

Paleoenvironmental changes recorded in Orog Lake, southwestern Mongolia during MIS 3 and its relationship with *Homo sapiens'* s migration into northern Asia

*Hitoshi Hasegawa¹, Nanase Noma¹, Nagayoshi Katsuta², Masafumi MURAYAMA³, Toru Tamura⁴, Masami Izuho⁵, Niiden Ichinnorov⁶, Davaasuren Davaadorj⁷, Noriko Hasebe⁸, Miho Sasaoka⁹, Masao Iwai⁹

1. Faculty of Science and Technology, Kochi Univ., 2. Faculty of Education, Gifu Univ., 3. Faculty of Agriculture and Marine Science, Kochi Univ., 4. Geological Survey of Japan, AIST, 5. Faculty of Social Sciences and Humanities, Tokyo Metropolitan Univ., 6. Mongolian Academy of Sciences, 7. National University of Mongolia, 8. Institute of Nature and Environmental Technology, Kanazawa Univ., 9. Center for Advanced Marine Core Research, Kochi Univ.

An aim of the present study is to understand detailed paleoenvironmental changes in Mongolia, situated at a key crossroad for *Homo sapiens's* migration between central, eastern, and northern Asia during the Initial and Early Upper Paleolithic (IUP-EUP). Available archaeological evidences have suggested the emergence of IUP at around ca. 45-40 ka (e.g., Zwyns *et al.*, 2014; Rybin *et al.*, 2016; Izuho *et al.*, 2018). However, yet the paleoenvironmental changes of this period in Mongolia is largely unclear, preventing us to understand whether the possible environmental changes were significant as a major driving forth for modern human' s lifeway.

In this paper, we present a new record of paleoenvironmental changes in southwestern Mongolia during MIS 3. In January 2017, we took two parallel cores (OROG01, 24 m; OROG02, 21 m) from Orog Lake, a shallow saline lake located in northwestern margin of Gobi Desert. The high-resolution major and minor element composition changes were obtained using μ XRF core scanner (Cox, Itrax) at Center for Advanced Marine Core Research, Kochi University. Based on the preliminary results of OSL and ¹⁴C age dating, basal age of sediment core OROG01 yielded ca. 38 \pm 4 ka, nearly accordant with the basal age of ~45 ka reported in the previous study (Yu *et al.*, 2019). On the basis of our high-resolution elemental composition data, in conjunction with previous sedimentological and palynological data (Yu *et al.*, 2019), the paleoenvironments of southwestern Mongolia were more humid with higher lake levels during MIS 3 than Holocene. Our results also suggest periodic and higher amplitude paleoenvironmental changes in this region, which likely correspond to Dansgaard-Oeschger events. This new record would allow us to discuss potential relationship between paleoenvironmental changes and ecosystem changes in Mongolia during the IUP-EUP.

Keywords: Lake sediments, Saline lake, Paleoenvironmental changes, Dansgaard event, *Homo sapiens*, Initial and Early Upper Paleolithic