



## **Dramatic cooling off southern Chile at ~1250 yr BP caused by reduced ENSO/solar activity?**

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A multiproxy study of a high-resolution sediment core from the southern part of the Peru-Chile Current (44°S, sedimentation rates  $>300 \text{ cm kyr}^{-1}$ ) provides significant insight into the regional and global climate evolution on decadal to centennial time-scales within the past 2000 years. Sea surface temperature (SST) and salinity (SSS) decreased  $\sim 1.5 \text{ }^\circ\text{C}$  and 2‰, respectively, during the past 2000 years, with a significant drop between 1250 and 750 yr BP. We suggest that the latter event was caused by cooling of the Antarctic leading to transport of fresher and colder waters via the Antarctic Circumpolar Current to the study area. This hypothesis is supported by the deuterium record of Taylor Dome ice core and the magnetic susceptibility of the ODP site 1098 (Palmer Deep, 64°S) showing an initial cooling at this time. A noticeable shift to more humid conditions on land at  $\sim 1250 \text{ yr BP}$  with the successive increase in continental runoff, nutrient and fresh water input into the study area could additionally account for the observed patterns in our record. The increase in the concentration of the siliceous organisms at the core site between 1250 and 750 yr BP is most likely caused by crossing of the zonal fronts and the respective nutrient impulse from deeper depths. This northward shift of the zonal systems, in turn, is possibly a response to decreased solar activity starting at 1250 yr BP leading to the cooling of the southeastern Pacific and western Antarctic, corresponding with a period of reduced ENSO and more La Niña-like conditions in the Pacific.