

GEOCHRONOLOGY OF SOUTHWESTERN CONNECTICUT

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U-Pb dating of plutonic and metamorphic rocks in southwestern Connecticut shows that magmatism, metamorphism, and deformation that should be associated with the major orogenic episodes of the New England Appalachians are not distinct, temporally restricted events. Rather these events recur over relatively short time intervals. This makes the definition of what events should be categorized as Taconian, Acadian, or Alleghanian difficult. The figure below emphasizes this point. Plotted are some of the U-Pb ages collected for southwestern Connecticut. Squares represent U-Pb zircon ages for plutonic rocks and circles U-Pb age constraints on metamorphism. It should be clear that there is little break in either magmatism or metamorphism from 450 to 360 Ma. Evidence for Ordovician magmatism include U-Pb zircon ages of 514 Ma for a biotite granite west of Cameron's Line and U-Pb zircon ages of 453 ± 3 Ma (Brookfield), 446 ± 2 Ma (Beardsley), and 446 ± 2 Ma (Newtown) from plutonic rocks east of Cameron's line. Titanites from Brookfield rocks yield ages 10 to 14 Ma younger than the zircon ages, consistent with post-intrusive cooling below their blocking temperature for Pb diffusion. West of Cameron's Line the regional foliation in schists (Dalton Fm.) is cut by granites with zircons yielding 445 ± 2 Ma ages, showing that much of the deformation is older. Evidence for Silurian magmatism include U-Pb zircon ages 438 to 354 Ma (Pumpkin Ground). Evidence for Silurian metamorphism include U-Pb xenotime ages of 435 Ma from the 511 Ma biotite granite west of Cameron's Line, U-Pb monazite ages of 420 ± 8 Ma, and U-Pb garnet ages of 415 to 418 Ma from schists in the Bridgeport area (Wepawaug Schist, The Straits Schist, Trap Falls Fm). Evidence for Late Silurian-Early Devonian magmatism include U-Pb ages of 406 ± 13 Ma from leucogranites in the Bridgeport area (Ansonia). Evidence for Early Devonian metamorphism include U-Pb ages of 398 ± 5 Ma from staurolites and kyanites from schists from Bridgeport to Waterbury (Straits Schist). Evidence for middle Devonian metamorphism include U-Pb monazite ages of 383 ± 3 Ma from these same metapelites. U-Pb zircon ages on syn- to post-kinematic pegmatites in the East Derby fault near New Haven shows that shear zones were active locally at approximately the same time (390 - 400 Ma). U-Pb zircon ages from granites (291 ± 4 Ma; Pinewood Adamellite) and pegmatites (360 ± 5 Ma and 240 ± 3 Ma) in the Bridgeport area show that magmatism and deformation continued from the Mississippian into the Triassic. This data points out how difficult it is to define the intrusion of individual plutons or pegmatites, growth of new minerals during metamorphism, and deformation of rocks regionally as being specifically related to individual orogenic episodes. This requires a better definition of what events should be grouped with individual orogenies and how the orogenic events should be distinguished in basement rocks.

