

**Geochronology and regional tectonic implications of Silurian deformation
in the Nashoba Terrane, southeast New England**

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The Nashoba Terrane is fault-bounded and lies between the Avalon Terrane immediately to the east and the Acadian-deformed Merrimack Belt (Kearsarge-Central Maine Synclinorium-KCMS) to the west. Recent U/Pb age determinations and geochemical data from metavolcanic and intrusive rocks within the terrane have provided a new perspective on the tectonics of this terrane and the role it played

in the evolution of the eastern margin of the Appalachian orogen during the mid-Paleozoic.

The Fish Brook Gneiss, previously interpreted as Precambrian basement, has yielded a Cambro-Ordovician U/Pb abraded zircon crystallization age of $499 \pm 6/-3$ Ma. This date constrains the age of the metavolcanic and metasedimentary rocks of the terrane to the interval between late Cambrian

and early Silurian. Geochemical signatures from the mafic metavolcanics indicate the Nashoba Terrane was a magmatic arc during at least part of this time period.

During the Silurian, the Nashoba Terrane underwent multiple deformation, metamorphism to the sillimanite-K-feldspar zone and intrusion by two types of magmas, calc-alkalic diorite-granite and peraluminous granite. Monazite from Fish Brook Gneiss gives an age for the metamorphism of 425 ± 2 Ma. A crystallization age for the younger phase of the Andover Granite, thought to be anatectically produced during the metamorphism, was determined by U/Pb on zircon to be 412 ± 2 Ma.

The Nashoba Terrane and consequently the eastern margin of the Appalachian orogen in southeast New England experienced a major orogenic event during the mid-Silurian, much earlier than the timing of the traditional "Acadian" deformation to the west. The orogenic cycle began earlier in the east as the Nashoba Terrane, along the leading edge of the converging eastern block, impinged (perhaps obliquely) upon the KCMS in the early-to mid-Silurian, well prior to the docking of Gondwana. The deformational front initiated at this time subsequently migrated to the west and northwest during the next 50 Ma, culminating in the Acadian orogenic phase of west-central New England.