
**Structure and timing of deformation and
metamorphism of the Baie Verte Peninsula,
Newfoundland Appalachians**

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On Baie Verte Peninsula (BVP), Newfoundland, the Baie Verte Line (BVL) forms a prominent zone of steep WNW-dipping fabrics separating the Laurentian margin rocks (Fleur de Lys Supergroup; Humber Zone) to the west from ophiolite and arc complexes of the Notre-Dame subzone (Baie Verte Oceanic Track; BVOT), to the east. East of the BVL, the main fabrics in the BVOT and Silurian cover are mainly oriented E-W. This abrupt structural curvature is known as the Baie Verte Flexure and has been interpreted to be inherited from the original geometry of the Laurentian margin.

Numerous published radiometric ages indicate that the predominant amphibolite-facies metamorphism of the Fleur de Lys Supergroup was Salinic (Silurian), not Taconic (Ordovician), whereas east of the BVL, most data in the Notre Dame subzone provided Middle Devonian to Early Carboniferous cooling ages. Correlating fabrics and metamorphic assemblages across the BVL is one of the main challenges to resolve the

structural evolution of the peninsula. New $^{40}\text{Ar}/^{39}\text{Ar}$ and U-Pb geochronologic data allow for better age control on deformation and metamorphic events, which improves correlations across the BVP.

This area has been affected by at least four phases of regional deformation. D_1 fabrics are strongly overprinted west of the BVL and are cryptic east of it. D_1 age constraints from the Fleur de Lys Supergroup range from ca. 468 to 459 Ma, and are interpreted to be related to west-directed obduction of ophiolites, arc-continent collision and burial of the Humber Zone during the Ordovician Taconian Orogeny. D_2 represents the main tectonometamorphic phase. Along the BVL, it is associated with penetrative steep SSW-trending fabrics attributed to east-directed thrusting and sinistral shear, and is dated between ca. 427 and 417 Ma. East of the BVL, the main fabric, correlated to S_2 , is mainly west-trending, associated with south-directed thrusting, greenschist to amphibolite facies metamorphism, affecting the Silurian Cape St. John group, and therefore has to be younger than ca. 426 Ma. D_2 is interpreted to be related to transpression during the Silurian Salinic Orogeny. D_3 west of the BVL is associated with a SSW-trending crenulation fabric and shear zones, mainly concentrated along the BVL. Kinematics of D_3 along the BVL mainly suggest dextral motion, with a component of transpression and transtension. East of the BVL, shallowly-inclined F_3 folds have been interpreted to be cogenetic with inversion of shear zones and reverse faults during dextral transtension. D_3 is thought to be contemporaneous with the unroofing of a tectonic window of Humber zone rocks (Ming's Bight Group) east of the BVL, where timing of deformation and cooling range between ca. 405 and 360 Ma. Finally, NE- to NW-trending F_4 cross folds are documented in the central (Rambler Mines area) and northeastern (Cape St. John Group) parts of the peninsula. Their age is unconstrained beyond being post- D_3 .

The long-lived non-coaxial nature of deformation has played a major role in defining the Baie Verte Flexure. The structure and evolution of northern Baie Verte Peninsula resemble a large-scale long-lived oblique transfer zone between the BVL and the Green Bay Fault, which acted in transpression during the Salinic Orogeny and was later reactivated as a Devonian–Early Carboniferous dextral transtensional zone.