Geophysical Research Abstracts,
Vol. 11, EGU2009-5135, 2009
EGU General Assembly 2009

Constraining snow accumulation rate in interglacials at EPICA Dome C using nitrate and chloride measurements

EW Wolff (1), M Bigler (2,3), M de Angelis (4), H Fischer (2,5), M Hansson (6), M Hutterli (1), R Rothlisberger (1), and R Udisti (7)

(1) British Antarctic Survey, Cambridge, United Kingdom (ewwo@bas.ac.uk), (2) University of Bern, Switzerland, (3) University of Copenhagen, Denmark, (4) LGGE, St Martin d'Heres, France, (5) Alfred-Wegener-Institut, Bremerhaven, Germany, (6) Stockholm University, Sweden, (7) University of Florence, Italy

The EPICA ice core from Dome C extends 3259 m in depth, and encompasses 800 ka of datable and sequential ice. Numerous chemical species have been measured along the length of the cores, and their fluxes related to changes in source strength and transport of material. However, nitrate and chloride both exhibit strong depositional and post-depositional effects, and therefore exhibit profiles that are particularly difficult to interpret in terms of environmental variables. Using shallow parts of the core, it was previously deduced that nitrate shows high concentrations in glacial periods, when it is well-preserved due to the higher levels of dust present in the atmosphere and ice. In interglacials, when dust is low, nitrate concentrations seem to be strongly dependent on the snow accumulation rate, with better preservation at higher accumulation rates. The ratio of chloride to sodium in interglacials also showed an accumulation dependence. Here, we present full 800 ka low-resolution records of reversible species such as nitrate and chloride, and show that the same patterns of post-depositional loss and preservation are shown throughout the record. Because the snow accumulation model used in creating the EDC3 age scale depended only on a poorly constrained accumulation-isotope hypothesis, this finding allows us to explore whether the nitrate and chloride data can be used to confirm the choice of parameters, or even to tune the age scale in particular critical periods.