CMIP6 Model Documentation

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Documentation Contents

1 Key Properties

Ocean Biogeochemistry key properties

1.1 Key Properties

Ocean Biogeochemistry key properties

1.1.1 Name *

Name of ocnbgchem model code

Enter TEXT:

1.1.2 Keywords *

Keywords associated with ocnbgchem model code

Enter COMMA SEPERATED list:

1.1.3 Overview *

Overview of ocnbgchem model.

Enter TEXT:

1.1.4 Model Type *

Type of ocean biogeochemistry model

Select SINGLE option:

- ☐ Geochemical - No living compartments
- ☐ NPZD - No plankton types
- ☐ PFT - Several plankton types
- ☐ Other - please specify:

1.1.5 Elemental Stoichiometry *

Describe elemental stoichiometry (fixed, variable, mix of the two)

Select SINGLE option:

- ☐ Fixed - Fixed stoichiometry
- ☐ Variable - Variable stoichiometry
- ☐ Mix of both - Both fixed and mixed stoichiometry

1.1.6 Elemental Stoichiometry Details *

Describe which elements have fixed/variable stoichiometry

Enter COMMA SEPERATED list:

1.1.7 Prognostic Variables *

List of all prognostic tracer variables in the ocean biogeochemistry component

Enter COMMA SEPERATED list:

1.1.8 Diagnostic Variables *

List of all diagnotic tracer variables in the ocean biogeochemistry component (derived from prognostic variables

Enter COMMA SEPERATED list:

1.1.9 Damping

Describe any tracer damping used (such as artificial correction or relaxation to climatology,...)

Enter TEXT:

1.2 Time Stepping Framework

Time stepping framework for ocean biogeochemistry

1.2.1 Overview

Overview of time stepping framework for ocean biogeochemistry in ocnbgchem model.

Enter TEXT:

1.3 Passive Tracers Transport

Time stepping method for passive tracers transport in ocean biogeochemistry

1.3.1 Method *

Time stepping framework for passive tracers

Select SINGLE option:

☐ Use ocean model transport time step

☐ Use specific time step

1.3.2 Timestep If Not From Ocean

Time step for passive tracers (if different from ocean)

Enter INTEGER value:

1.4 Biology Sources Sinks

Time stepping framework for biology sources and sinks in ocean biogeochemistry

1.4.1 Method *

Time stepping framework for biology sources and sinks

Select SINGLE option:

☐ Use ocean model transport time step

☐ Use specific time step

1.4.2 Timestep If Not From Ocean

Time step for biology sources and sinks (if different from ocean)

Enter INTEGER value:

1.5 Transport Scheme

Transport scheme in ocean biogeochemistry

1.5.1 Overview

Overview of transport scheme in ocean biogeochemistry in ocnbgchem model.

Enter TEXT:

1.5.2 Type *

Type of transport scheme

Select SINGLE option:

☐ Offline

☐ Online

1.5.3 Scheme *

Transport scheme used

Select SINGLE option:

☐ Use that of ocean model

☐ Other - please specify:

1.5.4 Use Different Scheme

Decribe transport scheme if different than that of ocean model

Enter TEXT:

1.6 Boundary Forcing

Properties of biogeochemistry boundary forcing

1.6.1 Overview

Overview of properties of biogeochemistry boundary forcing in ocnbgchem model.

Enter TEXT:

1.6.2 Atmospheric Deposition *

Describe how atmospheric deposition is modeled

Select SINGLE option:

- ☐ From file (climatology)
- ☐ From file (interannual variations)
- ☐ From Atmospheric Chemistry model

1.6.3 River Input *

Describe how river input is modeled

Select SINGLE option:

- ☐ From file (climatology)
- ☐ From file (interannual variations)
- ☐ From Land Surface model

1.6.4 Sediments From Boundary Conditions

List which sediments are speficied from boundary condition

Enter COMMA SEPERATED list:

1.6.5 Sediments From Explicit Model

List which sediments are speficied from explicit sediment model

Enter COMMA SEPERATED list:

1.7 Gas Exchange

Properties of gas exchange in ocean biogeochemistry

1.7.1 Overview

Overview of properties of gas exchange in ocean biogeochemistry in ocnbgchem model.

