

Tournaisian thrusting in the northeastern Cobequid Highlands, Nova Scotia and its regional significance

D.J.W. Piper¹ and G. Pe-Piper²

¹*Geological Survey of Canada (Atlantic), Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2, Canada < piper@agc.bio.ns.ca >*

²*Department of Geology, Saint Mary's University, Halifax, Nova Scotia B3H 3C3, Canada*

Distributed crustal-scale shear faulting in the Cobequid Highlands in the middle Devonian to Carboniferous resulted from the oblique convergence of the Meguma and Avalon terranes. In the northeastern Cobequid Highlands, seismic reflection profiles show Neoproterozoic and lower Palaeozoic rocks, together with enigmatic foliated rocks, overlying early Carboniferous Fountain Lake Group. The foliated rocks form the hanging wall of a north-vergent thrust fault. Their protolith is inferred from petrography and geochemistry to be principally Neoproterozoic rhyodacitic tuffs and late Palaeozoic hypabyssal intrusions. The age of thrusting is stratigraphically constrained to the late Tournaisian - early Viséan and sericite from mylonite yielded a Tournaisian K-Ar age of 352 ± 8 Ma. The thrusting occurs at the base of a

tectonic-escape sheet and resulted from a constraining bend in the master Rockland Brook fault. Farther west, where the Rockland Brook fault trends almost E-W, Tournaisian extensional features include the Nuttby basin and widespread small gabbro intrusions. At deeper structural levels, granite plutons were intruded in a similar tectonic regime of thrusting and local extension through tectonic escape. The emplacement process resulted from progressive widening of initial dykes, analogous to those deformed in the thrust hangingwall. The regional pattern of Tournaisian half-graben formation in the southern Maritimes Basin, synchronous with pluton emplacement and thrusting in adjacent horsts, is compared with similar Miocene deformation in the southern Aegean sea and is argued to be inconsistent with the postulated regionally

extensive detachment termed the Margaree shear zone.