Deformation and Igneous Intrusion in the Cobequid Highlands: relation to extension of the Magdalen Basin

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The Cobequid Highlands occupy a pivotal position with respect to some of the major structures controlling Devono–Carboniferous sedimentation. The geology of the highlands is dominated by east–west faults parallel to the Cobequid–Chedabucto fault. These may have acted at times as transfer faults for major extensional structures in the Magdalen Basin including the Margaree Shear Zone. Distribution patterns and sequences of igneous rocks in the Cobequid Highlands provide information on sequential styles of deformation at this time. The age of the igneous rocks is only broadly constrained, but new dating is being carried out by Nearing at Dalhousie.

New mapping and aeromagnetic data show that the major diorite plutons have orthogonal outlines, suggesting that they occupy pull–apart space controlled by the major east–west faults. Diorites both cut and are cut by granite plutons, with magma intermingling relationships suggesting approximately co–existing magmas. All the plutonism is probably broadly synchronous based on Rb/Sr isochrons; recent U/Pb dating of zircons by Doig and Murphy suggests ages close to the Devonian–Carboniferous boundary. Biostratigraphic and Rb/Sr isochron evidence for a Devonian age for the Fountain Lake Group volcanism in the eastern Cobequids suggests that these volcanics predate the major plutonic phase.

The stretching lineation observed in the Cape Chignecto pluton appears to be partly syn–magmatic. This deformation culminated in the Namurian uplift event that caused thrusting of the Fountain Lake Group near Squally Point. Evidence of strike–slip synmagmatic deformation is also seen in the Hart Lake–Byers Lake pluton near the Rockland Brook fault. Further evidence for synchronous deformation and igneous activity is provided by undeformed dykes cutting deformed dykes, plutons, and the thrust faults in the Fountain Lake volcanics at Squally Point. Detailed mapping by Pass shows that late dykes are associated with east–west pull–apart.

The latest intrusive phase appears to be pods on the scale of hundreds of metres of gabbro with feldspar megacrysts: these are particularly abundant in the eastern Cobequids. The age of the youngest igneous activity is uncertain, but is probably post–Namurian.