[JJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

[M-IS10]Paleoclimatology and paleoceanography

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Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Past environmental changes and events at multi-decadal to tectonic timescale toward an understanding of Earth climate system by an integration of terrestrial and marine proxy studies and numerical modeling will be discussed. We welcome a variety of paleo-environmental studies from a wide range of background. In particular, a series of presentations relating to the Anthropocene will be planned. This is a merged session of A-OS31 "Linkage between oceanography and paleoceanography in marginal, shelf and coastal oceans" and M-IS23 "Paleoclimatology and paleoceanography" sessions at JPGU 2017. We hope that this session will provide an opportunity to promote communication between participants from multidisciplinary field.

[MIS10-P14]Comparison of bi-stable regimes of the Atlantic Meridional Overturning Circulation under present-day and glacial climate using a climate model of intermediate complexity

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Ice core reconstructions show that there were abrupt climate changes termed Dansgaard-Oeschger (D-O) oscillations during glacial period. D-O events start with about 10 ℃ of warming in Greenland within a few decades. Many studies have suggested that D-O oscillations are related to the stability of the Atlantic Meridional Overturning Circulation (AMOC). The AMOC is ocean circulation in Atlantic, which is composed of northward surface current, deep water formation in North Atlantic, and southward return flow in the deep ocean. Previous modelling studies show that a mode transition of the AMOC through a large freshwater input can reproduce an abrupt climate change similar to a D-O event (e.g. Rahmstorf 2002; Ganopolski and Rahmstorf 2001). Whereas many model studies on the bi-stable regimes of the AMOC have been conducted in the present-day climate, the AMOC in the glacial period is less investigated. The purpose of this study is to compare the bi-stable regimes of the AMOC under present-day and glacial climate using MIROC-lite (Oka et al. 2010), a climate model of intermediate complexity. In this study, we first reproduced climate conditions of present-day (CTL) and last glacial maximum (LGM) using MIROC-lite and then investigated the responses of the AMOC to changes of freshwater flux in North Atlantic under both CTL and LGM climate. Both experiments show the bi-stable regime of the AMOC and two stable modes under the same freshwater input. However, as indicated in Ganopolski and Rahmstorf (2001), our results also show that there are differences in details about bi-stable regimes between CTL and LGM climate. CTL climate with no freshwater input has "on mode", the current status, and "off mode", where doesn't exist the AMOC. On the other hand, LGM climate has two modes each of which has the AMOC of different magnitude, "on mode" and "weak mode". In our presentation, we discuss these results in detail.