CMIP6 Model Documentation

Institute: DWD

Model: MPI-ESM-1-2-HR

Topic: Aerosol

Doc. Generated: 2018-02-12

Doc. Seeded From: N/A

Specialization Version: 0.2.0

Further Info: https://es-doc.org/cmip6

https://specializations.es-doc.org/cmip6

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1 Key Properties

Key properties of the aerosol model

1.1 Key Properties

Key properties of the aerosol model

1.1.1 Model Overview

 $Overview\ of\ aerosol\ model.$

```
{\bf Spec.}\  \  {\bf ID:}\  \  {\bf cmip 6. aerosol. } key\_properties.model\_overview
```

Is Required ? TRUE

Enter TEXT value:

1.1.2 Model Name

 $Name\ of\ aerosol\ model\ code$

```
Spec. ID: cmip6.aerosol.key_properties.model_name
```

Is Required ? TRUE

Enter TEXT value:

1.1.3 Scheme Scope

Atmospheric domains covered by the aerosol model

```
Spec. ID: cmip6.aerosol.key_properties.scheme_scope
Is Required ? TRUE
Select value(s):

Troposhere
```

☐ Mesosphere

Mesosphere Mesosphere

Whole atmosphere

Stratosphere

Other - please specify:

1.1.4 Basic Approximations

 $Basic\ approximations\ made\ in\ the\ aerosol\ model$

 ${\bf Spec.~ID:}~cmip 6. aerosol. key_properties. basic_approximations$

Is Required ? TRUE

1.1.5 Prognostic Variables Form

 $Prognostic\ variables\ in\ the\ aerosol\ model$

Spec. ID: cmip6.aerosol.key_properties.prognostic_variables_form
Is Required ? TRUE
Select value(s):
3D mass/volume ratio for aerosols
3D number concentration for aerosols
Other - please specify:
1.1.6 Number Of Tracers
Number of tracers in the aerosol model
${\bf Spec.~ID:}~cmip 6. aerosol. key_properties.number_of_tracers$
Is Required ? TRUE
Enter INTEGER value:
1.1.7 Family Approach Are aerosol calculations generalized into families of speciesxxx? Spec. ID: cmip6.aerosol.key_properties.family_approach
Is Required ? TRUE
Select value:
☐ True ☐ False
1.2 Software Properties
Software properties of aerosol code
1.2.1 Repository
Location of code for this component.
${\bf Spec.~ID:}~{\bf cmip 6. aerosol. key_properties. software_properties. repository$
Is Required ? FALSE
Enter TEXT value:
1.2.2 Code Version Code version identifier. Spec. ID: cmip6.aerosol.key_properties.software_properties.code_version
<u> </u>

```
Is Required ? FALSE
```

Enter TEXT value:

1.2.3 Code Languages

```
Code\ language(s).
```

```
{\bf Spec.~ID:}~cmip 6. aerosol. key\_properties. software\_properties. code\_languages
```

Is Required ? FALSE

Enter TEXT value(s):

1.3 Timestep Framework

Physical properties of seawater in ocean

1.3.1 Method

Mathematical method deployed to solve the time evolution of the prognostic variables

 ${\bf Spec.~ID:}~cmip 6. aerosol. key_properties. timestep_framework. method$

Is Required ? TRUE

Select	value

Uses atmospheric chemistry time stepping
Specific timestepping (operator splitting)
Specific timestepping (integrated)
Other - please specify:

1.3.2 Split Operator Advection Timestep

Timestep for aerosol advection (in seconds)

 $\textbf{Spec. ID:} cmip6.aerosol.key_properties.timestep_framework.split_operator_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framework.split_advection_timestep_framewo$

Is Required ? FALSE

Enter INTEGER value:

1.3.3 Split Operator Physical Timestep

 $Timestep\ for\ aerosol\ physics\ (in\ seconds).$

 $\textbf{Spec. ID:} \ cmip 6. aerosol. key_properties. timestep_framework. split_operator_physical_timestep_framework. split_operator_physical_timestep_framewo$

