



Investigating the global-field behaviour and duration of a geomagnetic excursion

Mads Faurschou Knudsen, Conall Mac Niocaill, and Gideon M. Henderson

Department of Earth Sciences, University of Oxford, United Kingdom

(madsk@earth.ox.ac.uk / Phone: +44 (0)1865 282 117)

Approximately 12 geomagnetic excursions have been identified in ocean sediments since the last full reversal of the geomagnetic field at 780 ka. By careful comparison of the field recorded in ocean sediments at geographically dispersed locations, this study aims to provide a detailed account of the spatial pattern and structure of the geomagnetic field during one such excursion.

Based on discrete samples collected from Ocean Drilling Project (ODP) cores covering a full latitudinal transect in the Atlantic Sector, we present records of the geomagnetic-field behaviour during the Iceland Basin Event (≈ 185 ka). Guided by published shipboard and U-channel records (Channell, 1999; Lund et al., 2001) we selected 500 new discrete samples from three ODP Legs (162 in the far North Atlantic, 172 in the central Atlantic, and 177 in the Atlantic sector of the Southern Ocean). We obtained detailed records of magnetic inclination and declination, in addition to relative palaeointensity determinations. In each of these records the excursion is documented by several consecutive samples.

Observed geomagnetic excursions in these cores are correlated by comparison to $\delta^{18}\text{O}$ -stratigraphy, relying on the fact that the Iceland Basin Event is synchronous with the transition between marine oxygen isotope stages (MIS) 7 and 6. Further information about the timing and duration of the event in these cores is provided by $^{230}\text{Th}_{x.s}$ measurements. The detailed results obtained in this study, together with a compilation of the existing literature on the Iceland Basin Event, provide information on the spatial pattern of the excursions magnetic field and enable an assessment of the dominant field structure during an excursion. Finally, the results underline the important issue

of how to define the onset and termination of an excursion.

Channell, J.E.T., 1999. Geomagnetic paleointensity and directional secular variation at Ocean Drilling Program (ODP) Site 984 (Bjorn Drift) since 500 ka: Comparisons with ODP Site 983 (Gardar Drift). *J. Geophys. Res.* **104**, 22937-22951.

Lund, S.P., Williams, T., Acton, G.D., Clement, B., & Okada, M. 2001. Bruhnes Chron magnetic field excursions recovered from Leg 172 sediments. *Proceedings of the Ocean Drilling Program, Scientific Results* **172**.