The changes in atmospheric input of trace elements from the LGM to the Early Holocene recorded in Greenland NEEM ice core

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The records of trace elements recovered from GRIP Greenland ice core showed that the atmospheric transports of those elements changed dramatically between glacial and interglacial periods [1]. Those records were, however, available only for several elements such as Al, Pb, Cu, Zn and Cd. In addtion, no data points for the cold Younger Dryas (YD) event were recovered.

In this research, 21 elements - Al, As, Ba, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Rb, Sb, Sc, Se, Sr, Th, Tl, U, V, Zn - were determined from 45 Greenland NEEM ice core sections corresponding to 8260~30780 years B2K (before 2000 A.D.). This study aims to reconstruct high resolution ice core records of various trace elements and investigate the changes in atmospheric transport of trace elements during transition time period from last glacial maximum (LGM) to the Early Holocene.

During the YD event (12200~14550 yr B2K), the mean concentrations of trace elements decreased to 16~24% of those for the LGM (15100~30780 yr B2K), and then further decreased to 0.4~10% during the Early Holocene (8260~11400 yr B2K). Only Cd and Se were exceptional. Their mean concentration levels were 33~69% (YD) and 28~57% (Holocene) of those for the last galcial period.

On the other hand, the mean crustal enrichment factors (EF_c) of the LGM and YD did not show any significant differences except Cd and Se. Also the mean EF_c values of most elements were less than 5. This represents that crust dust was the dominant source for most of atmospheric transported elements even for the YD event despite of decreases in dust input. However, during the Early Holocene, the changes in the mean EF_c values were different depending on element. The EF_c values of Cd, Co, Cr, Cu, Mo, Ni, Pb, Sb, Se and Zn increased 2.2~31.2 times of those for the LGM, while the other elements showed no significant changes. This was probably due to decreased dust input and increased volcanic activities during the Holocene as reported from GISP2 ice core [2].

[1] Hong *et al*. (1996) *Earth Planet Sci Lett* **143** 233-244. [2] Zielinski *et al*. (1996) *Quart Res* **45** 109-118