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19-7 - ACADIAN, NEO-ACADIAN, AND ALLEGHENIAN TECTONIC REACTIVATION OF TACONIC THRUSTS IN THE NORTHERN NEW ENGLAND APPLACHIANS



Monday, 18 March 2024



10:20 AM - 10:40 AM



Merrimack Room (Doubletree by Hilton)

Abstract

We present results of integrated $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology and microstructural analyses of samples from Taconic thrust faults of the northern New England Appalachians that provide evidence for reactivation during the Acadian, Neo-Acadian, and Alleghenian orogenies. $^{40}\text{Ar}/^{39}\text{Ar}$ ages c. 420 Ma from western frontal thrusts of the Green Mountains and Berkshire Massif have been interpreted previously to reflect partial resetting of Taconic ages during Acadian metamorphism. In Massachusetts and southern Vermont, these W-directed thrusts transport Grenville basement and its cover sequences over Cambrian-to-Ordovician phyllites and graphitic schists. Our recent investigations of these faults, however, yield a suite of c. 420 Ma $^{40}\text{Ar}/^{39}\text{Ar}$ ages obtained from syn-tectonic mica in mylonites and footwall schist/phyllite that are interpreted, rather, to reflect a pulse of W-directed thrusting. This interpretation that these ages record the timing of deformation is based, in part, on the preservation of quartz and feldspar dislocation creep microstructures (i.e., lack of evidence for static recrystallization), as well as the regional distribution of these data relative to Acadian metamorphic isograds. These results align with recent findings for the timing of formation of the Green Mountain Anticlinorium in northern Vermont, as well as detrital zircon data that require isolation of the Catskill Basin from the Connecticut Valley-Gaspe Basin (CVGB) at the onset of deposition around that time. Mylonites and samples from the adjacent footwall schists and phyllites also locally record evidence for minor to wholesale resetting c. 355 Ma associated with a younger phase of ductile deformation. Further evidence for partial resetting of $^{40}\text{Ar}/^{39}\text{Ar}$ ages c. 250 is associated with hematite-rich seams parallel to the mylonitic foliation and cross-cutting fractures. We explore how these age populations relate to those obtained from, for example, the CVGB and Chester and Athens Domes, and their implications for correlating surface geology with results from seismic imaging of the lithospheric and mantle structure in the northern New England Appalachians.

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