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New fossil evidence for an Early Cambrian age  
for the lower Goldenville Formation  
(Meguma Group), southwestern Nova Scotia

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The oldest unit in southwestern Nova Scotia, the Cambrian Goldenville Formation, was considered to be a monotonous sequence of undividable thick metasandstone beds. However, based on recent field work related to the Southwest Nova Mapping Project combined with high-resolution aeromagnetic data, a thick interval of metasiltstone (High Head Member) containing abundant trace fossils was recognized as a distinct, regionally mappable unit. A complete section of the member is exposed along the coast in the High Head area north of Yarmouth. It consists of 780 m of well laminated, fine-grained metasiltstone. A series of 7–8 thin (30 cm to 1 m wide) metasandstone beds separated by thin (< 25 cm wide) metasiltstone beds are present in the middle of the section. The base of the metasandstone beds are typically coarse-grained to conglomeratic and fine upwards into laminated to cross-bedded fine-grained metasandstone.

Also in the area of the metasandstone beds are two thin (1 m wide) mafic sills. The lower sill displays peperite-like structures along its lower contact with the metasiltstone suggesting that it originally intruded into unconsolidated wet sediments. Two thin (< 1 m wide), cleaved mafic dykes occur farther down section. Other than the fine laminations and rare ripple marks and cross-bedding, the High Head member lacks sedimentary structures.

The base of this member is gradational over several meters with an underlying unit of massive metasandstone (1–3 m wide) interbedded with minor metasiltstone and rare slate. The upper contact is also gradational and marked by the presence of several thin (< 10 cm) metasandstone beds that increase in thickness (> 1 m) and abundance up section into the overlying unit. Overall, the unit strikes northeast and dips steeply (~ 60°) to the southeast. A steep (~ 80°) northeast-trending and southeast-dipping, weak to moderately developed cleavage is present that results in a shallow southwest-plunging intersection lineation. Kink bands are common throughout the section.

The High Head member appears to be barren of shelly fossils but trace fossils are abundant. Approximately 20 different trace fossil morphologies have been recognized, the most significant being the index trace fossil *Oldhamia*. *Oldhamia* is a characteristic ichnofossil of fine-grained, deep-water siliciclastic sequences of Early to early Middle Cambrian age. This occurrence is important because it is the first in Nova Scotia and the first from the Meguma Group and its presence suggests that the Goldenville Formation, below this occurrence, may extend into the Precambrian.