

Interpretive Notes

The Meguma Group, the oldest rocks exposed in the area, comprises the Goldenville Formation, an unfossiliferous grey quartz metawacke with about 15 percent interbedded green slate, conformably overlain by the Halifax Formation, a black slate with silty metawacke containing rare Early Ordovician graptolites elsewhere (Crosby, 1962). The base of the Goldenville Formation is not exposed, but the formation is at least 3000 m thick in the map area. The Halifax Formation is at least 1000 m thick in the map area; an unknown thickness of upper Halifax has been removed by erosion.

Cleavage developed before the Meguma Group beds were folded. In response to north-south directed horizontal compression, some quartz grains were dissolved at points of high stress, and mica was concentrated and aligned to form a spaced cleavage in metawacke and a continuous cleavage in slate beds. Mass balance calculations by Fueten (1983) show that about 20 percent of the quartz was dissolved from metawacke beds. Bedding-parallel quartz veins with crack-seal texture (Ramsay, 1980) indicative of high fluid pressure in the Goldenville Formation are the repository for some of the dissolved silica. The veins in places also contain calcite, arsenopyrite, chlorite and gold.

Subsequent to cleavage formation, buckle folding of beds and rotation of cleavage took place by a particulate flow mechanism (Borradaile, 1981) which was probably enhanced by high intergranular fluid pressure. Bedding-parallel flow caused the largest cleavage rotation in slates and the least cleavage rotation in sandy metawacke beds (Henderson, 1983). The folds are upright to south-verging with wavelengths of 2 to 10 km. In cross section, anticlines are rather flat-topped and synclines are tight and narrow. In longitudinal section the folds abruptly terminate or bifurcate, but in general they are cylindrical rather than conical or an échelon. Reynolds and Muecke (1978) reported a minimum age of between 415 and 400 Ma for the deformation (Acadian Orogeny) which produced the regional cleavage and large folds in the Meguma Zone.

Numerous muscovite-biotite granite plutons intruded the folded Meguma Group without appreciable wall-rock deformation during a relatively short period from 375 to 355 Ma ago (Clarke et al., 1980). Granitic bodies occur only near the north margin of the Meguma Zone in the map area, and may have caused growth of garnet and randomly oriented staurolite porphyroblasts in slate, and very fine-grained tremolite/actinolite from carbonate cement in some metawacke beds.

Although the primary fabric of the granite is hydromorphic granular, penetrative shearing in a belt about 3 km wide south of the West River-St. Mary's Fault has produced protomylonite, mylonite, ultramylonite and some pseudotachylite in the granites and metamorphosed sediments. The sense of shear is dextral, and is clearly indicated by asymmetrical C and S fabrics in originally undeformed granite (cf. Berthé et al., 1979). The dextral shearing antedates the formation of widely-spaced northwest-striking sinistral faults. These faults are probably coeval with conjugate sinistral and dextral kinking of the Acadian cleavage. In the map area dextral kink bands are the dominant member of the set.

Horton Group of Early Carboniferous age (Bell, 1960) contains boulders of sheared Meguma Group rocks and granite that were derived from a highland to the south and deposited as conglomerates against the scars of the West River-St. Mary's Fault. There is no evidence that this normal fault was active after Carboniferous sedimentation. West of the map area Carboniferous sediments overlap the Meguma Group unconformably many kilometers south of the westward projection of the West River-St. Mary's Fault (Benson, 1967). The intensity of Variscan (Alleghenian) deformation of the Horton rocks increases north of the map area towards the Cobequid-Chedoke fault system. At two localities along St. Mary's River in the map area pebbles are fractured and extended in a subhorizontal northeast-southwest direction. Farther north, finer grained, more regularly bedded Carboniferous sedimentary rocks in Hopewell and Lochaber map areas (Benson, 1967, 1974) define a system of right-stepping northeast-southwest trending en échelon folds indicative of dextral transcurrent shearing during the Variscan deformation.

A northwest-striking basalt dyke about 2 m wide and 2 km long occurs on Sober Island. The age of the dyke is not known. It is not deformed and may have intruded along a fracture parallel to the northwest-striking sinistral faults.

Much of the area is covered by Late Wisconsin glacial drift. Mainly two varieties of till are present: thin, sandy, grey ground moraine of very local derivation, and drumlinoid till rich in red clay derived from sediment in the Northumberland Basin (Grant, in Prest et al., 1972, p. 3-8). The relief shading on the geological map shows the drumlins very well.

Economic Geology

Gold-quartz veins of the Goldenville Formation have been mined since the 1860s, but production declined rapidly as near-surface deposits were depleted in the early 20th century. No gold mines are currently active in the Meguma Zone. The Goldenville District has the largest production record (1862-1946) and the largest total production (210,132 oz). Other gold districts within the map area with significant production are Salmon River (81,049 oz), Harrigan Cove (7,946 oz), Eum Secum (1,275 oz), and Cochrane Hill (1,192 oz). Malcolm and Faribault (1929) described in detail the geology of Nova Scotia gold deposits.

