Geomagnetic Moment Variation and Excursions Since 400 ka BP: Paleomagnetic and Authigenic 10Be/9Be Sedimentary Records from the Portuguese Margin

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A paleomagnetic study was performed along several parallel cores collected in clayey-carbonate sedimentary sequences deposited over the last 3 climatic cycles in area of high accumulation rate of the Portuguese margin. The stable magnetization of depositional origin is carried by pseudo-single and small multidomain titano-magnetites. A high resolution continuous proxy-record of variations of direction and intensity of the geomagnetic field documents over the last 400 ka a regime of paleosecular variation interrupted by numerous episodes of weak relative paleointensity often accompanied by strong deviations of paleomagnetic directions. Among these features, three are assignable to well-known excursions or events (Laschamps, Blake, Jamaica/Pringle falls), four confirm the occurrence of excursions recently reported (Icelandic basin, Calabrian ridge 0 and 1, Levantine) and three suggest the occurrence of other excursions at 95, 240 and 290 ka BP. Most of these paleointensity lows and accompanying excursions are recorded at the times of d18O interglacial or interstadial stages. A detailed investigation of authigenic 10Be/9Be variations was performed along along the same cores. Authigenic 10Be/9Be ratio variation is the most reliable proxy of cosmonuclide production variation which is over such time scales- primarily driven by variation of the strength of the magnetosphere, itself modulated by variation of the geomagnetic moment. The phases of significant authigenic 10Be/9Be enhancement support the paleomagnetic evidences of geomagnetic moment drops associated with global scale paleomagnetic excursions. The lack of significant delays in the authigenic 10Be/9Be signal in recording dipole moment variations allows a more accurate timing of dipole moment lows. 10Be/9Be data confirm the preferential occurrences of dipole moment lows during or at the end of interglacial episodes, with a quasi-period of 100 ka.

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