ABSTRACT

Bodies of chlorite amphibole schist within the Late Proterozoic-Early Paleozoic Ashe Metamorphic Suite (AMS) in northwest North Carolina have been divided into Edmonds- and Todd-types based on modal mineralogy and bulk geochemistry (Scotford and Williams, 1983). Todd-type chlorites have a sheet-like geometry, meters- to several 10's of meters-thick and 10's of meters to several kms long and are concordant with the regional Ashe foliation. Where contact relationships can be determined, Todd-type coarse-grained schists (CGCS) are in sharp contact with coarse-grained amphibolites; Todd-type fine-grained schists (FGCS) are in sharp contact with fine-grained amphibolites and locally contain included decimeter-size, angular blocks of fine-grained amphibolites.

Chlorites from Todd-type and Edmonds-type rocks have significantly different (5% level) compositions. Using the method of Zane and Weiss (1998), which is specifically designed for microprobe analyses, all of these chlorites can be broadly classified as Mg-rich Type I.

Sampled Todd-type CGCS and their adjacent coarse-grained amphibolites have very similar amphibole mineralogies and paragenetic sequences. Both have relict magnesio-hornblende grains, rich in Fe/Ti-oxide inclusions, as the initial amphibole phase which is overgrown and largely replaced by Mg-rich actinolite (0.87 ± 0.03 Mg/Mg+Fe). In some amphibolites the actinolite is overgrown by an inclusion-free magnesio-hornblende. Cummingtonite is the final amphibole phase in both of these lithologies; it replaces the actinolite and chlorite grains. Sampled Todd-type FGCS and their adjacent fine-grained amphibolites also have similar amphibole mineralogies and paragenetic sequences. Both consist of a variety of hornblendes (magnesio-hornblende, tschermakite, and pargasite) that are overgrown or replaced with cummingtonite. MgO-CaO-Al_2O_3 bulk compositions of the fine- and coarse-grained amphibolites are statistically identical at the 5% level. However, these amphibolites' bulk compositions are different from their associated chlorite amphibole schists.