

**THE PERSIMMON CREEK GNEISS,
EASTERN BLUE RIDGE, NORTH CAROLINA-GEORGIA:
EVIDENCE FOR THE MISSING TACONIC ARC?**

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ABSTRACT

The Persimmon Creek Gneiss (PCG) is a metamorphosed pluton in the Eastern Blue Ridge that ranges widely in composition, from gabbro to granodiorite, with tonalite dominating. Plagioclase (both magmatic and recrystallized) is by far the most abundant mineral. Quartz, biotite, and epidote are also ubiquitous, whereas potassium feldspar is sparse or absent and hornblende is present only in the most mafic rocks. The abundant sub- to euhedral epidote has euhedral zoning and is probably magmatic. Zircon ion probe U-Pb data indicate that the PCG crystallized 468 Ma and carried abundant inherited zircons, mostly of Grenville age.

In keeping with its obvious lithologic variability, the PCG ranges widely in major element composition (52-70 wt% SiO₂, ~1-3 wt% K₂O). It is depleted in high field strength elements and displays moderate

LREE enrichment (~50-150 x chondrite), flat HREE at ~10 x chondrite, negative Eu anomalies, and moderate Sr concentrations (300-400 ppm). In all of these respects except HFSE depletion, it is unique among Ordovician plutons of the northern Georgia - South Carolina - North Carolina Blue Ridge and Inner Piedmont. Its Nd-Sr-O isotopic composition falls between those of mafic-ultramafic rocks and metasedimentary and basement rocks of the Blue Ridge and Inner Piedmont.

The geochemistry, mineral assemblages and textures, and field relations of the PCG suggest that it represents a deep-seated pluton that crystallized from a wet, oxidized magma. We propose that it formed as a result of subduction preceding Taconic collision of the Piedmont Terrane with Laurentia. It may be a rare remnant of a weakly developed, short-lived arc.