CMIP6 Model Documentation

Institute:	NOAA-GFDL
Model:	GFDL-ESM4
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Note:	* indicates a required property

Documentation Contents

1 Key Properties

Land ice key properties

1.1 Key Properties

Land ice key properties

1.1.1 Name *

Name of landice model code

Enter TEXT:

1.1.2 Keywords *

Keywords associated with landice model code

Enter COMMA SEPERATED list:

1.1.3 Overview *

Overview of landice model.

Enter TEXT:

1.1.4 Ice Albedo *

Specify how ice albedo is modelled

Select MULTIPLE options:

- ☐ Prescribed
- ☐ Function of ice age
- ☐ Function of ice density
- ☐ Other - please specify:

1.1.5 Atmospheric Coupling Variables *

Which variables are passed between the atmosphere and ice (e.g. orography, ice mass)

Enter COMMA SEPERATED list:

1.1.6 Oceanic Coupling Variables *

Which variables are passed between the ocean and ice

Enter COMMA SEPERATED list:

1.1.7 Prognostic Variables *

Which variables are prognostically calculated in the ice model

Select MULTIPLE options:

- ☐ Ice velocity
- ☐ Ice thickness
- ☐ Ice temperature
- ☐ Other - please specify:

1.2 Software Properties

Software properties of land ice code

1.2.1 Repository

Location of code for this component.

Enter TEXT:

1.2.2 Code Version

Code version identifier.

Enter TEXT:

1.2.3 Code Languages

Code language(s).

Enter COMMA SEPERATED list:

2 Grid

Land ice grid

2.1 Grid

Land ice grid

2.1.1 Name

Name of grid in landice model.

Enter TEXT:

2.1.2 Overview

Overview of grid in landice model.

Enter TEXT:

2.1.3 Adaptive Grid *

Is an adative grid being used?

Select either TRUE or FALSE:

☐ True ☐ False

2.1.4 Base Resolution *

The base resolution (in metres), before any adaption

Enter FLOAT value:

2.1.5 Resolution Limit

If an adaptive grid is being used, what is the limit of the resolution (in metres)

Enter FLOAT value:

2.1.6 Projection *

The projection of the land ice grid (e.g. albers_equal_area)

Enter TEXT:

3 Glaciers

Land ice glaciers

3.1 Glaciers

Land ice glaciers

3.1.1 Name

Commonly used name for the glaciers in landice model.

Enter TEXT:

3.1.2 Overview

Overview of land ice glaciers in landice model.

Enter TEXT:

3.1.3 Description *

Describe the treatment of glaciers, if any

Enter TEXT:

3.1.4 Dynamic Areal Extent

Does the model include a dynamic glacial extent?

Select either TRUE or FALSE:

☐ True ☐ False

4 Ice

Ice sheet and ice shelf

4.1 Ice

Ice sheet and ice shelf

4.1.1 Name

Commonly used name for the ice in landice model.

Enter TEXT:

4.1.2 Overview

Overview of ice sheet and ice shelf in landice model.

Enter TEXT:

4.1.3 Grounding Line Method *

Specify the technique used for modelling the grounding line in the ice sheet-ice shelf coupling

Select SINGLE option:

- ☐ Grounding line prescribed
- ☐ Flux prescribed (Schoof)
- ☐ Fixed grid size
- ☐ Moving grid
- ☐ Other - please specify:

4.1.4 Ice Sheet *

Are ice sheets simulated?

Select either TRUE or FALSE:

☐ True ☐ False

4.1.5 Ice Shelf *

Are ice shelves simulated?

Select either TRUE or FALSE:

☐ True ☐ False

4.2 Mass Balance

Description of the surface mass balance treatment

4.2.1 Overview

Overview of description of the surface mass balance treatment in landice model.

Enter TEXT:

4.2.2 Surface Mass Balance *

Describe how and where the surface mass balance (SMB) is calulated. Include the temporal coupling frequeny from the atmosphere, whether or not a seperate SMB model is used, and if so details of this model, such as its resolution

Enter TEXT:

4.3 Basal

Description of basal melting

4.3.1 Bedrock

Describe the implementation of basal melting over bedrock

Enter TEXT:

4.3.2 Ocean

Describe the implementation of basal melting over the ocean

Enter TEXT:

4.4 Frontal

Description of claving/melting from the ice shelf front

4.4.1 Calving

Describe the implementation of calving from the front of the ice shelf

Enter TEXT:

4.4.2 Melting

Describe the implementation of melting from the front of the ice shelf

Enter TEXT:

4.5 Dynamics

4.5.1 Overview

Overview of in landice model.

Enter TEXT:

4.5.2 Description *

General description of ice sheet and ice shelf dynamics

Enter TEXT:

4.5.3 Approximation *

Approximation type used in modelling ice dynamics

Select MULTIPLE options:

- ☐ SIA
- ☐ SAA
- ☐ Full stokes
- ☐ Other - please specify:

4.5.4 Adaptive Timestep *

Is there an adaptive time scheme for the ice scheme?

Select either TRUE or FALSE:

☐ True ☐ False

4.5.5 Timestep *

Timestep (in seconds) of the ice scheme. If the timestep is adaptive, then state a representative timestep.

Enter INTEGER value: