

Reconstruction of Blake excursion using the cosmogenic radio nuclide Beryllium-10 in Antarctic Dome Fuji ice core

Rindai TSUNEKAWA^{1*}, YOKOYAMA, Yusuke¹, TAKAHASHI, Satomi¹, MIYAIRI, Yousuke¹, AZE, Takahiro², HORIUCHI, Kazuho³, MATSUZAKI, Hiroyuki¹, MOTOYAMA, Hideaki⁴

¹The University of Tokyo, ²Tokyo Institute of Technology, ³Hirosaki University, ⁴National Institute of Polar Research

An important development in the field of geomagnetism is the recognition of excursions that serve as chronostratigraphic tools for the dating and correlation of marine and lacustrine sediment cores. Here, we reconstruct the Blake excursion from 127ka to 101ka by analyzing ¹⁰Be in the second Dome Fuji deep ice core. We focus attention on the Blake excursion because it occurs during Marine Isotope Stage (MIS) 5, during the last interglaciation, beyond the range of radiocarbon dating. ¹⁰Be and other cosmogenic radionuclides, such as ¹⁴C, ²⁶Al, and ³⁶Cl are good proxies for geomagnetic field intensity because atmospheric production increases during periods of low intensity during excursions, and ¹⁰Be is particularly well suited due to its long half life, high production rate, and well understood fallout process. While the accumulation of ¹⁰Be in sediments is complicated due to enrichment from sources other than direct atmospheric fallout, polar ice cores are remarkable archives of ¹⁰Be, especially those from Antarctica, which is isolated from other continents. Ice cores drilled at Dome Fuji also have the advantage of a well dated chronology using the O₂/N₂ ratios (Kawamura, et al., 2007). Results indicate there are five discrete peaks in ¹⁰Be flux during the Blake excursion that will allow export of the Dome Fuji chronology to the MIS5 intervals of sediment cores.

Keywords: ice core, cosmogenic radio nuclide, Blake excursion, Dome Fuji