

Strength of the Geomagnetic Field in the Cretaceous Normal Superchron: New Data from Submarine Basaltic Glass of the Troodos Ophiolite

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After decades of effort, much is known about the behavior of the geomagnetic field. We know that the frequency of reversals has changed profoundly through time from periods of frequent reversals (as for the 50 million years) to periods of no reversals for 40 or more million years (as in the mid-Cretaceous and Permian). We also know that when the field reverses, its strength drops dramatically. We do not know what causes reversals or what inhibits them, although numerical simulations have provided some tantalizing hints (e.g., Glatzmaier et al. *Nature*, 401, 885, 1999). The observation that reversals are associated with low field strength has long led to the suggestion that low fields are a precondition for reversal and that a high average field strength would inhibit the reversal process. It is reasonable therefore to hypothesize that periods of no reversals had high average field intensities. The data, however, are scarce. The published record includes constraints from fewer than two dozen specimens that meet the minimum criteria of internal consistency (e.g., Selkin and Tauxe, *Phil. Trans., R. Soc. Lond., A*, 358, 1065, 2000). We will present new paleointensity data from over 300 specimens from 77 sites obtained from submarine basaltic glasses collected from the Troodos Ophiolite (~92 Ma). About half meet the strictest standards; 22 sites having from 2 to 6 specimens meet the criteria of Selkin and Tauxe (2000) and have reasonable within site standard deviations. These yield a grand mean of 33 +/- 17 microtesla suggesting a dipole strength equivalent to the present field. Whether this is considered "high" depends on what is taken as average. Following, for example, Selkin and Tauxe (2000), we believe that the present field is nearly twice the average; hence the field at 92 Ma was "high", although not as high as argued by Tarduno et al. (*Science*, 291, 1779, 2001) based on a much smaller data set.

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