Geophysical Research Abstracts, Vol. 9, 07639, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07639

Methanesulfonate over eight glacial cycles

M.E. Hansson (1), M. de Angelis (2), H. Fischer (3), J.P. Steffensen (4), R. Udisti (5), E. Wolff (6).

(1) Department of Physical Geography and Quaternary Geology, Stockholm University, S-106 91 Stockholm, Sweden (margareta.hansson@natgeo.su.se), (2) LGGE, CNRS-UJF, Grenoble, France, (3) Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany, (4) Niels Bohr Institute, University of Copenhagen, Denmark, (5) Department of Chemistry, University of Florence, Italy, (6) British Antarctic Survey, Cambridge, United Kingdom.

The EPICA Dome C ice core from Antarctica provides the longest ice core record ever, spanning more than eight glacial cycles. Unique high-resolution chemical records are the result from analyses of discrete samples by ion chromatography (IC) within the EPICA ion chemistry consortium. The decreasing long-term trend in the methanesulfonate (MS-) record is examined here. Both MS- and non-sea salt (nss) sulfate in the Antarctic atmosphere are considered to be derived mainly from oxidation of marine biogenic DMS. The deposition flux of the mass dominating nss sulfate is almost constant through the eight glacial cycles while more MS- is deposited (or retained in the snow) during glacials than interglacials. Since nss sulfate at Dome C is assumed to be mainly dry deposited and not affected by post-depositional processes, the stable nss sulfate flux suggests that the local atmospheric concentration was constant. This leads us to the conclusion that marine biogenic DMS emissions did not vary between the different climates. The large variation in MS- flux must therefore reflect other changes. Several studies have shown that MS^- concentrations suffer from post-depositional losses at low-accumulation sites in the present climate. On the other hand, the high glacial concentrations suggest that the MS^- signal is preserved in the even thinner annual snow layers during glacial periods, possibly due to a changed chemistry in the snow layers. Although a possible explanation for the glacial-interglacial variations, we find no indication that the long-term trend in MS- is a function of post-depostional processes. The decreasing long-term trend might instead indicate changes in the marine environment, possibly influencing the partitioning in the atmospheric oxidation processes.