# CMIP6 Model Documentation

| | |
|---|---|
| **Institute**: | AWI |
| **Model**: | AWI-CM-1-1-HR |
| **Topic**: | Top Level |
| **Doc. Generated**: | 2018-12-16 |
| **Doc. Seeded From**: | N/A |
| **Specialization Version**: | 1.1.1 |
| **Further Info**: | https://es-doc.org/cmip6 |
| **Note**: | * indicates a required property |

# Documentation Contents

# 1 Key Properties

*Key properties of the model*

### 1.1.1 Top level properties

*Key properties of the model*

#### 1.1.1.1 Name *

*Name of coupled model*

**Enter TEXT:**

#### 1.1.1.2 Keywords *

*Keywords associated with coupled model*

**Enter COMMA SEPERATED list:**

#### 1.1.1.3 Overview *

*Top level overview of coupled model*

**Enter TEXT:**

### 1.2.1 Flux Correction

*Flux correction properties of the model*

#### 1.2.1.1 Details *

*Describe if/how flux corrections are applied in the model*

**Enter TEXT:**

### 1.3.1 Genealogy

*Genealogy and history of the model*

#### 1.3.1.1 Year Released *

*Year the model was released*

**Enter TEXT:**

#### 1.3.1.2 CMIP3 Parent

*CMIP3 parent if any*

**Enter TEXT:**

#### 1.3.1.3 CMIP5 Parent

*CMIP5 parent if any*

**Enter TEXT:**

#### 1.3.1.4 CMIP5 Differences

*Briefly summarize the differences between this model and its CMIP5 parent, if applicable*

**Enter TEXT:**

#### 1.3.1.5 Previous Name

*Previously known as*

**Enter TEXT:**

### 1.4.1 Software Properties

*Software properties of model*

#### 1.4.1.1 Repository

*Location of code for this component.*

**Enter TEXT:**

#### 1.4.1.2 Code Version

*Code version identifier.*

**Enter TEXT:**

#### 1.4.1.3 Code Languages

*Code language(s).*

**Enter COMMA SEPERATED list:**

#### 1.4.1.4 Components Structure

*Describe how model realms are structured into independent software components (coupled via a coupler) and internal software components.*

**Enter TEXT:**

#### 1.4.1.5 Coupler

*Overarching coupling framework for model.*

**Select SINGLE option:**

- ☐ OASIS - The OASIS coupler - prior to OASIS-MCT
- ☐ OASIS3-MCT - The MCT variant of the OASIS coupler
- ☐ ESMF - Vanilla Earth System Modelling Framework
- ☐ NUOPC - National Unified Operational Prediction Capability variant of ESMF
- ☐ Bespoke - Customised coupler developed for this model
- ☐ Unknown - It is not known what/if-a coupler is used
- ☐ None - No coupler is used

☐ Other - please specify:

## 1.5.1 Coupling

### 1.5.1.1 Atmosphere Double Flux *

*Is the atmosphere passing a double flux to the ocean and sea ice (as opposed to a single one)?*

**Select either TRUE or FALSE:**

☐ True ☐ False

### 1.5.1.2 Atmosphere Fluxes Calculation Grid

*Where are the air-sea fluxes calculated*

**Select SINGLE option:**

☐ Atmosphere grid

☐ Ocean grid

☐ Specific coupler grid

☐ Other - please specify:

### 1.5.1.3 Atmosphere Relative Winds *

*Are relative or absolute winds used to compute the flux? I.e. do ocean surface currents enter the wind stress calculation?*

**Select either TRUE or FALSE:**

☐ True ☐ False

## 1.6.1 Tuning Applied

*Tuning methodology for model*

### 1.6.1.1 Description *

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

**Enter TEXT:**

### 1.6.1.2 Global Mean Metrics Used

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

**Enter COMMA SEPERATED list:**

#### 1.6.1.3 Regional Metrics Used

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

**Enter COMMA SEPERATED list:**

#### 1.6.1.4 Trend Metrics Used

*List observed trend metrics/diagnostics used in tuning model/component (such as 20th century)*

**Enter COMMA SEPERATED list:**

#### 1.6.1.5 Energy Balance *

*Describe how energy balance was obtained in the full system: in the various components independently or at the components coupling stage?*

**Enter TEXT:**

#### 1.6.1.6 Fresh Water Balance *

*Describe how fresh_water balance was obtained in the full system: in the various components independently or at the components coupling stage?*

