

A paleomagnetic study of ca. 580 Ma volcanic rocks near Grand Bank, Avalon Zone of Newfoundland, Canada, and implications for true polar wander in the Ediacaran

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Paleomagnetic studies suggest that Laurentia moved from the equator to the pole and then back again within ~60 Ma during the Ediacaran. Since plate tectonic speeds are not fast enough to allow this to happen, it has been hypothesized that inertial interchange true polar wander occurred, causing the Earth to tumble through 90° and then back again. To help test this hypothesis, this study provides new paleomagnetic data for ca. 580 Ma volcanic rocks of the Marystown Group collected near Grand Bank in the Avalon zone of Newfoundland. The volcanic rocks were studied with alternating field and thermal demagnetization which showed that remanence is carried mostly by magnetite rather than hematite. Seven sites provide stable remanence directions with mean tilt-corrected declination and inclination of 287° and 58° ($\alpha_{95} = 13^\circ$). The corresponding paleolatitude is 39° -12/+16. A positive conglomerate test, using rhyolitic crystal-lithic tuff clasts from an agglomerate, shows that the magnetite-bearing clasts carry primary remanence. Magnetic polarity reversals are present within the section. The Marystown Group results, along with other stable paleomagnetic data from Avalonia, suggest that Avalonia remained at mid- to low-latitudes during the mid-Ediacaran.