



The changes in atmospheric Al and As during 1710~1970 AD recorded in Greenland NEEM ice core

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The first high-resolution records of Al and As for the last three centuries are recovered from NEEM shallow ice core (NEEM 2009S1) from the northwestern Greenland. The Al concentrations of NEEM 2009S1 ice core shows inverse correlation with the water stable isotope ratios. This implies that the atmospheric dust input into the northwestern Greenland related to climate changes not only in long-term scale of glacial-interglacial cycles but also in short-term changes such as termination of little ice age.

The As concentrations of NEEM 2009S1 ice core largely increased from the late 19th century to the early 20th century. This feature is very similar to the Alpine ice core profile of As implying the anthropogenic enrichment of As occurred in a hemispheric scale for that period. The comparisons of As changes with various industrial records indicate the main anthropogenic source of As was non-ferrous metal production rather than coal combustion as reported previously.