

# Paleomagnetic Progress in Peri-Gondwanan Terranes of Cape Breton Island, Nova Scotia<sup>1</sup>

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Paleopoles from primary Ediacaran magnetization directions established the Gondwanan origin of northern Appalachian Avalonian terranes, but magnetic overprints in the same rocks also provide useful tectonic information. Thus, in the Southeastern New England Avalon Zone, virtual geomagnetic poles (VGPs) calculated from magnetic B and C components in both 595 Ma Lynn-Mattapan volcanic rocks and 490-488 Ma Nahant Gabbro track mid- and late-Paleozoic segments of the North American apparent polar wander path (APWP), suggesting the influence of Acadian and Neo-Acadian accretionary events. We report here on multi-vectorial magnetizations in pilot samples from Cape Breton Island, Nova Scotia, where the Bras d'Or and Mira terranes represent both Ganderian and Avalonian elements transferred from Gondwana. Overprint relationships in these terranes may constrain their amalgamation with each other as well as their docking with Laurentia. As in southeastern New England, secondary remanences can be identified in Cape Breton Island as consistent magnetization directions in rocks of differing ages. The S- to SSE-trending and gently downward pointing direction reported in 1985 by Johnson and Van der Voo in Middle Cambrian sedimentary rocks of the Bourinot Group (Bras d'Or terrane), for example, is also present in the 563 Ma Main à Dieu Formation and in 620 Ma Chisholm Brook Granite and East Bay Hill rhyolite (Mira terrane). This magnetization represents the C component already found around Boston, MA. The resulting VGPs in both areas occupy positions on the North American APWP consistent with a Neo-Acadian overprint, possibly related to the docking of the Meguma terrane against previously accreted Avalonia. Other overprint directions encountered in this investigation give rise to VGPs that do not coincide with the North American APWP, hence appear to reflect tectonic events independent of Laurentia. One such cluster comprising both Mira and Bras d'Or VGPs includes the paleopole also reported by Johnson and Van der Voo for volcanic rocks in the Bourinot Group. This relationship suggests that the two terranes were neighbours at moderate southerly paleolatitudes by ca. 505 Ma and allows the possibility that Bourinot volcanism played a role in overprinting older rocks, including 620 Ma East Bay Hills rhyolite (Mira) and 553 Ma Creignish Hills granite (Bras d'Or). Another intriguing observation from our preliminary data is a low-latitude cluster of VGPs that lies near the Late Ordovician overprint VGPs from Swedish limestones (after rotation into a North American reference frame). Other workers have previously interpreted these Baltic VGPs to reflect the collision between East Avalonia and Baltica during closure of the Tornquist Sea. Peeling away the overprints reveals a possible primary direction in 620 Ma rocks of the Mira terrane. Three pilot samples from two sites show normal and reverse polarity and a positive tilt test. VGPs from these samples resemble the VGP obtained from the 609 Ma Dedham Granite in Boston, Massachusetts.

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