New U-Pb (zircon) data from the northern Boisdale Hills show that rhyolite on Long Island and syenogranite of the nearby Mount Cameron pluton have similar ages of $505 \pm 3$ Ma and $509 \pm 2$ Ma, respectively. These ages are similar to those known or inferred from some felsic plutonic units elsewhere in central Cape Breton Island and suggest that latest Cambrian to earliest Ordovician igneous activity was widespread in the Bras d’Or terrane. The new dates also suggest that stratigraphic and structural relationships in the Boisdale Hills are more complex than previously interpreted.

The dated rhyolite and other volcanic and sedimentary rocks in the northern Bourinot belt in the Boisdale Hills were previously included in undivided Middle Cambrian Bourinot Group. In the southern Bourinot belt, the Bourinot Group was subdivided into the Eskasoni, Dugald, and Gregwa formations. The Eskasoni Formation is dominantly a bimodal volcanic suite with petrological characteristics indicative of origin in a continental within-plate tectonic setting. Its present contacts, both with adjacent older metamorphic and plutonic rocks and with the apparently overlying fossiliferous Dugald and volcanogenic Gregwa formations, are faulted. Our new mapping demonstrates that the Eskasoni, Dugald and Gregwa formations can be extended into the central Bourinot belt where they were previously undivided. However, continuity cannot be demonstrated between these Middle Cambrian units and the dated volcanic and associated sedimentary units in the northern Bourinot belt. Hence, assuming that both U-Pb and fossil ages are correct, our interpretation is that the Upper Cambrian - Lower Ordovician Northern Boisdale Hills volcanic unit is younger than the Bourinot Group, although petrochemical data suggest that it formed in a similar tectonic regime.

The presence in the Bourinot belt of fauna characteristic of the Acado-Baltic faunal province appears to tie the Bras d’Or terrane to other Avalonian (peri-Gondwanan) terranes. However, the Bras d’Or terrane differs from the adjacent Mira terrane which includes Lower as well as Middle and Upper Cambrian units and lacks volcanic and plutonic rocks of this age.