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# DID THE BREVARD FAULT ZONE CONTROL NEOACADIAN CHANNEL AND ESCAPE FLOW IN THE SOUTHERN APPALACHIAN INNER PIEDMONT? EVIDENCE FROM MONAZITE U-PB GEOCHRONOLOGY AND REE GEOCHEMISTRY

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In the last two decades, crustal channel and escape flow, wherein long-wavelength ductile flow of lower crustal material transports mass and heat out of the collision zone, have remained among the most impactful ideas proposed to explain shortening accommodation in continental collisions. In the Inner Piedmont (IP), southern Appalachians, channel and escape flow have been previously proposed for the Devonian-Mississippian Neoacadian orogeny, and the deep exhumational level of the IP relative to other orogens in which channel flow has been proposed makes it ideal for testing the channel and escape flow models. In the IP channel flow model, the Brevard fault zone (BFZ) footwall is interpreted to buttress orogen-normal crustal flow of the hot IP in northwestern North Carolina and drive escape flow to the southwest. However, the polymetamorphic and deformational history of the southern Appalachians has made it difficult to isolate the spatial and temporal extent of thermal and deformational events driving flow of the interpreted channel. To address this, we use *in situ* laser ablation split stream monazite (Mz) U-Pb geochronology and geochemistry coupled with quantitative P-T data to define the extent and conditions of Paleozoic metamorphic events in the southern Appalachians of North Carolina. In this area, northwest of the BFZ, Mz dates indicate mostly Taconic (~462 Ma) and minor Neoacadian metamorphism (~368 Ma) whereas IP data show Neoacadian metamorphism (~363–330 Ma) with no Taconic ages. IP Mz also records a transition over time from HREE-poor to HREE-rich compositions, indicating Mz growth associated with both garnet growth and breakdown, respectively. This, along with diffuse chemical profiles and resorption textures in garnet, suggests that IP Mz records prograde to retrograde metamorphism. Furthermore, P-T estimates from the eastern Blue Ridge of northwestern NC are 5–9 kbar and 565–730 °C, whereas peak Neoacadian metamorphism in the IP core reached 5–8 kbar and 750–850 °C. We interpret this to indicate that the BFZ footwall acted as both a thermal and rheological boundary in northwestern NC during Neoacadian metamorphism, supporting earlier interpretations. Future work will assess the timing and conditions of metamorphism further south into the Blue Ridge and IP of South Carolina, Georgia, and Alabama.

Session No. 40

T18. Alleghanian Overprinting of Pre-Alleghanian Accreted Terranes
Sunday, 19 March 2023: 8:00 AM-12:00 PM

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