Is Required ? FALSE

Enter INTEGER value:

1.3.4 Integrated Timestep

Timestep for the aerosol model (in seconds)

 ${\bf Spec.~ID:}~cmip 6. aerosol. key_properties. timestep_framework. integrated_timestep_framework. Integrated_timestep_fram$

Is Required ? TRUE

Enter INTEGER value:

1.3.5 Integrated Scheme Type

 $Specify\ the\ type\ of\ timestep\ scheme$

1.4 Meteorological Forcings

Other - please specify:

1.4.1 Variables 3D

Three dimensionsal forcing variables, e.g. U, V, W, T, Q, P, conventive mass flux

Spec. ID: cmip6.aerosol.key_properties.meteorological_forcings.variables_3d

Is Required ? FALSE

Enter TEXT value:

1.4.2 Variables 2D

Two dimensionsal forcing variables, e.g. land-sea mask definition

 ${\bf Spec.}\ \ {\bf ID:}\ cmip 6. aerosol. key_properties. meteorological_forcings. variables_2d$

Is Required ? FALSE

1.4.3 Frequency

Frequency with which meteological forcings are applied (in seconds).

 ${\bf Spec.\ ID:}\ cmip 6. aerosol. key_properties. meteorological_forcings. frequency$

Is Required ? FALSE

Enter INTEGER value:

1.5 Resolution

Resolution in the aersosol model grid

1.5.1 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.aerosol.key properties.resolution.name

Is Required ? TRUE

Enter TEXT value:

1.5.2 Canonical Horizontal Resolution

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

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

Is Required ? FALSE

Enter TEXT value:

1.5.3 Number Of Horizontal Gridpoints

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

 ${\bf Spec.~ID:}~cmip 6. aerosol. key_properties. resolution. number_of_horizontal_gridpoints$

Is Required ? FALSE

Enter INTEGER value:

1.5.4 Number Of Vertical Levels

Number of vertical levels resolved on computational grid.

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

Is Required ? FALSE

Enter INTEGER value:

1.5.5 Is Adaptive Grid

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

 ${\bf Spec.~ID:}~cmip 6. aerosol. key_properties. resolution. is_adaptive_grid$

Is Required ? F.	ALSE	
Select value:		
True		False

1.6 Tuning Applied

Tuning methodology for aerosol model

1.6.1 Description

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

 ${\bf Spec.\ ID:}\ cmip 6. aerosol. key_properties. tuning_applied. description$

Is Required ? TRUE

Enter TEXT value:

1.6.2 Global Mean Metrics Used

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

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

Is Required ? FALSE

Enter TEXT value(s):

1.6.3 Regional Metrics Used

List of regional metrics of mean state used in tuning model/component

 ${\bf Spec.}\ \ {\bf ID:}\ cmip 6. aerosol. key_properties. tuning_applied. regional_metrics_used$

Is Required ? FALSE

Enter TEXT value(s):

1.6.4 Trend Metrics Used

 $List\ observed\ trend\ metrics\ used\ in\ tuning\ model/component$

 ${\bf Spec.~ID:}~cmip 6. aerosol. key_properties. tuning_applied. trend_metrics_used$

Is Required ? FALSE

2 Grid

 $Aerosol\ grid$

3 Transport

 $Aerosol\ transport$

3.1 Transport

 $Aerosol\ transport$

3.1.1 Overview

Overview of transport in atmosperic aerosol model

 $\mathbf{Spec.} \ \mathbf{ID:} \ \mathrm{cmip} 6. \mathrm{aerosol.transport.overview}$

Is Required ? TRUE

Enter TEXT value:

3.1.2 Scheme

 $Method\ for\ aerosol\ transport\ modeling$

Spec. ID: cmip6.aerosol.transport.scheme

Is Required ? TRUE

Sel	lect	val	عندا
O.E.	Lec L	va.	ıue

Uses Atmospheric chemistry transport scheme
Specific transport scheme (eulerian)
Specific transport scheme (semi-lagrangian)
Specific transport scheme (eulerian and semi-lagrangian

Specific transport scheme (lagrangian)

3.1.3 Mass Conservation Scheme

Method used to ensure mass conservation.

