# Cosmogenic Nuclide and Paleointensity Signatures of Geomagnetic Dipole Lows over and since the Brunhes/Matuyama boundary.

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**Résumé**

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The hypothetic contribution of the Earth's axis precession to the geodynamo energy was recently reinforced by experimental and numerical models (e.g. Vanyo, 2004, Roberts et Wu, 2005, Le Bars, 2013), triggering new research on the influence of orbital periodicities in the paleomagnetic field spectrum (e.g. Fuller, 2006 and Xuan and Channel, 2008). Sedimentary archives providing time-series of geodynamo variations – such as relative paleointensity (RPI) and inclination may be biased or contaminated during the acquisition of post-depositional remanent magnetization (PDRM), altering both the amplitude and phase of dipole moment variations records. Therefore in such records the detection of quasi-orbital periods or phase relationships between RPI series and d18O signatures does not constitute convincing clues. First studies coupling paleomagnetism and cosmogenic nuclide geochemistry (Carcaillet et al. 2003, 2004 ; Thouveny et al. 2008) encouraged the launching of the MAG-ORB project in order to construct time series of RPI and cosmogenic 10Be production rate by measuring the authigenic 10Be/9Be ratio and remanent magnetizations along high sedimentation rate cores collected in the Pacific and Indian equatorial oceans. Geomagnetic dipole lows (GDL) linked to excursions over the Brunhes epoch and to the Brunhes/Matuyama boundary are recorded by RPI lows and related 10Be overproduction events. The production is doubled during the Laschamp event (recorded in 3 sites at 41 ka in marine isotope stage 3 (MIS

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3)), and during the B/M transition (recorded in two cores at ca 773 ka at the end of MIS 19). In few cases 10Be maxima and RPI minima are perfectely synchronized (record MD90-0963/ Maldives area (Valet et al. 2014)). In most cases significant offsets are measured: 10Be maxima being recorded 5 to 30 cm above the corresponding RPI minima, denouncing a delayed PDRM acquisition (record MD05-2930 / Papua-New Guinea margin (Ménabréaz et al., 2012, 2014). Relationships established between clusters of authigenic 10Be/9Be ratio values and clusters of absolute Virtual Dipole Moment values are compatible with theoretical cosmogenic isotope production models (e.g. Masarik and Beer, 2009). Cosmogenic Be records can thus be translated into "10Be derived" dipole moment which can be analysed in terms of power specta and temporal rates of changes and thus provide new insight on the geodynamo behaviour.

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