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Authigenic $^{10}Be/^{9}Be$ ratios allow to control accuracy of paleomagnetic records of geodynamo variations at millennial to million year scales

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Geomagnetic dipole moment (GDM) variations over stable polarity epochs as well as during reversals and excursions provide key information on geodynamo regimes. However, paleomagnetic records obtained from sediments and lava sequences are biased by uncertainties hampering accurate reconstructions. In order to test and improve the reliability, resolution and precision of relative paleointensity (RPI) records, reconstructions of the cosmogenic nuclide Beryllium-10 (^{10}Be) atmospheric production rate, inversely proportional to the GDM value, have been obtained on the same sedimentary sequences. New authigenic $^{10}Be/^{9}Be$ ratio (Be-ratio, proxy of atmospheric ^{10}Be production rate) and paleomagnetic records were produced from marine sedimentary cores retrieved from the North Atlantic, Indian and Pacific Oceans. Both methods provide comparable records, although stratigraphic offsets are sometimes detected between RPI low and the related Be-ratio peak. These unconformities point out (post-) detrital remanent magnetization (pDRM) effects leading to variable (0-16 cm) magnetization locking-in depths. All these results were compiled and calibrated using a theoretical ^{10}Be production model in order to obtain a continuous GDM record for the last 2 Ma (BeDiMo2Ma). This record independent from paleomagnetic RPI records permits to test and improve the robustness and precision of GDM reconstructions and thus better constrain geomagnetic field instabilities at the millennial and million year time scale. The Be-ratio derived GDM lows (GDL) inventory is fully compatible with the GDL series associated with polarity reversals and excursions of the last 2 Ma. The presented results confirm that Be-ratio and paleomagnetic records accurately reconstruct the rhythms and amplitudes of the geomagnetic dipole moment variations, providing robust constraints to confront numeric or analogic simulations of geodynamo processes.