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Intensity of the Earth's magnetic field: results from Franz-Josef-Land, Russia

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Information about the paleointensity of the Earth's magnetic field plays an important role for the understanding of the processes in the Earth's core. Reliable paleointensity estimates from or before the Cretaceous Normal Superchron (a 37 Ma long time interval of normal polarity) represent a fundamental constraint numerical models that promise to provide unprecedented insight into the operation of the geodynamo. The paleointensity values obtained from igneous rocks from Franz-Josef-Land which forms part of the Cretaceous igneous province were used to calculate the Virtual Axial Dipole Moment (VADM) in order to allow comparison to published data. Absolute palaeointensities were determined using the Thellier-Thellier-technique incorporating modifications, which allow checking for biasing effects such as alteration and/or multidomain contributions. Extensive rock-magnetic and ore-microscopic investigations were conducted with the objective to assess the reliability of the results. As the paleolatitude of Franz-Josef-Land is basically undetermined possible solution can be the VADM based on the paleolatitudes recalculated from modern plate tectonic kinematic models, which are precise enough for the last 120 m.y.. Although these values have to be considered as preliminary and a rough estimate, an interesting pattern is readily identified. Our very preliminary VADM results of radiometrically-dated samples agree very well with published data and do not support the hypotheses that paleointensities are highest when reversal rates are lowest, i.e. that the most stable geodynamo is most efficient and has the highest dipole moment.