Geophysical Research Abstracts
Vol. 12, EGU2010-12632, 2010
EGU General Assembly 2010

Transient simulation of the last inception (128 to 115ka BP) with a coupled climate – cryosphere model

Didier M. Roche (1,2), Christophe Dumas (1), Catherine Ritz (3), and Hugues Goosse (4)

(1) Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL), CEA/INSU-CNRS/UVSQ, C.E. de Saclay, Orme des Merisiers Bat. 701, 91190 Gif sur Yvette Cedex, France (didier.roche@lsce.ipsl.fr), (2) Section Climate Change and Landscape Dynamics, Department of Earth Sciences, Vrije Universiteit Amsterdam, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands, (3) Laboratoire de Glaciologie de Grenoble (LGGE), 54, Rue Molière, Domaine Universitaire, BP 96, 38402 Saint Martin d'Hères Cedex, France, (4) Université catholique de Louvain (UCL), Institut d'Astronomie et de Géophysique Georges Lemaître, 2, chemin du Cyclotron, B-1348 Louvain-la-Neuve, Belgium

When looking at glacial / interglacial climate evolution, one of the most standing issue is ice-sheets evolution and its relation to climate. While we have a good knowledge of the ice-sheet retreat during the last deglaciation (from different ice-sheet reconstructions, see https://pmip3.lsce.ipsl.fr/wiki/doku.php/pmip3), ice-sheet evolution over the last glacial inception is less well-known. There is some well-established evidence that sea-level was standing 3 to 5 meters above present-day levels, with a substantial part coming from melting of the Greenland ice-sheet. Also the dynamics of the inception is complex with inception starting in northern Canada and in northern (east) Siberia (Svendsen et al., 2004).

In this paper, we use the LOVECLIM coupled atmosphere—ocean—vegetation model newly coupled to the GRISLI ice-sheet and ice-shelves dynamic model, in a set-up for the northern hemisphere, forced by changing insolation parameters from 128 ka BP to 115 ka BP. Using an ensemble of parameters states that provide different climate sensitivity for the LOVECLIM model (cf. Goosse et al., 2007) we assess the sensitivity of climate to ice-sheet growth and the feedbacks of climate on the ice-sheets. In order to disentangle the effect of coupling an ice-sheet model to climate we also compare our simulations to the same parameter setup with an offline ice-sheet setup.

We finally discuss the implications of our simulations in the broader glacial / interglacial timeframe, in particular with respect to the ice-sheet location and extent but also with regards to sea-level change in a warmer than present (128 ka BP) and colder than present (115 ka BP) climates.