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Devonian magnetostratigraphy: new data and old problems

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The global polarity time scale (GPTS) is relatively unconstrained for the Paleozoic, particularly the Devonian. Constraining the GPTS and reversal frequency for the Devonian is crucial for the understanding of the behaviour of Earth's magnetic field. Furthermore, construction of a GPTS for the Paleozoic could provide a valuable tool for age determination in other studies. However, most paleomagnetic data from the Devonian is problematic. The data are difficult to interpret and don't have a single easy to resolve (partial or full) overprint. Paleointensity studies suggest that the field was much weaker than the field of today, which could have been accompanied by many reversals (a hyperreversing field). In order to improve the geomagnetic polarity time scale in the Devonian, and quantify the number of reversals in this time, we sampled three Devonian sections in Germany, Poland and Canada. These sections show evidence that the rocks were not significantly heated, and they show little evidence for remineralisation. This minimises the chance the rocks were remagnetised after the Devonian. Our data show that even when rocks are well qualified to have reliably recorded the Devonian field, the interpretation is not straightforward. We also discuss problems with the Devonian GPTS as presented in the geologic timescale.