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High-Resolution Dust record of last glacial period (MIS 4 to MIS 2) from Talos Dome Ice Core

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Mineral dust trapped in Antarctic ice cores plays an important role in the study of past climate and atmospheric circulation variability in the Southern Hemisphere.
In this work we investigate the Talos Dome (Northern Victoria Land, East Antarctica) ice core dust concentration record through a Laser Sensor (LS) technique. Analyses were performed in continuous as a part of the Continuous Flow Analysis (CFA) system, and discontinuously with Beckman Coulter©Counter for comparison and LS calibration.
The LS device provided two basic outputs: (1) "bag" (1 m long sections) mean values and (2) high resolution (1 cm resolution) data. Both signals were processed in the contest of this work and two dust records, respectively at low and high resolution, were produced.
Here we report the bag mean dust record from the end of the last deglaciation (about 12,000 years B.P.) to Marine Isotopic Stage 4 (MIS 4, 70,000 years BP).
The comparison of the TALDICE LS and EPICA-Dome C dust record provides interesting information about climatic conditions of South Pacific-Ross Sea sector of Antarctica, and atmospheric circulation patterns during last glacial period, with a good agreement between MIS 3 and Last Glacial Maximum (LGM), where several millennial and plurimillennial scale climatic oscillation are observed. For these reasons it is possible suppose that dust transport mechanisms towards TD and DC were the same during the last glacial period. However, MIS 4 in TD ice core was lower, both in concentration and flux, compared to EDC. Likely, during LGM, very cool air masses extended above the Antarctic plateau, even in TD area, have created a subsidence condition which haven't allowed the cyclonic perturbation to penetrate the interior of Antarctica continent. In fact, the Polar Front has moved towards lower latitude in that period, maintaining far away the disturbances.
These preliminary observations suggest that the coupling between inner sites such as EDC and the Talos Dome peripheral site becomes progressively stronger from early pleniglacial conditions (MIS 4) to late pleniglacial conditions (late MIS 3, MIS 2).

The work was carried out in Alfred Wegner Institute for Polar and Marine Research (AWI – Bremerhaven, Germany) in the contest of a collaboration between Germany, Switzerland and Italian groups. This work is part of the TALDICE (TALos Dome ICE core) project, leaded by Italy, that involved also Germany, France, Switzerland and UK.