

P-T ESTIMATES OF “RETROGRESSED ECLOGITES” IN THE EASTERN BLUE RIDGE

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North Carolina Eastern Blue Ridge metabasites within the Ashe Metamorphic Suite have been largely recognized as eclogite bodies whose primary metamorphic assemblage includes garnet, omphacite, quartz, and rutile. Plagioclase and hornblende appear as retrograde phases. Two sites within the province, Boone and Bakersville, lie approximately 50-60km apart from one another. Their P-T estimates are insufficiently constrained, and Ti-bearing minerals can help refine their P-T paths. Indeed, rutile is stable at higher pressures than titanite, and both can incorporate Zr into their lattice structures with increasing temperature.

Using the CAMECA SXFive EMPA at the American Museum of Natural History (New York), X-ray maps and quantified profiles were obtained on thin sections from both sites and processed using XMapTools 3.4.1 (Lanari et al., 2014). Application of the Zr-in-rutile thermometry model established by Ferry & Watson (2007) generated the following temperature estimates: In three samples from Bakersville, rutile inclusions in garnet yield prograde temperatures of 625-630°C, while rutile grains in the matrix recorded peak temperatures of 700-720°C. Two samples from Boone contain some rutile grains mostly at the edge of garnet and in the matrix that both yield temperatures of 600-620°C.

These preliminary results allow for refinement of the previous estimates obtained using mineral equilibrium on Bakersville samples, as rutile in garnet crystallized during prograde path at ~630°C (previously estimated at 400-680°C) and matrix rutile during peak metamorphism at 700-720°C (previously estimated at 600-800°C). Previous estimates for Boone peak metamorphism are approximately 720°C based on re-integrated omphacite. Our results for rutile included in garnet are significantly lower at 600-620°C, which may indicate that rutile crystallized during prograde path.