

Evolution of the Fredericton Trough

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A system of post-Taconian horsts and grabens delimit the tectonostratigraphic zones of New Brunswick. The Fredericton Trough and Matapedia Basin represent graben structures that developed astride the older tectonic grain beginning in the latest Ordovician and earliest Silurian.

Uplifted blocks of Taconian basement on the margins of the Fredericton Trough are represented by the Miramichi Massif in the northwest and Cookson Inlier in the southeast. Shallow-water Silurian sediments (Oak Bay Formation and Waweig Formation in the southeast, "Canterbury conglomerate and limestone" in the north-

west) are preserved on these positive areas.

Small inliers of similar basement are found in the Becaguimec River area (overlain by Upper Ordovician conglomerate) on the southeastern margin of the Matapedia Basin and in the centre of the Basin at Mars Hill, Maine.

Volcanism initiated during the rifting is restricted to narrow down-faulted blocks on both margins of the Fredericton Trough (Mascarene Group, Long Reach Formation, Jones Creek Formation in the southeast; Dorrington Hill Formation, Hartin Formation in the northwest). The bimodal volcanics varied from submarine in the Early Silurian to sub-aerial in the Early Devonian.

Late Ordovician? to Early Silurian sedimentation within the Trough consisted of fine-grained, red and green sandstone and siltstone (Queen Brook Formation in the southeast; "Stanley beds" in the northwest). Later thick deposits of Silurian greywacke (Digdequash Formation, "Burtts Corner greywacke") reflect more rapid uplift of the source areas on the flanks of the Trough. The greywacke is overlain by

shallow-water calcareous sandstone deposits of Early Devonian age (Flume Ridge Formation) representing a mature rift stage of sedimentation.

During the subsequent compressional stage, vergences of second folds indicate that the sedimentary rocks of the Trough were thrust over the uplifted blocks on its opposite flanks. Syntectonic to post-tectonic plutons (St. George and Pokiok batholiths) ranging from Early Devonian to Early Carboniferous intruded the faulted margin of the Trough. Displacement of Early Carboniferous basalt indicates 800 m of down-throw on the southeastern side of the Fredericton Fault. This latest movement was related to the development of the Carboniferous Moncton Basin farther to the southeast.

The presence of horst and graben structures trending northeasterly across the normal east-northeasterly tectonic trend of the Appalachians may result from New Brunswick's position relative to the Saint Lawrence Promontory. Since Acadian tectonism in New Brunswick can be related to block faulting, no Devonian accretionary terranes will exist here north of the Avalonian Platform.