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Geologic Map of the northern part of the Rectortown Quadrangle, Virginia

by

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[1]Reston, Va.

EXPLANATION

af

artificial fill

Qal

Quaternary deposits

Zd_1 /+

Metadiabase (Late Proterozoic?)

Fine- to medium-grained, dark gray to black, unfoliated, extremely resistant rock forming bouldery outcrops, weathering to brownish-red soil. Consists of relict clinopyroxene partly replaced by stubby prisms and fibrous bundles of brown or pale green actinolitic amphibole; scattered epidote clusters; saussuritised laths of plagioclase having subophitic texture; skeletal magnetite with exsolved titanite; biotite with straw yellow to black interference colors; and acicular sheaves of muscovite. This rock was mapped as Jurassic diabase by Espenshade (1983), but its degree of alteration precludes correlation with the ubiquitous, very fresh diabase in the Culpeper basin. However the metadiabase is less recrystallized than greenstone/amphibolite dikes of probable Late Proterozoic age (see below). Dikes mapped as JTR d by Espenshade (1983) are included. ---, continuous dike; +, isolated float.

Zd_2 ..x

Metadiabase (Late Proterozoic)

Dark grayish-green, fine- to medium-grained, distinctly foliated albite-epidote amphibolite consisting of green chlorite, albite, epidote, quartz (10%), blue-green actinolite, and magnetite with exsolved titanite. In contrast to Zd_1, this rock is foliated but lacks the cataclastic character of Marshall metagranite (see below). Indistinct foliation is defined by mutually intersecting curvilinear shear planes marked mostly by red, semiopaque iron oxide. The mineral assemblage indicates low-prograde greenschist facies metamorphism; the dikes are assumed to be Late Proterozoic feeder dikes to the Catoctin Formation. Most of the dikes shown are from Espenshade (1983). ...., continuous dike; x, float.

Ym

c/f

Marshall Metagranite (Proterozoic Y)

Ym, gray brown to tan, fine- to medium-grained, moderately to strongly sheared granitoid. Unit ranges from quartz syenite to tonalite or trondhjemite in composition, but most samples are monzogranite or granite. The Marshall Metagranite typically shows some degree of mylonitization, resulting in flattened and strongly strained quartz aggregates, broken feldspar grains, and partial to pervasive sericitization and saussuritization. The saussurite, in turn, is almost everywhere recrystallized to subhedral to euhedral flakes of white mica, epidote granules, anhedral clumps of titanite, magnetite, and subordinate olive-green biotite (nil to 7 percent). Veinlets of mica and epidote cut across the trend of the foliation. Deformational features range from slight, in rocks having a generally well preserved hypidiomorphic-granular texture, to intense, resulting in a protomylonite (phyllonite of Espenshade, 1983, 1986) with a strong planar fabric consisting mostly or entirely of angular quartz fragments in a matrix of sericite differentially recrystallized. Textural types indicated on the map are c, coarse-grained, generally K-feldspar rich Marshall, estimated K-feldspar/plagioclase ratio 2:1-3:1; f, fine- to medium-grained Marshall, which tends to be richer in plagioclase and to contain less K-feldspar (estimated plagioclase-K-feldspar/plagioclase ratio 1:1-5:1). Feldspar ratios estimated mostly from stained slabs; other modal data visually estimated from thin sections.

A basic, unresolved question is whether the variable composition of the Marshall Metagranite has resulted by differentiation of a single magma; or, rather, whether it reflects discrete pulses of magma, generated from more or less distinct sources. This question is particularly relevant regarding the tonalite/trondhjemite phase, inasmuch as this rock, where relatively unaltered, contains plagioclase to the near-exclusion of K-feldspar. The blotchy and unevenly distributed K-feldspar in many samples suggests that K has been a mobile constituent and that, therefore, the primary composition of the Marshall cannot be accurately assessed without extensive sampling of relatively homogeneous and representative rocks. Major- and trace-element analysis to resolve some of these questions are getting started (see map for sample localities 1 and 2), and further analytical work is anticipated.

Map Symbols

Geologic contact, dashed where approximate or inferred

Planar Features (may be combined)

Strike and dip of foliation in Marshall Metagranite, defined by curvilinear, mutually intersecting shear planes typically enclosing ovoid feldspar megacrysts

60

vertical inclined

Bearing and plunge of lineation in Marshall Metagranite (in most cases defined by intersections of two foliation planes)

30

Strike and dip of jointing in Marshall Metagranite

40

vertical inclined

Strike and dip of shear (phyllonitic) zone in Marshall Metagranite

60

Location of sample for chemical analysis and isotopic age determination; ① = field number WW22, ② = field number WW29

Unfoliated metadiabase dike; --- continuous outcrops, + float

Schistose albite-epidote amphibolite dike (metadiabase); .... continuous outcrops, x float

References

Espenshade, G.S., 1983, Geologic map of part of the Rectortown quadrangle, Fauquier and Loudoun Counties, Virginia: U.S. Geological Survey Open-File Map 83-503, scale 1:24,000.

____1986, Geology of the Marshall quadrangle, Fauquier County, Virginia: U.S. Geological Survey Bulletin 1560, 60 p., scale 1:24,000.