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Uncertainties on gas chronologies with different scenario of accumulation and temperature for EPICA cores

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A precise comparison of Greenland and Antarctic ice core records can be accomplished using atmospheric gas records as correlative tools. Methane is of special interest for two reasons: 1) it shows large and rapid temporal changes, and 2) the rapid changes closely follow Greenland rapid climatic variability during the last glacial and the transition (Severinghaus et al., 1998). Recently a high-resolution methane record combined with a detailed isotopic profile was produced from the EDML ice core in Antarctica (EPICA community members, 2006). It shows that also the small amplitude and short duration isotopic events of the last glacial in Antarctica have a counterpart in Greenland. What links the temperature fluctuations of the two remote locations is probably the thermohaline circulation. Support for this theory of a bipolar seesaw comes from the finding that the amplitude of the Greenland warming is linearly correlated with the duration of the preceding warm phase in Antarctica.

The gas dating tool provides a relative chronology between ice cores, not an absolute dating. The quality of the chronology strongly depends on how accurately one can estimate the difference between ice and gas age (delta-age). One way to constrain the

latter is to rely on a stratigraphic marker recorded in the ice matrix of two ice cores, allowing correlation of the ice records in addition to the gas correlation. The ^{10}Be enhancement corresponding to the Laschamp event at 40.4 $\pm$ 2 kyr BP (Guillou et al., 2004) provides such a marker. Yiou et al. (1997) and Raisbeck et al. (2002) showed this ^{10}Be peak is contemporary with the Dansgaard-Oeschger event # 10.

Here we evaluate delta-age and delta-depth for the two EPICA ice cores using CH_4 records and the ^{10}Be peak. We discuss the compatibility of different climatic and chronological scenarios with respect to this new constraint.

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