

Reversal Excursions and the Future of High(er) Resolution Correlation

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Although magnetostratigraphy has become crucial to global stratigraphic correlation, its practical resolution is limited, on average, to some 100,000 yr. The recording of reversal excursions or subchrons smaller than the resolution of the marine magnetic anomalies ('cryptochrons' or tiny wiggles) may, in principle, provide a higher-resolution correlation. Indeed, ubiquitous short-lived reversals are found during the Brunhes and Matuyama Chrons, and their (global) presence is increasingly confirmed. In addition, we continue to find new ones. There are a few problems, however. Firstly, a clear definition of (reversal) excursion vs. small subchron is lacking. The hypothesis of Gubbins (1999) that they are an inherent property of the geodynamo suggests that a distinction is not easily formulated. Secondly, to determine the existence of such short-lived features, a high-resolution sampling is required, which is increasingly facilitated by modern equipment, but yet not always feasible. Thirdly, to determine with certainty which reversal excursion has been recorded, often one either uses indirect evidence - e.g. a well-dated paleointensity record with minima that, through re-inforcement, suggest the presence of excursions - or a high-resolution (astro)chronology, in which case the records of excursions are redundant and not required for higher-resolution correlation. Finally, short reversal excursions are, as a rule, often not recorded because of the NRM acquisition mechanisms in sediments. Therefore, whether recorded reversal excursions are global or regional - e.g. due to an increase of reversed flux at the CMB - is not well determined. Clearly, many excursions have already been proven a globally occurring phenomenon, but a regional occurrence may only mean that suitable records are simply still lacking. Here, we discuss the above mentioned criteria, with an emphasis on the global versus regional occurrence of reversal excursions.

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