Other - please specify:

 ${\bf Spec.}\ {\bf ID:}\ cmip 6. aerosol. transport. mass_conservation_scheme$

Is Required ? TRUE

Select value(s):

Select value(s):		
	Uses Atmospheric chemistry transport scheme	
	Mass adjustment	
	Concentrations positivity	
	Gradients monotonicity	

3.1.4 Convention

 $Transport\ by\ convention$

Spec. ID: cmip6.aerosol.transport.convention		
Is Required ? TRUE		
Select value(s):		
	Uses Atmospheric chemistry transport scheme	
	Convective fluxes connected to tracers	
	Vertical velocities connected to tracers	
	Other - please specify:	

4 Emissions

Atmospheric aerosol emissions

4.1 Emissions

 $Atmospheric\ aerosol\ emissions$

4.1.1 Overview

 $Overview\ of\ emissions\ in\ atmosperic\ aerosol\ model$

Spec. ID: cmip6.aerosol.emissions.overview

Is Required ? TRUE

Enter TEXT value:

4.1.2 Method

 $Method\ used\ to\ define\ aerosol\ species\ (several\ methods\ allowed\ because\ the\ different\ species\ may\ not\ use\ the\ same\ method).$

Spec	. ID: cmipo.aerosoi.emissions.metnod	
Is Required ? TRUE		
Selec	t value(s):	
	None	
	Prescribed (climatology)	
	Prescribed CMIP6	
	Prescribed above surface	
	Interactive	
	Interactive above surface	
	Other - please specify:	
4.1.3	Sources	
Sources o	f the aerosol species are taken into account in the emissions scheme	
Spec	. ID: cmip6.aerosol.emissions.sources	
Is Re	equired ? FALSE	
Selec	t value(s):	
	Vegetation	
	Volcanos	
	Bare ground	

	Sea surface
	Lightning
	Fires
	Aircraft
	Anthropogenic
	Other - please specify:
4.1.4	Prescribed Climatology
Specify the	e climatology type for aerosol emissions
Spec.	$\textbf{ID:} \ cmip 6. aerosol. emissions. prescribed_climatology$
Is Re	quired ? FALSE
Selec	t value:
	Constant
	Interannual
	Annual
	Monthly
	Daily
4.1.5	Prescribed Climatology Emitted Species
List of ae	rosol species emitted and prescribed via a climatology
Spec.	${\bf ID: cmip 6. aerosol. emissions. prescribed_climatology_emitted_species}$
Is Re	quired ? FALSE
Enter	TEXT value:
4.1.6	Prescribed Spatially Uniform Emitted Species
List of ae	rosol species emitted and prescribed as spatially uniform
Spec.	$\textbf{ID:} \ cmip 6. aerosol. emissions. prescribed_spatially_uniform_emitted_species$
Is Re	quired ? FALSE
Enter	TEXT value:
4.1.7	Interactive Emitted Species
List of ae	rosol species emitted and specified via an interactive method
Spec.	${\bf ID:}\ cmip 6. aerosol. emissions. interactive_emitted_species$
Is Re	quired ? FALSE

Enter TEXT value:

4.1.8 Other Emitted Species

 $List\ of\ aerosol\ species\ emitted\ and\ specified\ via\ an\ other\ method$

 ${\bf Spec.~ID:}~cmip 6. aerosol. emissions. other_emitted_species$

Is Required ? FALSE

Enter TEXT value:

4.1.9 Other Method Characteristics

Characteristics of the other method used for aerosol emissions

 ${\bf Spec.~ID:}~cmip 6. aerosol. emissions. other_method_characteristics$

Is Required ? FALSE

5 Concentrations

Atmospheric aerosol concentrations

5.1 Concentrations

Atmospheric aerosol concentrations

5.1.1 Overview

Overview of concentrations in atmosperic aerosol model

Spec. ID: cmip6.aerosol.concentrations.overview

Is Required ? TRUE

Enter TEXT value:

5.1.2 Prescribed Lower Boundary

List of species prescribed at the lower boundary.

