# Late Pleistocene Variations in crenarchaotal production and riverine influence in the Central Arctic Ocean (ACEX Hole M0004C)

# Masanobu Yamamoto[1]; Saiko Sugisaki[2]; Tatsuhiko Sakamoto[3]

[1] Env. Eath Sci., Hokkaido University; [2] none; [3] IFREE, JAMSTEC

http://geos.ees.hokudai.ac.jp/yamamoto/

Little is known about the source of organic matter and the response of sedimentary organic matter composition to glacial-interglacial changes in the central Arctic Ocean. Here we have generated late Pleistocene records of biomarkers and ice rafted debris (IRD) from IODP-Arctic Coring Expedition (ACEX) Hole M0004C to understand the glacial-interglacial changes of marine production and mass transportation in the Arctic Ocean.

Major biomarkers detected in Hole M0004C were isoprenoid tetraethers including creanarchaeol from pelagic crenarchaota, branched tetraethers from terrestrial soil anaerobic bacteria, long-chain n-alkanes, n-fatty acids and n-alkan-1-ols, derived from fresh higher plants, and gem-alkanes (branched aliphatic alkanes with a quaternary substituted carbon atom), derived from unknown source. Minor biomarkers were oleanenes of angiosperm origin, unsaturated fatty acids, bacteria-derived anteiso- and iso-fatty acids, various hydroxy acids, formed by hydroxylation of n-fatty acids by aerobic bacteria, cholesterol and sitosterol, and hopanes, formed by diagenetic alteration of bacterial biohopanoids. There was no concrete evidence for in situ production of phytoplanktons.

The concentrations of these biomarkers varied with IRD number variation. During periods of abundant IRD, branched tetraethers and diagenetic hopanes were abundant, suggesting that clastic materials were supplied by ice rafting. During periods of scarce IRD, the other biomarkers such as creanarchaol and long-chain compounds were abundant, suggesting that both marine creanarchaota production and the riverine discharge was enhanced. The IRD and biomarker variations were synchronized with the eastward expansion of the Fennoscandinavian Ice Sheet to northen Siberia, suggesting that the ice cover of northen Siberia is critical in switching mass transportation mechanisms and marine crenarchaeotal production in the Arctic Ocean.