

PROTEROZOIC GEOLOGY OF THE NORTHEASTERN WET MOUNTAINS, CENTRAL COLORADO

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The first large-scale mapping of the northeastern Wet Mountains shows that Mid-Proterozoic amphibolite-grade gneisses are intruded by several generations of granite. They lie near the hypothesized terrane boundary separating Yavapai and Mazatzal rocks in Colorado. The oldest lithologies include metasediments (biotite gneiss, biotite-hornblende gneiss and minor cpx-bearing hornblende gneiss) and less voluminous metabasalts (amphibolite). The metasediments are a good match with NASC on REE plots and lie near the sub-greywacke-arkose border on an Al₂O₃-Fe₂O₃-SiO₂ diagram. An active continental margin/island arc setting is plausible for these rocks. The interlayered basalts are enriched in LILE relative to N-MORB and slightly depleted in HFSE. They plot as calc-alkaline and as a mature island arc or continental margin arc. This contrasts with amphibolites to the north of the Arkansas River, which are tholeiitic and with the bimodal volcanic suites to the west near Salida. All these assemblages resemble Yavapai rocks. Metamorphic conditions in a sillimanite-biotite-cordierite rock in the northern Wets were 575°C and 4-6 Kb; garnet-biotite assemblages yielded temperatures of 450°C and 525°C. These rocks were isoclinally folded and contain NW-WSW striking foliations. Mineral lineations plunge generally downdip to the NE or NNE, coincident with hinge lines of folds. Fabrics suggest top-to-SW shear, followed by down-NE extension crenulation. One syntectonic granite has yielded a preliminary U-Pb age of 1725 Ma +/- 87 Ma (M.E. Bickford, Syracuse University).

The metamorphic suite was intruded by gneissic granodiorite of probable Boulder Creek age. Younger foliated granite bodies of possible Silver Plume age cut the other units. They assimilated country rock and may have induced a thermal metamorphic overprint that produced unaligned biotite and possibly reset garnet-biotite thermometers. These granites can be distinguished from the Boulder Creek granitics by their higher Al₂O₃ content and FeO and trace element compositions. Foliation patterns within these sill-like bodies define Km-scale folding suggesting that NW-SE contraction post-dated intrusion.