Spec. ID: cmip6.aerosol.concentrations.prescribed_lower_boundary

Is Required ? FALSE

Enter TEXT value:

5.1.3 Prescribed Upper Boundary

List of species prescribed at the upper boundary.

 ${\bf Spec.\ ID:}\ cmip 6. aerosol. concentrations. prescribed _upper_boundary$

Is Required ? FALSE

Enter TEXT value:

5.1.4 Prescribed Fields Mmr

 $List\ of\ species\ prescribed\ as\ mass\ mixing\ ratios.$

 ${\bf Spec.~ID:}~cmip 6. aerosol. concentrations. prescribed_fields_mmr$

Is Required ? FALSE

Enter TEXT value:

5.1.5 Prescribed Fields Mmr

List of species prescribed as AOD plus CCNs.

Spec. ID: cmip6.aerosol.concentrations.prescribed_fields_mmr

Is Required ? FALSE

6 Optical Radiative Properties

Aerosol optical and radiative properties

6.1 Optical Radiative Properties

Aerosol optical and radiative properties

6.1.1 Overview

Overview of optical and radiative properties

Spec. ID: cmip6.aerosol.optical_radiative_properties.overview

Is Required ? TRUE

Enter TEXT value:

6.2 Absorption

Absortion properties in aerosol scheme

6.2.1 Black Carbon

 $Absorption\ mass\ coefficient\ of\ black\ carbon\ at\ 550nm\ (if\ non-absorbing\ enter\ 0)$

 ${\bf Spec.\ ID:}\ cmip 6. aerosol. optical_radiative_properties. absorption. black_carbon$

Is Required ? FALSE

Enter FLOAT value:

6.2.2 Dust

Absorption mass coefficient of dust at 550nm (if non-absorbing enter 0)

 ${\bf Spec.\ ID:}\ cmip 6. aerosol. optical_radiative_properties. absorption. dust$

Is Required ? FALSE

Enter FLOAT value:

6.2.3 Organics

 $Absorption\ mass\ coefficient\ of\ organics\ at\ 550nm\ (if\ non-absorbing\ enter\ 0)$

 ${\bf Spec.}\ {\bf ID:}\ cmip 6. aerosol. optical_radiative_properties. absorption. organics$

Is Required ? FALSE

Enter FLOAT value:

6.3 Mixtures

6.3.1 External
Is there external mixing with respect to chemical compositionxxx?
${\bf Spec.~ID:}~cmip 6. aerosol. optical_radiative_properties. mixtures. external$
Is Required ? TRUE
Select value:
☐ True ☐ False
6.3.2 Internal
Is there internal mixing with respect to chemical compositionxxx?
${\bf Spec.\ ID:}\ cmip 6. aerosol. optical_radiative_properties. mixtures. internal$
Is Required ? TRUE
Select value:
☐ True ☐ False
6.3.3 Mixing Rule If there is internal mixing with respect to chemical composition then indicate the mixing rule Spec. ID: cmip6.aerosol.optical_radiative_properties.mixtures.mixing_rule Is Required ? FALSE
Is Required ? FALSE
Enter TEXT value:
6.4 Impact Of H2o
6.4.1 Size
Does H2O impact sizexxx?
Spec. ID: cmip6.aerosol.optical_radiative_properties.impact_of_h2o.size
Is Required ? TRUE
Select value:
☐ True ☐ False
6.4.2 Internal Mixture Does H2O impact internal mixturexxx? Spec. ID: cmip6.aerosol.optical radiative properties.impact of h2o.internal mixture

