



Bipolar and chronological consequences of methane measurements in the Talos Dome ice core

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The international project IPICS of the International Polar Year 2007/09 aims in particular to use new coastal drillings in Antarctica to study the regional variability of Antarctic climate, and its relationship with climatic changes in other regions of the Earth.

Here, we investigate a new drilling conducted by a consortium of five European nations led by Italy, on the coastal site of Talos Dome (Antarctica). It reached a depth of 1620 m during the field season 2007/2008.

We measured the methane (CH₄) 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 well-known temporal evolution of this signal allows us to define tie points with respect to other ice cores from Greenland and Antarctica, using in particular the rapid CH₄ changes associated with the last termination and the Dansgaard/Oeschger events.

We also investigated the isotopic composition of molecular oxygen (making another dating tool in the gas phase of the ice core) in order to bring additional chronological constraints during periods where CH₄ changes become more muted. It has been measured at the LSCE during MIS 2, 4, and the last glacial inception.

Comparing these records with their counterpart in other ice cores, and using an ice flow model and an inverse method, we propose a preliminary age scale for the trapped gas and the surrounding ice at Talos Dome. It indicates that the Talos Dome stratigraphy is undisturbed down to 1560 m, corresponding to about 300 000 years BP.

More importantly, the comparison of water isotopic profiles from the Talos Dome, EDC, and NGRIP 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 seesaw with Greenland temperature is also valid for this coastal site, thus contradicting the neighbouring Taylor Dome ice core findings. We will also investigate if those conclusions can be extended to the last glacial period.