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SEA SURFACE TEMPERATURE VARIABILITY IN THE ATLANTIC SECTOR OF THE SOUTHERN OCEAN (ODP SITE 1090) ACROSS THE MIDDLE PLEISTOCENE TRANSITION INFERRED FROM Mg/Ca RATIOS IN PLANKTONIC FORAMINIFERA.

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Many paleoceanographic studies have focused on the Middle Pleistocene Transition (MPT), since during this period of time the frequency of glacial-interglacial (G/I) cycles changed from 41ky to 100ky, despite no fundamental differences in insolation forcing. Concomitant changes in ocean circulation and glacier dynamics, as well as a decrease in atmospheric CO2 concentrations have been suggested to be involved in this climatic transition. However, controversy on specific cause-effect mechanisms still remains. The Southern Ocean plays a key role in the ocean circulation system and global climate not only due to the exchange among different water masses from major basins, but also because it facilitates CO2 exchange between the deep ocean and the atmosphere. The Ocean Drilling Program (ODP) Site 1090, located in the present- day Subantarctic zone (42°54.8´S - 8°54´E, 3702m), spans the entire MPT, and allows sampling at moderate temporal resolution (2ky). The sediments accumulated above the calcium carbonate compensation depth, ensuring the preservation of calcareous microfossils through G/I periods. Sea surface temperature (SST) was reconstructed with planktonic foraminiferal Mg/Ca ratios (from Neogloboquadrina pachyderma (sinistral)), spanning the MPT from 1250-588Ka. Our results show G/I temperature variability between 4.2 and 14.2 °C when we use the Nurnberg (1995) equation to calculate SST, and between 2.9 and 11.9 °C when the Elderfield and Ganssen (2000) equation is used. The variability obtained from the latter calibration is in good agreement with that derived from other paleothermometers: Modern Analog Technique (MAT) and organic biomarkers from calcareous phytoplankton (UK37). Differences between Mg/Ca calibrations are probably the result of contrasting materials and approaches (culture vs. core-top). SST showed the expected lower G/I variability around 1000ka, and an increase of G/I variability after 900ka. Proxy comparison between our new Mg/Ca-derived SSTs and those derived from UK37 suggest that the water column was well mixed at the beginning of the MPT. From approximately 1150-900ka, the larger temperature differences observed between proxies suggest enhanced stratification, which continued during glacial periods after 900ka. However, previous work suggested that during late Pleistocene glacial periods the water column in the subantarctic region was less stratified than during interglacial times, perhaps due to frontal migrations. In this sense, further work using the Mg/Ca signature of deeper dwelling foraminifera should help to evaluate water column thermal gradients during this time span.