Is Required ? $\ensuremath{\mathsf{TRUE}}$

Select value: _____ True _____ False

6.5 Radiative Scheme

 $Radiative\ scheme\ for\ aerosol$

6.5.1 Overview

 $Overview\ of\ radiative\ scheme$

 ${\bf Spec.}\ \ {\bf ID:}\ cmip 6. aerosol. optical_radiative_properties. radiative_scheme. overview$

Is Required ? TRUE

Enter TEXT value:

6.5.2 Shortwave Bands

Number of shortwave bands

 ${\bf Spec.~ID:}~cmip 6. aerosol. optical_radiative_properties. radiative_scheme. shortwave_bands$

Is Required ? TRUE

Enter INTEGER value:

6.5.3 Longwave Bands

Number of longwave bands

 $\mathbf{Spec.}\ \mathbf{ID:}\ cmip 6. aerosol. optical_radiative_properties. radiative_scheme. longwave_bands$

Is Required ? TRUE

Enter INTEGER value:

6.6 Cloud Interactions

Aerosol-cloud interactions

6.6.1 Overview

Overview of aerosol-cloud interactions

Spec. ID: cmip6.aerosol.optical_radiative_properties.cloud_interactions.overview

Is Required ? TRUE

Enter TEXT value:

6.6.2 Twomey

Is the Twomey effect includedxxx?

 ${\bf Spec.}\ \ {\bf ID:}\ cmip 6. aerosol. optical_radiative_properties. cloud_interactions. two mey$

Is Required ? TRUE
Select value:
☐ True ☐ False
6.6.3 Twomey Minimum Ccn
If the Twomey effect is included, then what is the minimum CCN numberxxx?
${\bf Spec.\ ID:\ cmip 6. aerosol.optical_radiative_properties.cloud_interactions.two mey_minimum_ccreations.two mey_minimum_ccrea$
Is Required ? FALSE
Enter INTEGER value:
6.6.4 Drizzle Does the scheme affect drizzlexxx?
Spec. ID: cmip6.aerosol.optical_radiative_properties.cloud_interactions.drizzle
Is Required ? TRUE
Select value:
☐ True ☐ False
6.6.5 Cloud Lifetime
Does the scheme affect cloud lifetimexxx?
${\bf Spec.~ID:}~cmip 6. a erosol. optical_radiative_properties. cloud_interactions. cloud_lifetime$
Is Required ? TRUE
Select value:
☐ True ☐ False
6.6.6 Longwave Bands
Number of longwave bands
${\bf Spec.}\ \ {\bf ID:}\ cmip 6. aerosol. optical_radiative_properties. cloud_interactions. longwave_bands$
Is Required ? TRUE
Enter INTEGER value:

7 Model

 $Aerosol\ model$

7.1 Model

 $Aerosol\ model$

7.1.1 Overview

 $Overview\ of\ atmosperic\ aerosol\ model$

Spec. ID: cmip6.aerosol.model.overview

Is Required ? TRUE

Enter TEXT value:

7.1.2 Processes

Processes included in the Aerosol model.

Spec. ID: cmip6.aerosol.model.processes

Is Required? TRUE

Select value(s):

Dry deposition

Sedimentation

Wet deposition (impaction scavenging)

☐ Wet deposition (nucleation scavenging)☐ Coagulation

Oxidation (gas phase)

Oxidation (in cloud)
Condensation

Ageing
Advection (horizontal)
Advection (vertical)

