



Quantifying paleosecular variation during the Cretaceous Normal Superchron

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The Cretaceous Normal Superchron (roughly 84-120 Ma) marks one of the anomalously long periods in Earth's history when the magnetic field did not reverse its polarity, presumably triggered by changes in the convective behavior of the geodynamo. Paleosecular variation, which quantifies the convecting vigor driving the geodynamo, can be used to track these changes. To help constrain paleosecular variation during the Cretaceous Normal Superchron, we sampled an extensive section of marine sediments in northern Peru, which spans over 20 Ma in time and is the longest continuous continental record of the Cretaceous Normal Superchron so far. Paleosecular variation in our section, expressed by the S-value, was found to be higher on average than that of the last 5 Myr, and significantly higher than the S-value calculated for the Cretaceous Normal Superchron by McFadden et al. (1991). Because Peru was at the geomagnetic equator in the Cretaceous, the S-value derived from our sampling site represents the baseline S-value for all latitudes. Importantly, we find large variations in S-value within the superchron, from 88 to 112 Ma, which explains why previous studies have yielded discrepant values when sampling over more limited time windows.

References: McFadden, P.L., Merrill, R.T., McElhinny, M.W., Lee, S.: Reversals of the Earth's Magnetic Field and Temporal Variations of the Dynamo Families. *Journal of Geophysical Research*, 96/B3, 3923-3933, 1991.