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South Pacific upper water conditions during the Late Pleistocene

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The Antarctic Circumpolar Current system (ACCs) is the most important current system in the Southern Ocean. The past changes in the strength and latitudinal position of the ACC frontal system are supposed to play a major role on the global oceanic circulation and thus the Earth's climate through their impact on atmospheric CO_2 contents by changes in water stratification conditions. Therefore the study of variability in the upper-ocean characteristics of the ACCs provides crucial information to understand and to reconstruct the global climate evolution. The dynamics of the upper-ocean vertical structure, primarily defined by vertical changes in salinity and temperature from the mixed layer down to the seasonal and permanent thermocline, can be tracked using the differences in stable oxygen isotopes and Mg/Ca-based temperatures recorded in the test of planktonic foraminifera. Only Mg/Ca thermometry coupled with $\delta^{18}O$ can guarantee a common source of signal, averaging the same environmental conditions (season and spatial habitat), where, the combined measurements of Mg/Ca and $\delta^{18}O$ allow to extract the $\delta^{18}O$ record of past upper ocean water column, and salinity variations. Here we report upper-ocean water column characteristics during the last million years derivate from paired measurements of Mg/Ca and $\delta^{18}O$ of shallow-living and deep-living planktonic foraminifera recovered from the core SO213-60-2 retrieved from the northern border of the Subantarctic Zone (SAZ) in the East Pacific Rise during the cruise SOPATRA. Along the core Mg/Ca values in *G. bulloides* and *G. inflata* ranged from ~2 to 1.2 and 2.2 to ~1mmol/mol, respectively. The estimated surface and subsurface Mg/Ca-temperatures oscillated between ~8 to 14°C and 2 to 10°C, respectively. The continuous increasing in subsurface temperatures to the present suggests a reduction in injection of Southern Ocean intermediate water to the South Pacific Ocean.