Two veins of argenteriferous galena occur in brecciated Goldenville Formation along the West River-St. Mary's Fault west of Glenville. Some development work has been carried out since their discovery in 1873, but there has been no record of production.

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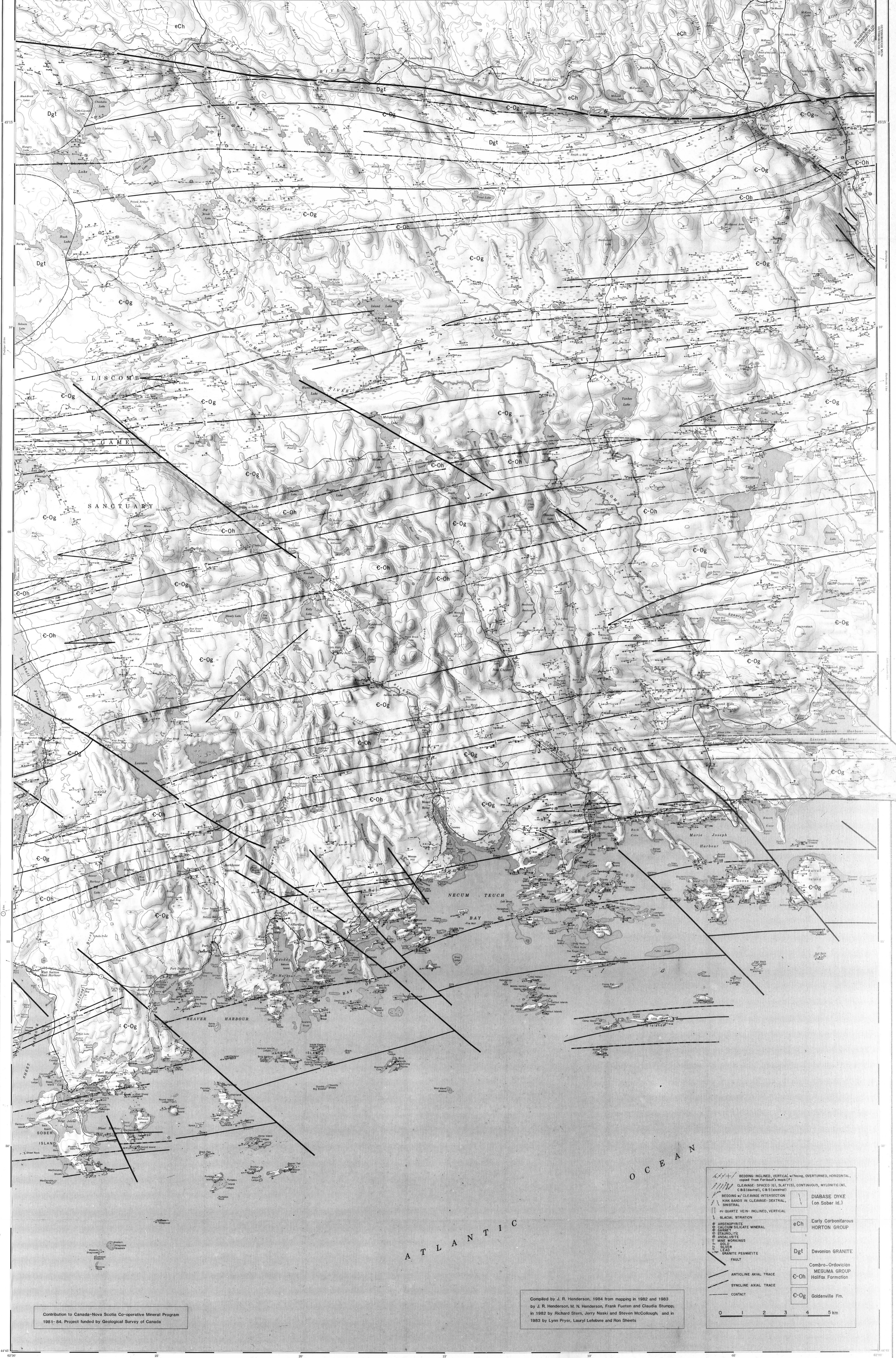
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	BEDDING INCLINED, VERTICAL, etc.
	CLEAVAGE SPACED (O), SLATY (S), CONTINUOUS, MYLONITIC (M), C & S (GARNET), C & S (BIOTITE)
	BEDDING w/ CLEARANCE INTERSECTION
	KINK BANDS IN CLEAVAGE (D) DEXTRAL, (S) SINISTRAL
	QUARTZ VEIN (I) INCLINED, VERTICAL
	GLACIAL STRIATION
	ARSENOPYRITE
	CALCIUM SILICATE MINERAL
	STAUROLITE
	ANDALUSITE
	MINING WORKINGS
	SOLID
	LEAD
	GRANITE PSAMATITE
	FAULT
	ANTICLINE AXIAL TRACE
	SYNCLINE AXIAL TRACE
	CONTACT
	eCh Early Carboniferous HORTON GROUP
	Dgt Devonian GRANITE
	C-Oh Cambro-Ordovician MEGUMA GROUP Halifax Formation
	C-Og Goldenville Fm.

0 1 2 3 4 5 km