Geophysical Research Abstracts, Vol. 7, 06150, 2005
SRef-ID: 1607-7962/gra/EGU05-A-06150
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The last interglacial (MIS 5e) represented in the chemical ice core record from Dome C, Antarctica

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The characterization of the last interglacial period along with its related transitions from the penultimate glacial period (Termination II) and toward the last glacial period (Inception I) is an important issue to understand the climate system of the earth. It corresponds to the Marine Isotope Stage (MIS) 5e and the Eemian period in Europe and has often been referred to as an analogue of the present warm period, the Holocene. Although other interglacial periods may show a greater similarity to the Holocene the MIS 5e plays a key role in paleoclimatology due to its better availability and resolution in different climate records.

On the Dome C ice core, which has been drilled in the frame of the European Project for Ice Coring in Antarctica (EPICA), we measured among other species the water-soluble ions sodium (Na^+), calcium (Ca^{2+}), ammonium ($NH_4{}^+$), and nitrate ($NO_3{}^-$) by means of Continuous Flow Analysis (CFA). In this study we focus on the depth interval containing Termination II, MIS 5e, and Inception I, the period from 160 to 100 ka before present, where our new data have a temporal resolution of approximately 3 years.

Based on our continuous high-resolution records we find no evidence for any abrupt cooling event during MIS 5e. Moreover the Inception I toward the last glacial period is gradual and less abrupt than both Termination II and I. However, while the two last glacial maxima appear very similar, the two interglacial periods, MIS 5e and Holocene, show noticeable differences. To emphasize this, we examine mainly three different flux records: (1) ss-Na^{+}, a marine aerosol proxy, around Antarctica related to the sea ice production rate, (2) nss-Ca^{2+}, a continental aerosol proxy, particularly connected to southern South America, and (3) $NH_4{}^{+}$, a proxy for marine biogenic emissions.

All these proxies show different evolutions in terms of amplitude and timing leading to the following conclusions: (1) The observed changes cannot be associated with modifications of atmospheric transport patterns alone, strong modifications in the source regions are influential as well. (2) The marine aerosol flux remains almost unchanged over the onset of Termination II and I (and during Antarctic glacial warm events) pointing to the presence of a temperature threshold below which the aerosol production rate and possibly the sea ice production rate are independent from temperature variations. (3) In southern South America the climate during MIS 5e was probably slightly drier than during the Holocene and remained on interglacial levels during most of the Inception I. In contrast to glacial periods, it seems to be uncoupled from the Antarctic climate evolution.