

## **The last thousand years at Talos Dome, Antarctica**

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### **Abstract**

The Antarctic has an unusual climate history compared to other continents for the past 2000 years : unlike other regions, the last 50 years are not unusually warm, and the period around 1850 is not unusually cold. All of Antarctic 2000-year climate records are derived from water isotopes from ice cores. Could it be that water isotopes are not a faithful temperature recorder, or is it that Antarctica has a distinct climate variability over this time period ?

Here we compare a temperature reconstruction derived from the analysis of inert gas isotopes (d15N and d40Ar) with water isotopes to assess how faithfully water isotopes record temperature trends over the last 1000 years at Talos Dome, Antarctica. Talos Dome (15°11' E, 72°49' S, 2315m a.s.l.) is a peripheral dome located in the South Pacific/Ross Sea sector of the East Antarctic Plateau. It receives air masses mainly from the Indian and secondarily from Pacific sectors of the Southern Ocean. As a result, its climate presents similarities both to West Antarctica (Pacific air masses) and to the East Antarctic plateau sites of Dome C and Vostok (Indian air masses).

We find that inert gas isotopes indicate a long term cooling trend at the site, which is not recorded in the dD signal. Second order parameters (d-excess and 17O-excess) show that the partitioning between Ross and Indian air masses likely has changed over this period, with a decrease in the Ross sea contribution. These results show that circulation changes likely complicate the interpretation of water isotopes. The combination of two methods at Talos Dome provides new constraints on the changes in the circulation associated with the Little Ice Age cooling in West Antarctica.

**Keywords:** ice cores, temperature reconstruction, last 2000 years