

Paleomagnetism of the Keuruu dyke swarm with implications for Nuna supercontinent

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We present a new paleomagnetic pole and isotope ages for the late Paleoproterozoic (Svecofennian) diabase dykes from Keuruu, Central Finland. The paleomagnetic results reveal a dual-polarity remanent magnetization with asymmetry, i.e. the mean directions are not antiparallel at 95% confidence level, and do not pass the reversal test (McFadden & McElhinny 1990). This is explained mainly by an unremoved secondary component contaminating both normal (N) and reversed (R) vectors. An R polarity dyke shows a U-Pb age of 1870 ± 9 Ma, and zircons from an N polarity dyke show a Pb-Pb age of 1868 ± 7 Ma. The primary nature of magnetisation in R polarity dykes is supported by a positive baked contact test (Buchan, 2013). As the N polarity dykes and the unbaked host rocks is of similar age (Huhma, 1986), and show similar paleomagnetic directions, we illustrate the baking by means of remanent magnetisation intensity decay behaviour. By combining the dual polarity means, we obtained a new key pole for Baltica at $Plat = 45.4^\circ N$, $Plon = 230.9^\circ E$, $A95 = 5.5^\circ$. Our data positions Baltica at low latitudes (19°), and aligns with Laurentia in a way that would easily proceed into the 1.8-1.2 Ga NENA (North Europe–North America) configuration (e.g. Salminen et al., 2014) of the Nuna supercontinent.

References:

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