**Enter TEXT:**

### 1.6.2 Heat

*Global heat convervation properties of the model*

#### 1.6.2.1 Global *

*Describe if/how heat is conserved globally*

**Enter TEXT:**

#### 1.6.2.2 Atmos Ocean Interface

*Describe if/how heat is conserved at the atmosphere/ocean coupling interface*

**Enter TEXT:**

#### 1.6.2.3 Atmos Land Interface *

*Describe if/how heat is conserved at the atmosphere/land coupling interface*

**Enter TEXT:**

#### 1.6.2.4 Atmos Sea-ice Interface

*Describe if/how heat is conserved at the atmosphere/sea-ice coupling interface*

**Enter TEXT:**

#### 1.6.2.5 Ocean Seaice Interface

*Describe if/how heat is conserved at the ocean/sea-ice coupling interface*

**Enter TEXT:**

#### 1.6.2.6 Land Ocean Interface

*Describe if/how heat is conserved at the land/ocean coupling interface*

**Enter TEXT:**

### 1.6.3 Fresh Water

*Global fresh water convervation properties of the model*

#### 1.6.3.1 Global *

*Describe if/how fresh_water is conserved globally*

**Enter TEXT:**

#### 1.6.3.2 Atmos Ocean Interface

*Describe if/how fresh_water is conserved at the atmosphere/ocean coupling interface*

**Enter TEXT:**

#### 1.6.3.3 Atmos Land Interface *

*Describe if/how fresh water is conserved at the atmosphere/land coupling interface*

**Enter TEXT:**

#### 1.6.3.4 Atmos Sea-ice Interface

*Describe if/how fresh water is conserved at the atmosphere/sea-ice coupling interface*

**Enter TEXT:**

#### 1.6.3.5 Ocean Seaice Interface

*Describe if/how fresh water is conserved at the ocean/sea-ice coupling interface*

**Enter TEXT:**

#### 1.6.3.6 Runoff

*Describe how runoff is distributed and conserved*

**Enter TEXT:**

#### 1.6.3.7 Iceberg Calving

*Describe if/how iceberg calving is modeled and conserved*

**Enter TEXT:**

#### 1.6.3.8 Endoreic Basins

*Describe if/how endoreic basins (no ocean access) are treated*

**Enter TEXT:**

#### 1.6.3.9 Snow Accumulation

*Describe how snow accumulation over land and over sea-ice is treated*

**Enter TEXT:**

### 1.6.4 Salt

*Global salt convervation properties of the model*

#### 1.6.4.1 Ocean Seaice Interface

*Describe if/how salt is conserved at the ocean/sea-ice coupling interface*

**Enter TEXT:**

### 1.6.5 Momentum

*Global momentum convervation properties of the model*

#### 1.6.5.1 Details

*Describe if/how momentum is conserved in the model*

**Enter TEXT:**

# 2 Radiative Forcings

*Radiative forcings of the model for historical and scenario (aka Table 12.1 IPCC AR5)*

## 2.1.1 Top level properties

*Radiative forcings of the model for historical and scenario (aka Table 12.1 IPCC AR5)*

### 2.1.1.1 Name

*Commonly used name for the radiative forcings in toplevel model.*

**Enter TEXT:**

### 2.1.1.2 Overview

*Overview of radiative forcings of the model for historical and scenario (aka table 12.1 ipcc ar5) in toplevel model.*

**Enter TEXT:**

## 2.1.2 CO2

*Carbon dioxide forcing*

### 2.1.2.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

### 2.1.2.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

## 2.1.3 CH4

*Methane forcing*

#### 2.1.3.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.3.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.4 N2O

*Nitrous oxide forcing*

#### 2.1.4.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.4.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

## 2.1.5 Tropospheric O3

*Troposheric ozone forcing*

### 2.1.5.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

### 2.1.5.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

## 2.1.6 Stratospheric O3

*Stratospheric ozone forcing*

### 2.1.6.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.6.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.7 CFC

*Ozone-depleting and non-ozone-depleting fluorinated gases forcing*

#### 2.1.7.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.7.2 Equivalence Concentration *

*Details of any equivalence concentrations used*

**Select SINGLE option:**

☐ N/A - Not applicabale (CFCs not included or emissions and concentrations determined by the model state)

☐ Option 1 - CFCs, including CFC-12, are provided as actual concentrations

☐ Option 2 - CFC-12 is provided as actual concentrations and any other gases are provided as an equivalence concentration of CFC-11

☐ Option 3 - Ozone depleting gases, including CFC-12, are provided as an equivalence concentration of CFC-12 and all other fluorinated gases are provided as an equivalence concentration of HFC-134a

☐ Other - please specify:

#### 2.1.7.3 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

## 2.1.8 SO4

*SO4 aerosol forcing*

### 2.1.8.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

### 2.1.8.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

## 2.1.9 Black Carbon

*Black carbon aerosol forcing*

### 2.1.9.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.9.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

## 2.1.10 Organic Carbon

*Organic carbon aerosol forcing*

#### 2.1.10.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.10.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

## 2.1.11 Nitrate

*Nitrate forcing*

#### 2.1.11.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.11.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.12 Cloud Albedo Effect

