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Glacial terminations in the Southern hemisphere: A case study from the EPICA Dome C ice core

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The many different proxy records from the EPICA Dome C ice core allow for the first time to compare nine glacial terminations in great detail. Despite the fact that all terminations cover the transition from a glacial maximum into an interglacial, there are large differences between single terminations. For some terminations, Antarctic temperature increases only moderately. For others, initial large temperature increases are followed by a substantial drop to moderate temperatures. In this paper, we look into the sequence of events for all terminations and check whether the same sequence applies to all terminations, despite their different characteristics. We investigate the phasing between a South American dust proxy (non-sea-salt calcium, nssCa), a sea ice proxy (sea salt sodium, ssNa) and Antarctic temperature (deuterium, dD).

At the start of the terminations, temperature and dust change synchronously, with decreasing dust flux and increasing temperature. The sea ice proxy only changes once the temperature has reached a particular threshold, corresponding to a dD of approximately –420 per mil. This reflects to a large extent the limited sensitivity of the sea

ice proxy during very cold periods with large sea ice extent. At terminations where this threshold isn't reached, ssNa shows no changes. Above this threshold, the sea ice proxy is closely coupled to the Antarctic temperature, and interglacial levels are reached at the same time for both ssNa and dD.

Once another threshold corresponding to a dD of approximately –405 per mil is reached, nssCa has normally reached interglacial levels and doesn't change any more, despite further warming. This could result from either the dust source being reduced to interglacial levels or a change to the wind systems that deflate and transport the dust from its source to Antarctica.