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Does the Permo-Triassic Geomagnetic Low Exist?

Dunia Blanco (1), Vadim Kravchinsky (2), and Jean-Pierre Valet (3)

(1) University of Alberta, Physics, Edmonton, Canada (blancoac@ualberta.ca/+1-780-4925097), (2) University of Alberta, Physics, Edmonton, Canada (vkrav@phys.ualberta.ca/+1-780-4920714), (3) Institut de Physique du Globe de Paris, France (valet@ipgp.jussieu.fr/ +33- 1- 44277463)

Paleointensity measurements have been done in Permo-Triassic basalt sills and dykes from the eastern (areas of the kimberlite pipes Sytikanskaya, Yubileinaya and Aikhal) and north-western (extrusive flows near Norilsk city) parts of the Siberian platform. A total of 317 samples were subject to a modified Thellier-Thellier technique. In order to assure the reliability of the paleointensity estimates partial thermoremanent magnetization checks and multidomain tail check were applied. Paleointensity measurements were performed at the University of Alberta and the Institut de Physique du Globe de Paris. Previous studies in the Norilsk area (Heunemann et al., 2004) suggest relatively low values for paleointensity, the results that lead the authors to propose that the Mesozoic Dipole Low extend at least down to the Permo-Triassic boundary. Our paleointensity estimates for the Norilsk area corroborate results of Heunemann et al. (2004), obtaining a mean virtual dipolar moment of $2.15\pm1.38\times10^{22}$Am^2. However, paleointensity estimates from the most eastern trap occurrences show a virtual dipolar moment (VDM) close to the present geomagnetic field value, $5.42\pm1.27\times10^{22}$Am^2, $6.06\pm1.28\times10^{22}$Am^2 and $5.87\pm0.95\times10^{22}$Am^2 for three kimberlite pipe areas respectively. With these results we conclude that the geomagnetic dipole low cannot be straightforwardly extended to the Permo-Triassic boundary. There could be different reasons for such variation in the VDM values for the traps erupted in relatively short time interval of one million years. (1) The dipole field could not be always able to recover to the average values (close to the present day field VDM) during too often geomagnetic polarity change. (2) A difference in the cooling rate for the extrusive and intrusive basalts could be responsible for the variations in the paleointensity results.