

## The Hope Valley Shear Zone In Rhode Island

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The Hope Valley shear zone (HVSZ) is a major late Paleozoic structure separating two distinct Avalonian basement terranes in southeastern New England. The Esmond-Dedham terrane (eastern) is largely composed of variably deformed 620 Ma granitic rocks (tonalite to granite). These rocks are locally overlain by latest Precambrian to Cambrian marine sediments, intruded by Ordovician to Devonian anorogenic plutons, and overlain by Pennsylvanian nonmarine basins. The Hope Valley terrane (western) is largely composed of highly deformed, leucocratic granite gneisses of late Precambrian age (~ 600 Ma).

Rocks of the Esmond-Dedham terrane are weakly to moderately deformed except within 15–20 km of the HVSZ. Strong linear and/or planar fabrics are developed in late Precambrian and Devonian (370 Ma) rocks near the HVSZ, and one Devonian pluton is truncated by the shear zone. Lineation trends, asymmetric feldspar augen and quartz c-axis fabrics in highly deformed gneisses proximate to the HVSZ all

indicate a major component of dextral shear.

The HVSZ is a major structure along which the Esmond-Dedham terrane was juxtaposed against the Hope Valley terrane during the Alleghanian orogeny. The accretion of the Esmond-Dedham terrane appears to be the cause of Alleghanian tectonism in southern and western Rhode Island and easternmost Connecticut. In contrast, the Hope Valley terrane was accreted to North America during the Ordovician or Devonian, and appears to underlie the Merrimack synclinorium. Along with other similar and related rocks, the granite gneisses of the Hope Valley terrane probably constituted the eastern basement block of the Acadian orogeny. The sequential accretion of "Avalonian" rocks in southeastern New England resolves some discrepancies among earlier tectonic models of the New England Appalachians. The tectonic interpretation of other eastern basement regions in the northern Appalachians might be approached in this context.