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Dynamics of atmospheric circulation over East Asia and North Pacific at the last glacial maximum simulated by MIROC 3.2 AOGCM and PMIP2 models

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The atmospheric circulation change over East Asia and North Pacific at Last Glacial Maximum (hereafter referred to as LGM) is examined by using Atmosphere-Ocean-Coupled General Circulation Model (hereafter AOGCM). The LGM experiment is performed by assuming the huge ice-sheets over North America and Fennoscansia (ICE-5G reconstruction) and reduced CO2, which follows the experimental design by Paleoclimate Modeling Intercomparison Project Phase 2 (PMIP2).

Firstly, we analyzed the change of precipitation, wind and water budget reproduced by MIROC 3.2, which is an AOGCM developed by CCSR/NIES/FRCGC institutes in JAPAN. During the summer, the subtropical high over North Pacific at LGM is weaker than that at the present day (PD). This results in the dry climate over East Asia due to the reduced northward transport of the water vapor on the western edge of the weakened high. The weak high at LGM also results in the wetter climate near the center of the high due to the weakened divergence of water vapor flux. During the winter, on the other hand, the Aleutian low is intensified, which causes the strong northerly flow over western North Pacific.

Secondly, the change of precipitation and wind mentioned above is compared with other AOGCM results which are available on PMIP2 database. The comparison with geological data will be also discussed.

Thirdly, the mechanism for the change of the subtropical Pacific high and Aleutian low is examined by the sensitivity experiments. In order to save the integration time, atmosphere component of MIROC 3.2 coupled with slab ocean model (hereafter AS-

GCM) is used for the sensitivity experiments. The pressure difference between LGM and PD reproduced by ASGCM is similar to that by AOGCM, although the former is slightly small. This means that the major dynamics could be represented by atmosphere coupled with slab ocean in our model, and that the full ocean dynamics has positive feedback on it. In the sensitivity experiments, the thermodynamic effect by ice albedo of North American ice sheet, rather than the mechanical effect by ice-sheet orography, results in both the weakened subtropical Pacific high and intensified Aleutian low. The thermal feedback of slab ocean also seems to work for the latter. The detailed analysis will be presented in the poster.