

Reassessment of Port au Port Peninsula paleomagnetism, with new preliminary results

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The Port au Port Peninsula in western Newfoundland provides excellent exposures of Early Cambrian through Carboniferous sedimentary rocks, representing a record of post-rift clastic sedimentation and platform carbonates of Laurentia's Early Paleozoic passive margin and its subsequent foundering, deformation and karsting related to successive Paleozoic orogenic events. Following early paleomagnetic work over 50 years ago, a number of studies in the 1980s and early 1990s sought to determine and test primary paleomagnetic results for the platformal rocks in the Port au Port Peninsula, to help define Laurentia's Paleozoic drift history. In a recent reassessment of the global paleomagnetic database for the Phanerozoic, Ordovician results from four studies in the St. George and Table Head Groups have been combined to contribute two Early Ordovician paleomagnetic poles from the peninsula. Here, we report preliminary paleomagnetic results from 21 sites in carbonate and red siltstone from the Cambrian Port au Port Group and Hawke Bay Formation in an effort to assess the autochthonicity of the Ordovician results and possible subsequent rigid block deformation history of the peninsula. The 21 sites produced 198 specimens, with 15 of those sites producing interpretable results. Demagnetization of the specimens revealed very weak magnetizations that were nevertheless resolvable as three recognizable magnetic components: *V*, *I*, and *M*. The *V* component is interpreted to be a Viscous Remanent Magnetization typically removed by 20 mT, showing a steep down, northerly direction that is similar to the present-day field direction. Leftover magnetization was coercively hard and was removed by thermal demagnetization. The *I* component unblocked over an intermediate temperature range up to 450°C, with a southeasterly shallow down or up direction. The *M* component was defined over a higher temperature range up to 580°C, in which magnetite unblocked and a shallow down, southeastern direction. A fold test on the 15 reporting sites was inconclusive, largely because the fold axis is similar to the ancient remanence direction, so it cannot be concluded whether the remanence was acquired before or after deformation. A preliminary paleopole was calculated (40° N; 151 E) and, when compared to the known apparent polar wander path of Laurentia, the paleopole falls approximately 30° east longitude off of the ~310 Ma portion of the path, implying that the study area may have experienced minor counterclockwise rotation since remanence was acquired. The specimens have not yet been fully demagnetized and require further thermal demagnetization steps at higher temperatures to unblock hematite, providing additional directional information.