Enter TEXT:

1.7.2 CO2 Exchange Present *

Is CO2 gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.3 CO2 Exchange Type

Describe CO2 gas exchange

Select SINGLE option:

☐ OMIP protocol

☐ Other - please specify:

1.7.4 O2 Exchange Present *

Is O2 gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.5 O2 Exchange Type

Describe O2 gas exchange

Select SINGLE option:

☐ OMIP protocol

☐ Other - please specify:

1.7.6 DMS Exchange Present *

Is DMS gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.7 DMS Exchange Type

Specify DMS gas exchange scheme type

Enter TEXT:

1.7.8 N2 Exchange Present *

Is N2 gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.9 N2 Exchange Type

Specify N2 gas exchange scheme type

Enter TEXT:

1.7.10 N2O Exchange Present *

Is N2O gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.11 N2O Exchange Type

Specify N2O gas exchange scheme type

Enter TEXT:

1.7.12 CFC11 Exchange Present *

Is CFC11 gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.13 CFC11 Exchange Type

Specify CFC11 gas exchange scheme type

Enter TEXT:

1.7.14 CFC12 Exchange Present *

Is CFC12 gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.15 CFC12 Exchange Type

Specify CFC12 gas exchange scheme type

Enter TEXT:

1.7.16 SF6 Exchange Present *

Is SF6 gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.17 SF6 Exchange Type

Specify SF6 gas exchange scheme type

Enter TEXT:

1.7.18 13CO2 Exchange Present *

Is 13CO2 gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.19 13CO2 Exchange Type

Specify 13CO2 gas exchange scheme type

Enter TEXT:

1.7.20 14CO2 Exchange Present *

Is 14CO2 gas exchange modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

1.7.21 14CO2 Exchange Type

Specify 14CO2 gas exchange scheme type

Enter TEXT:

1.7.22 Other Gases

Specify any other gas exchange

Enter TEXT:

1.8 Carbon Chemistry

Properties of carbon chemistry biogeochemistry

1.8.1 Overview

Overview of properties of carbon chemistry biogeochemistry in ocnbgchem model.

Enter TEXT:

1.8.2 Type *

Describe how carbon chemistry is modeled

Select SINGLE option:

☐ OMIP protocol

☐ Other protocol

1.8.3 Ph Scale

If NOT OMIP protocol, describe pH scale.

Select SINGLE option:

- ☐ Sea water
- ☐ Free
- ☐ Other - please specify:

1.8.4 Constants If Not OMIP

If NOT OMIP protocol, list carbon chemistry constants.

Enter COMMA SEPERATED list:

2 Tracers

Ocean biogeochemistry tracers

2.1 Tracers

Ocean biogeochemistry tracers

2.1.1 Name

Commonly used name for the tracers in ocnbgchem model.

Enter TEXT:

2.1.2 Overview

Overview of ocean biogeochemistry tracers in ocnbgchem model.

Enter TEXT:

2.1.3 Sulfur Cycle Present *

Is sulfur cycle modeled ?

Select either TRUE or FALSE:

☐ True ☐ False

2.1.4 Nutrients Present *

List nutrient species present in ocean biogeochemistry model

Select MULTIPLE options:

☐ Nitrogen (N)

☐ Phosphorous (P)

☐ Silicium (S)

☐ Iron (Fe)

☐ Other - please specify:

2.1.5 Nitrous Species If N

If nitrogen present, list nitrous species.

Select MULTIPLE options:

☐ Nitrates (NO3)

☐ Amonium (NH4)

☐ Other - please specify:

2.1.6 Nitrous Processes If N

If nitrogen present, list nitrous processes.

Select MULTIPLE options:

- ☐ Dentrification
- ☐ N fixation
- ☐ Other - please specify:

2.2 Ecosystem

Ecosystem properties in ocean biogeochemistry

2.2.1 Overview

Overview of ecosystem properties in ocean biogeochemistry in ocnbgchem model.

