

Changes in lead isotopic compositions over the past 30,000 years in NEEM deep ice core from Greenland

SUNGMIN HONG^{1*}, CHANGHEE HAN^{1,2},
YEONGCHEOL HAN² AND SOON DO HUR²

¹Department of Ocean Sciences, Inha University, 100 Inha-ro, Nam-gu, Incheon 402-751, Republic of Korea (*smhong@inha.ac.kr)

²Korea Polar Research Institute, Songdomirearo 26, Yeonsu-gu, Incheon 406-840, Republic of Korea

Pb concentrations and its isotopic compositions have been determined in NEEM (North Greenland Eemian Ice Drilling) deep ice core from Greenland (77.45° N, 51.06° W, 2,450 m a.s.l.) using thermal ionization mass spectrometry (TIMS). 44 core sections analyzed were from depths of 1215 m to 1671 m, corresponding to the period ~8000 yr BP to ~30,800 yr BP. An improved decontamination method and ultraclean analytical procedures were used to prevent possible contamination. We present here the first comprehensive and reliable Pb concentrations and Pb isotopic record showing temporal variations in concentrations and isotopic compositions as a function of climatic conditions from the Last Glacial Maximum to the Holocene transition period. Low Pb concentrations (<10 pg/g) were found during warm climatic period, while higher Pb concentrations (up to 150 pg/g) were found during cold climatic period. ²⁰⁶Pb/²⁰⁷Pb isotopic ratios were generally lower during warmer conditions and higher during colder conditions. This difference in ²⁰⁶Pb/²⁰⁷Pb isotopic ratios linked to climatic conditions indicates changes in relative contributions of natural sources (mainly crustal and possibly volcanogenic Pb) as well as changes in the source areas of dust. Our NEEM ice core record provides a clue to deduce the coupling/decoupling processes of atmospheric circulation and environmental changes with climate change in the Northern Hemisphere.