The last deglaciation from the coastal TALDICE ice core (East Antarctica)

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The TALos Dome Ice CorE (TALDICE) project retrieved an ice core from a peripheral dome of East Antarctica. Talos Dome (72° 49' S, 159° 11' E; 2315 m; 80 kg m^{-2} yr^{-1}; -41°C) is located at about 290 km from the Southern Ocean and 250 km from the Ross Sea. Backtrajectory analyses suggest that Talos Dome is influenced by air masses arriving both from the Pacific (Ross Sea) and Indian Ocean sectors. In December 2007 the drilling team reached the depth of 1619.2 m. A preliminary dating based on an ice flow model and an inverse method suggests for the upper 1560 m an age of about 300 000 years BP.

We measured the methane (CH_4) mixing ratio in the Talos Dome ice core in the depth range from 73 (close-off) to 1620 m, at a depth resolution ranging from 0.5 to 4 m. Two laboratories (LGGE and Bern) were involved, using slightly different techniques. The CH_4 mixing ratio measured in the TALDICE ice core allows us to define tie points with respect to other ice cores from Greenland and Antarctica, using in particular the rapid CH_4 changes associated with the last termination and the D/O events. Additional chronological constraints are offered by the isotopic composition of molecular oxygen.

The comparison of water isotopic profiles from Talos Dome, EDC [1], EDML [2] and NGRIP [3] ice cores, once put on a common time scale, reveals that during the last deglaciation, climatic changes at Talos Dome were essentially in phase with the Antarctic plateau, and that the bipolar see saw with Greenland temperature is also valid for this coastal site. Furthermore, a preliminary TALDICE deuterium excess record is presented here for the last deglaciation.

[1] Jouzel, J., *et al.* (2007), *Science* **317** 793-796. [2] EPICA Community Members (2006), *Nature* **444** 195-198. [3] North Greenland Ice Core Project Members (2004), *Nature* **431** 147–151.

Relative influence of salinity and growth rate on Calcite Mg/Ca

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Many paleoclimate and temperature models begin with the assumption that Mg/Ca in biogenic calcite is predominantly determined by temperature relative to parameters such as salinity, growth rate, pH or pCO_2. However, Ferguson *et al*. recently reported that Mg/Ca ratios in foramanifera tests correlate more strongly with salinity than temperature [1].

In this study, we measured Mg/Ca in calcites grown at variable salinities to test the hypothesis that high salinity environments promote uptake of Mg. Our previous work demonstrated that Mg content in calcite increases with growth rate, particularly in the presence of rate-enhancing hydrophilic peptides, and that Mg uptake also increases in biochemical environments that favor cation desolvation [2]. From these insights, we predicted that changes in Mg/Ca signature may arise because of 1) growth kinetic effects, or 2) factors that reduce the barrier to Mg desolvation relative to Ca. Our kinetic measurements by *in situ* atomic force microscopy show that calcite growth rate increases with ionic strength. The Mg content of the corresponding overgrowths was analyzed by Secondary Ion Mass Spectrometry (SIMS) using a Cameca IMS-7f Geo magnetic sector instrument. Coupling these methods provides a new window into the processes driving elemental contents and serves as an independent test of the extent to which salinity affects Mg/Ca signatures.

[1] Ferguson *et al*. (2008) *EPSL* **265**, 153-166. [2] Stephenson *et al*. (2008) *Science* **322**, 724.