

The Hammondvale metamorphic suite: part of an exhumed Neoproterozoic convergent margin in the Avalon Terrane, southern New Brunswick

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The Hammondvale metamorphic suite consists of relatively high-pressure/low-temperature metamorphic rocks located at the northwestern margin of the Caledonian Highlands near Hammondvale (NTS 21H/11,12). It is in faulted contact along its southeastern margin with the ca. 560-550 Ma volcanic and sedimentary rocks of the Coldbrook Group and associated plutonic units. On its northwestern margin the suite is unconformably overlain by sedimentary rocks of the Carboniferous Windsor Group, but drill cores show that the suite extends under the Carboniferous cover to the northwest toward the Caledonia-Clover Hill Fault.

The Hammondvale metamorphic suite consists dominantly of albite- and garnet-porphyroblastic mica schist with a prominent foliation defined by alternating albite- and muscovite ± biotite- rich layers. A strong mineral lineation is locally developed and defined by recrystallized quartz ribbons

and asymmetric porphyroblasts. Minor marble and calc-silicate layers are typically banded with thin muscovite-rich layers. Amphibolite and quartzite layers and felsic sills/dykes occur rarely. Pressure and temperature estimates from mineral assemblages in the mica schist, marble, and calc-silicate rocks indicate that metamorphic conditions of 8.5-9.8 kbar and 500-590°C were achieved. Three ⁴⁰Ar/³⁹Ar muscovite dates range from 617-603 Ma and provide minimum ages for the high-pressure metamorphism in this unit. These argon ages are similar to those obtained from detrital muscovite in the Cambrian Saint John Group, suggesting that the Hammondvale metamorphic suite was exposed by Early Cambrian time.

The Hammondvale metamorphic suite has traditionally been interpreted to be a metamorphic equivalent of part of the Green Head Group. However, the composition of the suite, the

style of metamorphism and deformation, and muscovite ages are significantly different from those in the Green Head Group. The muscovite cooling ages suggest a more plausible relationship with the ca. 620 Ma metavolcanic and metasedimentary rocks of the Broad River Group exposed farther to the southeast. We interpret the Hammondvale metamorphic suite to represent an isolated fragment of part of

an accreted subduction complex, hence confirming the presence of a major suture between the Avalon terrane and now-adjacent inboard terranes previously included in the Avalon terrane. Based on the present configuration of units, subduction was to the present southeast, under the Broad River Group.