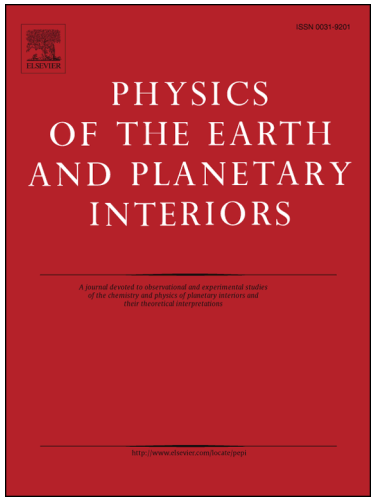

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Late Quaternary Paleomagnetic Secular Variation Recorded in Deep-Sea Sediments from the Demerara Rise, Equatorial west Atlantic Ocean

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Abstract

We have carried out a paleomagnetic/rock magnetic study of two gravity cores and two multicores from the Demerara Rise (~8°N), adjacent to NE South America. The magnetic measurements indicate that there is a stable natural remanent magnetization (NRM) carried primarily by detrital magnetite/titanomagnetite that preserves the local pattern of paleomagnetic secular variation (PSV). The two gravity cores have consistent patterns of directional variability. The rock magnetic intensities in both gravity cores vary by less than a factor of three. Relative paleointensity estimates have been derived by normalizing the NRM to Chi, ARM, and SIRM. Both gravity cores show the same pattern of relative paleointensity variability. 27 calibrated radiocarbon dates from our studied gravity cores and one additional piston core (Huang et al., 2014) have been used to build chronologies for the two gravity cores. Core 25GGC has bulk sedimentation rates varying from 18-22 cm/ky and contains a PSV record for the last 19 ka; core 9GGC has bulk sedimentation rates of 9-17 cm/ky and contains a PSV record for the last 28 ka. There are no other published, good-quality, well-dated full-vector PSV records within 4000 km of the sites, a region which constitutes almost 20% of the Earth's surface area. Our relative paleointensity records are consistent with other global records under the assumption of field intensity being largely a global-scale process. We have compared our directional PSV data statistically with eight other good-quality, well-dated low-latitude PSV records. Our statistical analysis shows that our Demerara Rise directional PSV records are consistent with those other studies and that the Late Quaternary Equatorial field variability is significantly lower than much longer-duration (780 ka to 5 Ma) variability.

Introduction

The detailed space/time pattern of geomagnetic field behavior (secular variation) during stable polarity is poorly resolved prior to the last few hundred years of instrumental records (e.g., Thompson and Baraclough, 1984; Bloxham and