Enter TEXT:

2.2.2 Upper Trophic Levels Definition *

Describe how upper trophic levels are defined in model (e.g. based on size)

Enter TEXT:

2.2.3 Upper Trophic Levels Treatment *

Describe how upper trophic levels are treated in model

Enter TEXT:

2.3 Phytoplankton

Phytoplankton properties in ocean biogeochemistry

2.3.1 Type *

Type of phytoplankton

Select SINGLE option:

- ☐ None
- ☐ Generic
- ☐ PFT including size based (specify both below) - Plankton functional type including size based
- ☐ Size based only (specify below)
- ☐ PFT only (specify below)

2.3.2 Pft

Phytoplankton functional types (PFT) (if applicable)

Select MULTIPLE options:

- ☐ Diatoms
- ☐ Nfixers
- ☐ Calcifiers
- ☐ Other - please specify:

2.3.3 Size Classes

Phytoplankton size classes (if applicable)

Select MULTIPLE options:

- ☐ Microphytoplankton
- ☐ Nanophytoplankton
- ☐ Picophytoplankton
- ☐ Other - please specify:

2.4 Zooplankton

Zooplankton properties in ocean biogeochemistry

2.4.1 Type *

Type of zooplankton

Select SINGLE option:

- ☐ None
- ☐ Generic
- ☐ Size based (specify below)
- ☐ Other - please specify:

2.4.2 Size Classes

Zooplankton size classes (if applicable)

Select MULTIPLE options:

- ☐ Microzooplankton
- ☐ Mesozooplankton
- ☐ Other - please specify:

2.5 Disolved Organic Matter

Disolved organic matter properties in ocean biogeochemistry

2.5.1 Overview

Overview of disolved organic matter properties in ocean biogeochemistry in ocnbgchem model.

Enter TEXT:

2.5.2 Bacteria Present *

Is there bacteria representation ?

Select either TRUE or FALSE:

☐ True ☐ False

2.5.3 Lability *

Describe treatment of lability in dissolved organic matter

Select SINGLE option:

☐ None

☐ Labile - Less than a few days

☐ Semi-labile - Few days to a few years

☐ Refractory - Over a few years

☐ Other - please specify:

2.6 Particules

Particulate carbon properties in ocean biogeochemistry

2.6.1 Overview

Overview of particulate carbon properties in ocean biogeochemistry in ocnbgchem model.

Enter TEXT:

2.6.2 Method *

How is particulate carbon represented in ocean biogeochemistry?

Select MULTIPLE options:

☐ Diagnostic

☐ Diagnostic (Martin profile)

☐ Diagnostic (Balast)

☐ Prognostic

☐ Other - please specify:

2.6.3 Types If Prognostic

If prognostic, type(s) of particulate matter taken into account

Select MULTIPLE options:

☐ POC

☐ PIC (calcite)

☐ PIC (aragonite

☐ BSi

☐ Other - please specify:

2.6.4 Size If Prognostic

If prognostic, describe if a particule size spectrum is used to represent distribution of particules in water volume

Select SINGLE option:

☐ No size spectrum used

☐ Full size spectrum

☐ Discrete size classes (specify which below)

2.6.5 Size If Discrete

If prognostic and discrete size, describe which size classes are used

Enter TEXT:

2.6.6 Sinking Speed If Prognostic

If prognostic, method for calculation of sinking speed of particules

Select SINGLE option:

☐ Constant

☐ Function of particule size

☐ Function of particule type (balast)

☐ Other - please specify:

2.7 Dic Alkalinity

DIC and alkalinity properties in ocean biogeochemistry

2.7.1 Overview

Overview of dic and alkalinity properties in ocean biogeochemistry in ocnbgchem model.

Enter TEXT:

2.7.2 Carbon Isotopes *

Which carbon isotopes are modelled (C13, C14)?

Select MULTIPLE options:

☐ C13

☐ C14)

2.7.3 Abiotic Carbon *

Is abiotic carbon modelled ?

Select either TRUE or FALSE:

☐ True ☐ False

2.7.4 Alkalinity *

How is alkalinity modelled ?

Select SINGLE option:

☐ Prognostic

☐ Diagnostic)