Heterogeneous chemistry

Nucleation

7.1.3 Coupling

 $Other\ model\ components\ coupled\ to\ the\ Aerosol\ model$

Is Required? FALSE Select value(s): Radiation Land surface Heterogeneous chemistry Clouds Ocean Cryosphere Gas phase chemistry Other - please specify: 7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required? TRUE Select value(s): DMS SO2 Ammonia Iodine Terpene Isoprene VOC NOx Other - please specify:	Spec.	ID: cmip6.aerosol.model.coupling	
□ Radiation □ Land surface □ Heterogeneous chemistry □ Clouds □ Ocean □ Cryosphere □ Gas phase chemistry □ Other - please specify: 7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required? TRUE Select value(s): □ DMS □ SO2 □ Ammonia □ Iodine □ Terpene □ Isoprene □ VOC □ NOx	Is Re	quired ? FALSE	
□ Land surface □ Heterogeneous chemistry □ Clouds □ Ocean □ Cryosphere □ Gas phase chemistry □ Other - please specify: 7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required? TRUE Select value(s): □ DMS □ SO2 □ Ammonia □ Iodine □ Terpene □ Isoprene □ VOC □ NOx	Select	t value(s):	
Heterogeneous chemistry		Radiation	
□ Clouds □ Ocean □ Cryosphere □ Gas phase chemistry □ Other - please specify: 7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required? TRUE Select value(s): □ DMS □ SO2 □ Ammonia □ Iodine □ Terpene □ Isoprene □ VOC □ NOx		Land surface	
□ Cryosphere □ Gas phase chemistry □ Other - please specify: 7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required? TRUE Select value(s): □ DMS □ SO2 □ Ammonia □ Iodine □ Terpene □ Isoprene □ VOC □ NOx		Heterogeneous chemistry	
☐ Cryosphere ☐ Gas phase chemistry ☐ Other - please specify: 7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required? TRUE Select value(s): ☐ DMS ☐ SO2 ☐ Ammonia ☐ Isoprene ☐ VOC ☐ NOx		Clouds	
Gas phase chemistry Other - please specify: 7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required ? TRUE Select value(s): DMS SO2 Ammonia Iodine Terpene Isoprene VOC NOx		Ocean	
Other - please specify: 7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required ? TRUE Select value(s): DMS SO2 Ammonia Iodine Terpene Isoprene VOC NOx		Cryosphere	
7.1.4 Gas Phase Precursors List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required? TRUE Select value(s): DMS SO2 Ammonia Iodine Terpene Isoprene VOC NOx		Gas phase chemistry	
List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required ? TRUE Select value(s): DMS SO2 Ammonia Iodine Terpene Isoprene VOC NOx		Other - please specify:	
□ SO2 □ Ammonia □ Iodine □ Terpene □ Isoprene □ VOC □ NOx	List of gas phase aerosol precursors. Spec. ID: cmip6.aerosol.model.gas_phase_precursors Is Required ? TRUE Select value(s):		
Ammonia Iodine Terpene Isoprene VOC NOx			
☐ Iodine ☐ Terpene ☐ Isoprene ☐ VOC ☐ NOx			
☐ Terpene ☐ Isoprene ☐ VOC ☐ NOx			
□ VOC □ NOx		Terpene	
□ NOx		Isoprene	
		VOC	
Other - please specify:		NOx	
		Other - please specify:	

7.1.5 Scheme Type

Type(s) of aerosol scheme used by the aerosols model (potentially multiple: some species may be covered by one type of aerosol scheme and other species covered by another type).

Spec.	$\textbf{ID:} \ cmip 6. aerosol. model. scheme_type$
Is Re	quired ? TRUE
Select	t value(s):
	Bulk
	Modal
	Bin
	Other - please specify:
71 <i>C</i> I	Dulle Cahama Chaoisa
	Bulk Scheme Species scies covered by the bulk scheme.
	ID: cmip6.aerosol.model.bulk_scheme_species
Is Required ? TRUE	
Select	t value(s):
	Sulphate
	Nitrate
	Sea salt
	Dust
	Ice
	Organic
	Black carbon / soot
	SOA (secondary organic aerosols)
	POM (particulate organic matter)
	Polar stratospheric ice
	NAT (Nitric acid trihydrate)
	NAD (Nitric acid dihydrate)
	STS (supercooled ternary solution aerosol particule)
	Other - please specify: