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Holocene Antarctic climate variability from ice and marine sediment cores: insights to ocean-atmosphere interaction

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In this paper we are attempting to quantify mainly temperature and sea ice variability, through integration of the available ice core and marine sediment core data from the Southern Ocean. The ice core data that we have used are the d18O data from the EPICA DML ice core. In the analyses we have included sea surface temperature and sea ice reconstructions from two marine sediment cores. TN057-13PC4 is a 14-meter long piston core from 53.2ˆS, 5.1ˆE. The site is located at northernmost extent of sea ice influence south of the Antarctic Polar Front (APF), and at the southernmost extent of variability of the atmospheric APF. The record is dated by 8 AMS 14C dates and is covering the past 18,000-yrs. Site TN057-17 at 50ˆS, 6ˆE is situated at a water depth of 3700 m, flooded by Circumpolar Deep Water, and close to the southernmost extent of North Atlantic Deep Water. It is an 8.2-m-long section of Holocene diatom ooze, sampled every 1-10 cm to achieve a 20-50 yr resolution. The record is dated by 11 AMS 14C dates and covers 13,000-yrs. We have applied recently developed time series analysis and other advanced statistical tools on the datasets for improved interpretation.