Geophysical Research Abstracts, Vol. 9, 03238, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-03238

A 800 ky deuterium excess record from the EPICA Dome C ice core

B. Stenni (1), E. Selmo (2), V. Masson-Delmotte (3), J. Jouzel (3), M. Braida (1), O. Cattani (3), S. Falourd (3), P. Iacumin (2), and S. J. Johnsen (4)

(1) Dept. of Geological Environmental and Marine Sciences, University of Trieste, Italy, (2) Dept. of Earth Sciences, University of Parma, Italy, (3) IPSL/Laboratoire des Sciences du Climat et de l'Environnement, UMR CEA-CNRS, CE Saclay, 91191 Gif-sur-Yvette, France, (4) Dept. of Geophysics, Niels Bohr Institute, University of Copenhagen, Denmark (stenni@univ.trieste.it)

Ice core records are one of the most valuable tools for reconstruction of past climate variations. Paleotemperature reconstructions from ice cores are based on the empirical relationships existing between either D/H or ^{18}O/^{16}O and condensation temperatures. Furthermore, the deuterium excess, $d = \delta$D – 8*δ^{18}O, contains information about climate conditions prevailing in the source regions of precipitation. The EPICA Dome C ice core (75˚06'04"S, 123˚20'52"E, 3233 m, -54.5˚C, 25.0 kg m^{-2} yr^{-1}) provides a climatic reconstruction of the last 800 ky BP. The full length of the ice core (3260 m) have been analysed for both δ^{18}O and δD values providing a new high resolution deuterium excess record. The δ^{18}O and δD were measured in Italy and France, respectively, on a continuous basis of 55 cm. The low frequency deuterium excess variability appears to be strongly influenced by obliquity fluctuations which are expected to alter the meridional temperature gradient between low and high latitudes. Our strategy is to combine the information from deuterium and deuterium excess data to reconstruct on a common time scale past changes in Dome Concordia surface temperature (Tsite) and ocean moisture source temperature (Tsource, mainly the sub-Antarctic Indian Ocean). We develop an inversion of the EPICA Dome C snow and ice isotopic composition using a simple isotopic model. Moreover, the glacial-interglacial change in moisture source conditions seems to have a limited impact on the temperature interpretation of Antarctic ice core records, with only a higher effect at the glacial inceptions.