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Paleomagnetism of Aptian-Albian sections from Brazilian Equatorial Margin (Brazil)

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Introduction

The early Cretaceous marks an important change in the Earth's magnetic field from a state of rapid polarity reversals, to one of long-term stability associated with the onset of the Cretaceous normal superchron (CNS) at ~121 Ma. Although it is a period of stability in the Earth's magnetic field, the CNS might have been characterized by more variability than previously thought. Changes in the reversal frequency have also been proposed to be mirrored by changes in field intensity, with periods of rapid reversals being associated with weaker dipole fields. However, recent studies suggest that short-lived reversals may have interrupted this apparent stability in the CNS, indicating a more complex behavior of Earth's magnetic field than previously assumed. This allows us to explore the behavior of the geomagnetic field during the CNS and enhances the potential for stratigraphic correlation with coeval marine successions in the Atlantic domain.

Method and/or Theory

Paleomagnetic sampling was conducted in sections and sedimentary cores from Brazilian Equatorial Margin. Magnetic remanence and rock magnetic parameters, such as magnetic susceptibility (χ), anhysteretic remanent magnetization (ARM) and isothermal remanent magnetization (IRM), were measured. Rock magnetic analyses indicated that primary magnetizations were preserved throughout the interval, with detrital magnetite identified as the primary magnetic carrier, predominantly in the pseudo-single domain (PSD) and low-coercivity states. Normalizations by χ , ARM_{15mT} and IRM_{15mT} were used to determine relative paleointensity curves and were compared to the curve resulting from the pseudo-Thellier method.

Results and Conclusions

The paleomagnetic record shows marked changes in both intensity and inclination. Inclination instability results are comparable with those found in volcanic rocks from surrounding the region. The high-resolution magnetic record revealed that the field variability was higher than expected during the CNS. The new data can serve as a dating and correlation tool for coeval records in this region.