



29-3: THE PRESCOTT PLUTONIC COMPLEX OF CENTRAL MASSACHUSETTS: GEOCHEMISTRY AND NEW INTERPRETATIONS RECONCILING AGE DATES AND CONTACT RELATIONS

Monday, March 19, 2018

08:40 AM - 09:00 AM

DoubleTree by Hilton - Emerald Ballroom III

The Prescott Complex is a bimodal, 30 km^2 plutonic body, occupying most of the Prescott Peninsula in the Quabbin Reservoir. It is exposed in the Prescott Syncline between the Kempfield Anticline (west) and Main Body of Monson Gneiss (east), both of Monson Gneiss, which is part of the metamorphosed Taconic arc plutonic complex of the Bronson Hill Anticlinorium (locally 454-442 Ma, Tucker and Robison, 1990). It cuts adjacent Ammonoosuc Volcanics (453 Ma) and Partridge Formation (449 Ma), but not Monson Gneiss. The larger part of the pluton is fine- to medium-grained 2 km^2 Cooleyville gneiss (449 Ma). The smaller part (7 km^2) is Packard Gabbro, fine- to very coarse-grained, mostly in a 7 km^2 body in the north (407 Ma). The Cooleyville age is within the range nearby Taconian gneisses, Ammonoosuc Volcanics, and Partridge Formation, but the Lower Devonian Packard age is equivalent to the nearby Emsian Erving Formation, which has layered amphibolites.

Geochemically, the Prescott rocks are calc-alkaline and very similar to the Taconian gneisses, Ammonoosuc Volcanics, and Partridge Formation. All have similar, prominent arc-associated anomalies on multi-element diagrams (Cooleyville Gneiss: negative Nb, Zr, Sr, Eu, Ti, positive Th, Pb, Li; Packard Gabbro: negative Nb, Zr, positive Th, Pb, Li). The Erving Formation amphibolites have anomalies identical to the Packard Gabbro, but are LREE-depleted whereas all others are slightly to moderately LREE-enriched.

We suggest that the Cooleyville is a Taconian arc pluton, intruded east of the main arc axis. Following Taconian subducted slab detachment, we propose a pair of post-442 Ma, pre-Clough Quartzite detachment faults that transported the Cooleyville Gneiss, Ammonoosuc Volcanics, and Partridge Formation from east of the arc axis, west and down to their current positions, explaining: 1) Cooleyville Gneiss crosscutting the Partridge and Ammonoosuc, 2) no crosscutting relationships between the Monson Gneiss, etc., and overlying units, 3) the regional geographic pattern of Ordovician units in contact with the Taconian gneisses, and 4) overlapping ages of the Ordovician units. The Packard Gabbro and Erving amphibolites are interpreted as melts from remnant Taconian arc mantle, reactivated by Acadian convergence that also produced the voluminous New Hampshire Magma Series.

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