*Cloud albedo effect forcing (RFaci)*

#### 2.1.12.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.12.2 Aerosol Effect On Ice Clouds *

*Radiative effects of aerosols on ice clouds are represented?*

**Select either TRUE or FALSE:**

☐ True ☐ False

#### 2.1.12.3 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.13 Cloud Lifetime Effect

*Cloud lifetime effect forcing (ERFaci)*

#### 2.1.13.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.13.2 Aerosol Effect On Ice Clouds *

*Radiative effects of aerosols on ice clouds are represented?*

**Select either TRUE or FALSE:**

☐ True ☐ False

#### 2.1.13.3 RFaci From Sulfate Only *

*Radiative forcing from aerosol cloud interactions from sulfate aerosol only?*

**Select either TRUE or FALSE:**

☐ True ☐ False

#### 2.1.13.4 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.14 Dust

*Dust forcing*

#### 2.1.14.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.14.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.15 Tropospheric Volcanic

*Tropospheric volcanic forcing*

#### 2.1.15.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.15.2 Historical Explosive Volcanic Aerosol Implementation *

*How explosive volcanic aerosol is implemented in historical simulations*

**Select SINGLE option:**

☐ Type A - Explosive volcanic aerosol returns rapidly to zero (or near-zero) background.

☐ Type B - Explosive volcanic aerosol returns rapidly to constant (average volcano)

☐ Type C - Explosive volcanic aerosol returns slowly (over several decades) to constant (average volcano) background.

☐ Type D - Explosive volcanic aerosol set to zero

☐ Type E - Explosive volcanic aerosol set to constant (average volcano) background

☐ Other - please specify:

#### 2.1.15.3 Future Explosive Volcanic Aerosol Implementation *

*How explosive volcanic aerosol is implemented in future simulations*

**Select SINGLE option:**

☐ Type A - Explosive volcanic aerosol returns rapidly to zero (or near-zero) background.

☐ Type B - Explosive volcanic aerosol returns rapidly to constant (average volcano)

☐ Type C - Explosive volcanic aerosol returns slowly (over several decades) to constant (average volcano) background.

☐ Type D - Explosive volcanic aerosol set to zero

☐ Type E - Explosive volcanic aerosol set to constant (average volcano) background

☐ Other - please specify:

#### 2.1.15.4 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.16 Stratospheric Volcanic

*Stratospheric volcanic forcing*

#### 2.1.16.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.16.2 Historical Explosive Volcanic Aerosol Implementation *

*How explosive volcanic aerosol is implemented in historical simulations*

**Select SINGLE option:**

☐ Type A - Explosive volcanic aerosol returns rapidly to zero (or near-zero) background.

☐ Type B - Explosive volcanic aerosol returns rapidly to constant (average volcano)

☐ Type C - Explosive volcanic aerosol returns slowly (over several decades) to constant (average volcano) background.

☐ Type D - Explosive volcanic aerosol set to zero

☐ Type E - Explosive volcanic aerosol set to constant (average volcano) background

☐ Other - please specify:

#### 2.1.16.3 Future Explosive Volcanic Aerosol Implementation *

*How explosive volcanic aerosol is implemented in future simulations*

**Select SINGLE option:**

☐ Type A - Explosive volcanic aerosol returns rapidly to zero (or near-zero) background.

☐ Type B - Explosive volcanic aerosol returns rapidly to constant (average volcano)

☐ Type C - Explosive volcanic aerosol returns slowly (over several decades) to constant (average volcano) background.

☐ Type D - Explosive volcanic aerosol set to zero

☐ Type E - Explosive volcanic aerosol set to constant (average volcano) background

☐ Other - please specify:

#### 2.1.16.4 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.17 Sea Salt

*Sea salt forcing*

#### 2.1.17.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.17.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.18 Land Use

*Land use forcing*

#### 2.1.18.1 Provision *

*How this forcing agent is provided (e.g. via concentrations, emission precursors, prognostically derived, etc.)*

**Select MULTIPLE options:**

☐ N/A - Not applicable - forcing agent is not included

☐ M - Emissions and concentrations determined by the model state rather than externally prescribed

☐ Y - Prescribed concentrations, distributions or time series data

☐ E - Concentrations calculated interactively driven by prescribed emissions or precursor emissions

☐ ES - Surface emissions (and 3-D concentrations away from the surface) derived via the model from the prescribed surface concentration

☐ C - Fixed prescribed climatology of concentrations with no year-to-year variability

☐ Other - please specify:

#### 2.1.18.2 Crop Change Only *

*Land use change represented via crop change only?*

**Select either TRUE or FALSE:**

☐ True ☐ False

#### 2.1.18.3 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**

### 2.1.19 Solar

*Solar forcing*

#### 2.1.19.1 Provision *

*How solar forcing is provided*

**Select MULTIPLE options:**

- ☐ N/A - Not applicable - solar forcing is not included
- ☐ Irradiance - Solar irradiance forcing
- ☐ Proton - Proton pathway to solar forcing
- ☐ Electron - Electron pathway to solar forcing
- ☐ Cosmic ray - Cosmic ray pathway to solar forcing
- ☐ Other - please specify:

#### 2.1.19.2 Additional Information

*Additional information relating to the provision and implementation of this forcing agent (e.g. citations, use of non-standard datasets, explaining how multiple provisions are used, etc.).*

**Enter TEXT:**