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Reconstructing paleoenvironmental changes around the Last Glacial Maximum in Bonaparte Gulf

Takeshige Ishiwa[1*], Yusuke Yokoyama[1], Katsuto Uehara[2], Yosuke Miyairi[1], Atsushi Suzuki[3], Minoru Ikehara[4], Stephen Obrochta[1], Ken Ikehara[3], Katsunori Kimoto[5], Julian Bourget[6], Hiroyuki Matsuzaki[7]

[1]Atmosphere and Ocean Research Institute, the University of Tokyo, [2]Research Institute for Applied Mechanics, [3]Geological Survey of Japan National Institute of Advanced Industrial Science and Technology, [4]Center for Advanced Marine Core Research, Kochi University, [5]Japan Agency for Marine-Earth Science and Technology, [6]The University of Western Australia, [7]School of Engineering, the University of Tokyo

Timing and magnitude of the last glacial maximum (LGM: around 20,000 years ago) is a key to understand the climate systems. Global surface temperature was lower more than 2 degreeC and global ice volume was much larger than that for today (Yokoyama et al., 2000; Clark et al., 2009). Hence the observations during the LGM can be used for testing climate and glacial models under the naturally forcing condition. The maximum drop of the sea-level during the LGM was as much as ca. 135 m ice volume equivalent sea-level (Yokoyama et al., 2001; Lambeck et al., 2002; Mitrovica, 2003) according to the direct sea-level data from far-field sites, away from former ice sheet regions. Here we report paleoenvironmental reconstruction based on recently re-sampled sediment cores from Bonaparte gulf, North Western Australia.

More than 29 cores were obtained during the KH-11-1 cruise in January-February 2011. Detailed sedimentological analyses including CT scanning, major elements geochemistry using X-ray core scanners and color reflectance were conducted with over 40 radiocarbon dating in cores from 90-140 m water depth. Organic carbon and nitrogen isotopes variations were in accord with core descriptions and sedimentological descriptions. Timing of these changes is clearly related to the sea-level changes occurred around LGM. The results then were compared paleotidal model to further interpret paleoenvironments in the regions. In the presentation, we focus on the results obtained from cores taken from 120 m and 140 m water depth to see the relations to sea-level changes.

References:

Clark et al. (2009) Science, v325 p710-714; Mitrovica (2003) Quaternary Science Reviews, v22, p127-133; Lambeck et al. (2002) Quaternary Science Reviews, v21, p343-360; Yokoyama et al. (2000) Nature, v406, p713-716; Yokoyama et al. (2001) Palaeogeography Palaeoclimatology Palaeoecology, v165, p281-297; Yokoyama and Esat (2011) Oceanography, v24, p54-69.

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