

Interactive comment on “Description of the Earth system model of intermediate complexity LOVECLIM version 1.2” by H. Goosse et al.

F. SAITO (Referee)

saitofuyuki@jamstec.go.jp

Received and published: 5 July 2010

This paper describes the structure and performance of LOVECLIM 1.2, which is an earth system model of intermediate complexity. The model includes Atmosphere, Ocean, Carbon cycles, Vegetation and Ice-sheet components, and the main characteristics of the components as well as coupling design among them are clearly described.

There are a few minor suggestion to be included in the revision, mainly relating to ice-sheet modeling.

There are some experiments using ‘uncoupled mode’ of ice sheet component. I think you need to explain how ice-sheet (or other component) is managed in the uncoupled mode. I assumed that the uncoupled ice sheet means constant ice-sheet topography

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and variable water flux from ice sheet depending on the snowfall (to keep the balance of ice sheet mass), but there are several possibilities.

Similarly, you explain the iceberg model, which is not activated in the present paper. I wonder how calving is treated in the ice sheet model when not activated.

I agree your description in P341, as ‘Land cover changes over Antarctica are not expected for most periods’ being studied. However, I wonder how you manage changes in the bed topography of the ocean when an ice shelf grounded or ice sheet floated during your simulation.

Very minor points.

Table 5. Some units are represented by ‘year’. What is the definition of the ‘year’? Usually an ice sheet model use 31556926 seconds as 1 year, but using this value may cause inconsistency with other model components. I do not think the difference in the definition of ‘year’ is significant (as long as you use the perturbation method to couple with the ice-sheet), but I think it good to mention.

Fig 7. Greenland figure. Lengths of distance in the X and Y direction are different. They should be identical.

Fig 7. surface elevation at the present?

Fig 7. What is the definition of ice-free area? The white regions seem to be ice-covered area.

References P361L26 Sato F is Saito F (forgive me for very minor point, but this is myself so I cannot skip it).

Interactive comment on Geosci. Model Dev. Discuss., 3, 309, 2010.

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