non-linear semi-explicit
- ☐ Fully explicit
- ☐ Other - please specify:

7.1.3 Embeded Seaice

Is the sea-ice embeded in the ocean model (instead of levitating) xxx?

Spec. ID: cmip6.ocean.uplow_boundaries.free_surface.embeded_seaice

Is Required ? TRUE

Select value:

☐ True ☐ False

7.2 Bottom Boundary Layer

Properties of bottom boundary layer in ocean

7.2.1 Overview

Overview of bottom boundary layer in ocean

Spec. ID: cmip6.ocean.uplow_boundaries.bottom_boundary_layer.overview

Is Required ? TRUE

Enter TEXT value:

7.2.2 Type Of Bbl

Type of bottom boundary layer in ocean

Spec. ID: cmip6.ocean.uplow_boundaries.bottom_boundary_layer.type_of_bbl

Is Required ? TRUE

Select value:

☒ Diffusive

☐ Acvective

☐ Other - please specify:

7.2.3 Lateral Mixing Coef

If bottom BL is diffusive, specify value of lateral mixing coefficient (in m2/s)

Spec. ID: cmip6.ocean.uplow_boundaries.bottom_boundary_layer.lateral_mixing_coef

Is Required ? FALSE

Enter INTEGER value: 100

7.2.4 Sill Overflow

Describe any specific treatment of sill overflows

Spec. ID: cmip6.ocean.uplow_boundaries.bottom_boundary_layer.sill_overflow

Is Required ? TRUE

Enter TEXT value: Specific treatment

8 Boundary Forcing

Ocean boundary forcing

8.1 Boundary Forcing

Ocean boundary forcing

8.1.1 Overview

Overview of boundary forcing in ocean

Spec. ID: cmip6.ocean.boundary_forcing.overview

Is Required ? TRUE

Enter TEXT value:

8.1.2 Surface Pressure

Describe how surface pressure is transmitted to ocean (via sea-ice, nothing specific,...)

Spec. ID: cmip6.ocean.boundary_forcing.surface_pressure

Is Required ? TRUE

Enter TEXT value:

8.1.3 Momentum Flux Correction

Describe any type of ocean surface momentum flux correction and, if applicable, how it is applied and where.

Spec. ID: cmip6.ocean.boundary_forcing.momentum_flux_correction

Is Required ? FALSE

Enter TEXT value: No

8.1.4 Tracers Flux Correction

Describe any type of ocean surface tracers flux correction and, if applicable, how it is applied and where.

Spec. ID: cmip6.ocean.boundary_forcing.tracers_flux_correction

Is Required ? FALSE

Enter TEXT value:

8.1.5 Wave Effects

Describe if/how wave effects are modelled at ocean surface.

Spec. ID: cmip6.ocean.boundary_forcing.wave_effects

Is Required ? TRUE

Enter TEXT value:

8.1.6 River Runoff Budget

Describe how river runoff from land surface is routed to ocean and any global adjustment done.

Spec. ID: cmip6.ocean.boundary_forcing.river_runoff_budget

Is Required ? TRUE

Enter TEXT value:

8.1.7 Geothermal Heating

Describe if/how geothermal heating is present at ocean bottom.

Spec. ID: cmip6.ocean.boundary_forcing.geothermal_heating

Is Required ? TRUE

Enter TEXT value: Spatial varying

8.2 Bottom Friction

Properties of momentum bottom friction in ocean

8.2.1 Type

Type of momentum bottom friction in ocean

Spec. ID: cmip6.ocean.boundary_forcing.momentum.bottom_friction.type

Is Required ? TRUE

Select value:

☐ Linear

☒ Non-linear

☐ Non-linear (drag function of speed of tides)

☐ Constant drag coefficient

☐ None

☐ Other - please specify:

8.3 Lateral Friction

Properties of momentum lateral friction in ocean

8.3.1 Type

Type of momentum lateral friction in ocean

Spec. ID: cmip6.ocean.boundary_forcing.momentum.lateral_friction.type

Is Required ? TRUE

Select value:

☐ None

☐ Free-slip

☒ No-slip

☐ Other - please specify:

8.4 Sunlight Penetration

Properties of sunlight penetration scheme in ocean

8.4.1 Scheme

Type of sunlight penetration scheme in ocean

Spec. ID: cmip6.ocean.boundary_forcing.tracers.sunlight_penetration.scheme

Is Required ? TRUE

Select value:

☐ 1 extinction depth

☐ 2 extinction depth

☐ 3 extinction depth

☐ Other - please specify:

8.4.2 Ocean Colour

Is the ocean sunlight penetration scheme ocean colour dependent xxx?

Spec. ID: cmip6.ocean.boundary_forcing.tracers.sunlight_penetration.ocean_colour

Is Required ? TRUE

Select value:

☒ True ☐ False

8.4.3 Extinction Depth

Describe and list extinctions depths for sunlight penetration scheme (if applicable).

Spec. ID: cmip6.ocean.boundary_forcing.tracers.sunlight_penetration.extinction_depth

Is Required ? FALSE

Enter TEXT value:

8.5 Fresh Water Forcing

Properties of surface fresh water forcing in ocean

8.5.1 From Atmopshere

Type of surface fresh water forcing from atmos in ocean

Spec. ID: cmip6.ocean.boundary_forcing.tracers.fresh_water_forcing.from_atmopshere

Is Required ? TRUE

Select value:

☐ Freshwater flux

☐ Virtual salt flux

☐ Other - please specify:

8.5.2 From Sea Ice

Type of surface fresh water forcing from sea-ice in ocean

Spec. ID: cmip6.ocean.boundary_forcing.tracers.fresh_water_forcing.from_sea_ice

Is Required ? TRUE

Select value:

☐ Freshwater flux

☐ Virtual salt flux

☐ Real salt flux

☐ Other - please specify:

8.5.3 Forced Mode Restoring

Type of surface salinity restoring in forced mode (OMIP)

Spec. ID: cmip6.ocean.boundary_forcing.tracers.fresh_water_forcing.forced_mode_restoring

Is Required ? TRUE

Enter TEXT value: