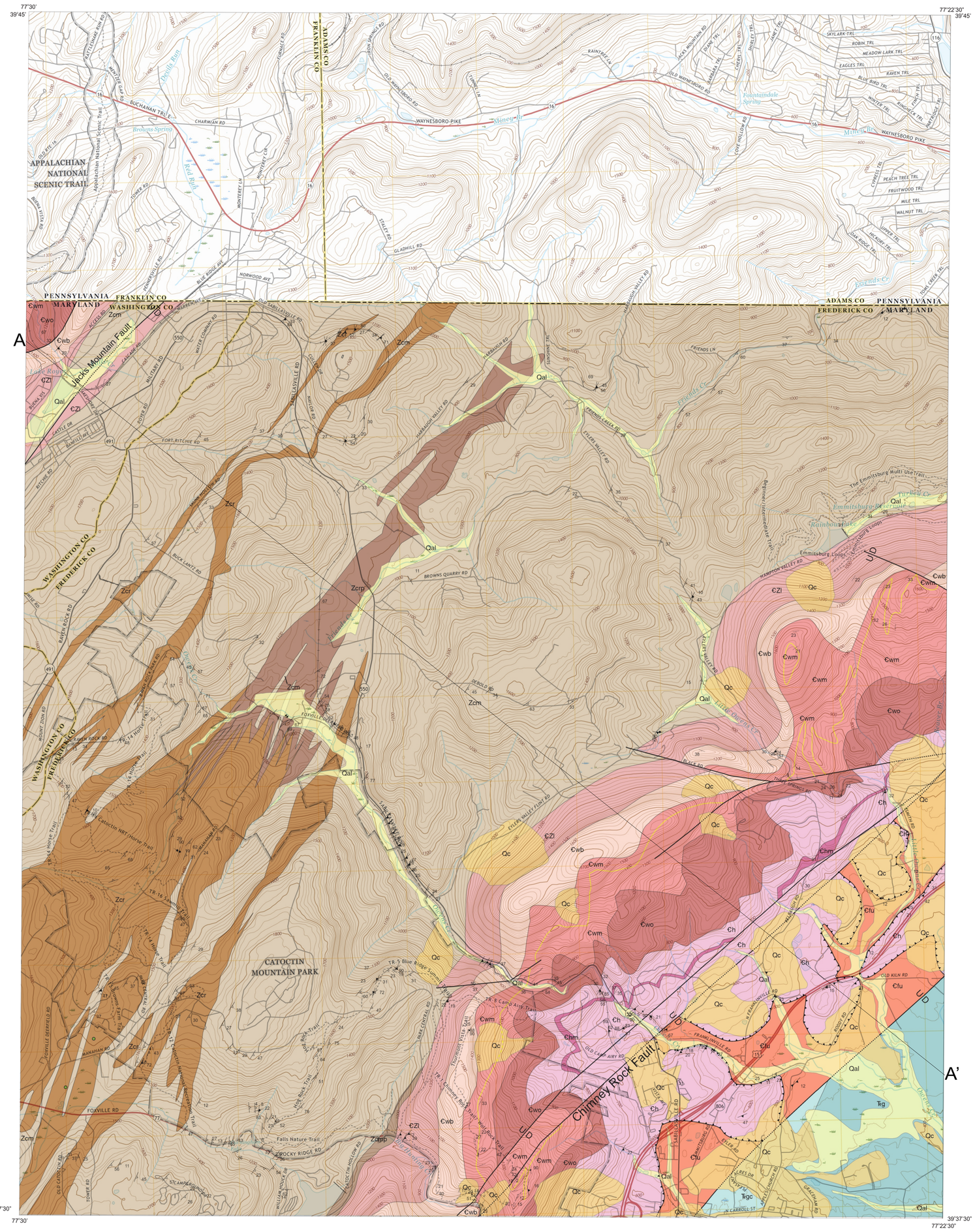

Geologic Map of the Maryland Portion of the Blue Ridge Summit Quadrangle, Frederick County, Maryland

By
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2021

U.S. Geological Survey (USGS) US Topo 7.5-minute Series
Blue Ridge Summit quadrangle, 2019.
Maryland State Plane Coordinate System 1983
(Projection: Lambert Conformal Conic, 1980 geodetic reference system)
(Horizontal Datum: North American Datum 1983)

Geographic coordinates (latitude-longitude). Shown near corners

Reported magnetic north declination (center of Blue Ridge Summit quadrangle): 10.5°W
To determine current magnetic declination see: (http://www.ngdc.noaa.gov/geomag/declination.shtml)

Adjoining 7.5-minute quadrangles
(Blue Ridge Summit quadrangle shaded)

1	2	3	1 Waynesboro 2 Iron Spring 3 Fairfield 4 Smithsburg 5 Emmitsburg 6 Myersville 7 Catoctin Furnace 8 Woodsboro
4		5	
6	7	8	

Scale 1:24 000
1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0.5 0 1 KILOMETERS

Contour Interval 20 feet
North American Vertical Datum of 1988

GN
(State Plane Grid North)

DESCRIPTION OF MAP UNITS

Quaternary

Alluvium
Qal
Poorly sorted, unconsolidated, tan, reddish-brown to dark-gray mud, silt, sand, and pebbles. These deposits form in stream channels, and along flood plains adjacent to the streams. Thickness estimated at 3 to 10 feet.

Colluvium
Qc
Unconsolidated and unsorted cobbles and boulders that accumulate on steep slopes overlying and downslope of sandstone and quartzite units. These deposits move slowly downslope under the influence of frost action and gravity. Two types were recognized in the Blue Ridge Summit Quadrangle. The first type is composed predominately of angular boulders that overlie outcroppings of quartzites of the Weverton Formation on the flanks of Catoctin Mountain. This type of colluvium appears to be the direct result of the mechanical breakdown of the quartzite intervals. The thickness was not determined, but appears highly variable. The second type of colluvium is composed of highly weathered, reddish-brown, rounded pebbles and cobbles of quartzite and vein quartz within a sandy matrix. This type of colluvium is present along the eastern base of Catoctin Mountain and covers outcrops of the Harpers, Frederick, and Gettysburg formations near Thurmont. The thickness of this colluvium ranges from a thin veneer of less 3 feet to more than 50 feet.

Triassic

Gettysburg Formation
Tg
Cyclically interbedded red-gray, laminated, very fine-grained, argillaceous sandstone, sandy siltstone and red to red-brown shale to rooted mudstone. Sandstone and siltstone intervals are commonly laminated to cross-laminated and siltstone intervals are mudcracked. Mudstone intervals are pervasively rooted and show signs of incipient soil development. The thickness of the Gettysburg Formation has been estimated at 8,000 to 22,000 feet (Brezinski, 2004; Root, 1988; Brezinski and Adams, 2021).

Gettysburg Formation Conglomerate
Tgc
Interbedded, red-brown, thin-bedded, fine-grained, argillaceous sandstone and red-brown, cobbly, limestone conglomerate. Forms a narrow belt along the western margin of the Gettysburg Formation. Thickness is 200 to 500 feet.

Cambrian

Frederick Formation (undifferentiated)
Cfu
Medium- to dark-gray, laminated to thin-bedded, pyritic, argillaceous limestone and highly sheared and deformed, laminated limestone. Because of limited exposure no member assignments could be made for the Frederick Formation in the Blue Ridge Summit Quadrangle (see Brezinski, 2004). In this area, the Frederick Formation is interpreted to occur as the foot-wall of the Owens Creek overthrust. Thickness in the Blue Ridge Summit Quadrangle is estimated at 500 to 1000 feet

Harpers Formation
Ch
Chm
Predominately tan-weathering, dark grayish green to dark gray, sheared phyllitic shale and siltstone with lesser amounts of metasandstones that may be quartzitic. Shale and siltstone are gray to greenish gray, dark gray-brown to medium-gray in color and commonly containing thin 2 to 6 inch thick, fine-grained sandstone layers. Locally intense shearing creates phyllitic areas where cleavage obscures bedding. Because of intraformational folding and intense cleavage, determining the thickness of the formation was not possible. Estimates range from 1,500 to 3,000 feet.

Mont Alto Member
Within the lower levels of the Harpers Formation there is a mappable quartzose metagraywacke that can be traced along the flank of Catoctin Mountain. This interval is light to medium gray, medium-bedded, coarse-grained to conglomeratic, quartzitic, and contains *Skolithos* burrows. Brezinski, (1992) considered this interval equivalent to the Mont Alto Member of the Harpers Formation in Pennsylvania. The Mont Alto Member is between 30 to 50 feet thick in the Blue Ridge Summit Quadrangle, but thickens northward into southern Pennsylvania.

Weverton Formation
Light- to medium-gray quartzite, conglomerate, medium- to dark-gray metagraywacke with intervals of dark-gray to black metasiltstone and phyllite. Three members are recognized (Brezinski, 1992).

Owens Creek Member
Cwo
Medium- to dark-gray, very coarse grained to conglomeratic, cross-bedded, medium- to thick-bedded metagraywacke. The coarse-grained character of this member makes recognition of cross-bedding difficult. Conglomeratic intervals contain large (0.5 to 1 inch) white and pink quartz pebbles. The type section of this member is on MD 550 along Owens Creek. Thickness ranges from 200 to 300 feet.

Maryland Heights Member
Cwm
Cwmw
Interbedded, thin (less than 30 feet), white quartzite and medium-gray metagraywacke and very dark gray, highly cleaved, volcaniclastic siltstone and phyllitic shale. Shales and siltstones are very poorly exposed and individual quartzites and graywackes are only locally traceable. Near the middle of this member there is a light-gray, massive, coarse-grained quartzite. Herein termed the Wolf Rock Quartzite Bed [Cwmw] this stratum is equivalent to the middle quartzite of Whitaker (1955), and the ledge-maker quartzite of Fauth (1977). This unit is up to 30 feet thick in the Blue Ridge Summit Quadrangle. Thickness of the Maryland Heights Member ranges from 200 to 400 feet.

Buzzard Knob Member
Cwb
The lowest member of the Weverton Formation consists of two ledge-forming quartzites, which are often difficult to discern between. The lower ledge consists of light- to medium-gray to light greenish gray, medium-bedded quartzite with dark-gray argillaceous layers up to 6 inches thick, separating the quartzite beds. Cross-bedding within individual quartzite strata is pervasive and is commonly accentuated by purplish or yellow-gold bands demarcating the individual cross-bed foresets. The upper ledge-forming quartzite is composed of medium- to thick-bedded, very light gray quartzite. Cross-bedding is abundant, but less obvious than in the lower ledge. This member is the main ridge-forming unit of the Maryland Blue Ridge. Thickness ranges from 175 to 350 feet.

Loudoun Formation
CZl
Interbedded, medium-gray, medium- to thin-bedded, tuffaceous sandstone, granule to pebble conglomerate, and dark-gray, tuffaceous phyllite. Massive, cross-bedded quartzite and thin, quartz-pebble conglomerate and pebbly polymictic lenses of conglomerate are interbedded within phyllite as are layers of flattened phyllite pebbles. The width of the outcrop belt widens dramatically in the Blue Ridge Summit and Emmitsburg quadrangles, indicating a localized thickening of the formation. In the Blue Ridge Summit Quadrangle, the Loudoun Formation is graphically determined to be from 800 to 1,500 feet in thickness.

Neoproterozoic

Catoctin Formation
The Catoctin Formation is a suite of volcanigenic rocks that consists principally of metabasalt, metarhyolite, and tuffaceous phyllites.

Metabasalt
Zcm
Medium to dark greenish gray, medium-grained, massive, metabasalt. Textures vary greatly between exposures, but commonly consist of massive to highly cleaved aphanitic, green-gray metabasalt exhibiting a range of primary textures including amygdaloidal, porphyoblastic, banded, vesicular, and flow-top brecciation. Areas of tectonic deformation are suggested by schistose chlorite- and actinolite-bearing metabasalt that are epidote-rich. Porphyroblasts are most commonly epidote, plagioclase feldspar, or chlorite that are flattened and elongated and composed of chlorite, actinolite, or epidote, ranging between 0.4 to 1 inch in length (Fauth, 1977). Vesicles are oval-shaped voids or may be filled amygdules that contain epidote, feldspar, and quartz. Primary layering is present in many exposures. Prominent veins and nodular masses of epidote and quartz are widely distributed throughout the unit. Thickness of the entire metabasalt unit is estimated at greater than 2,000 feet.

Porphyritic Metabasalt
Zcmp
Light greenish gray to greenish-gray metabasalt with light greenish gray to white euhedral feldspar phenocrysts comprising 5 to 15% of the rock. Thickness 100 to 200 feet.

Metarhyolite
Zcr
Medium-gray to medium dark bluish gray, dense, metarhyolite. Variations are noted on the map, not delineated separately. The most common variety is aphanitic bluish gray metarhyolite that is massive, and dense and exhibits a conchoidal fracture. Rare phenocrysts are present, but comprise less than 1 percent of the rock. Weathers light gray to light medium gray. Several textural subunits have been noted but not mapped. Medium bluish gray, flow-banded metarhyolite containing planar to convoluted flow bands 0.12 to 0.4 inch (3 to 10 mm) thick. Banding is discontinuous and most prominent on weathered surfaces. Phenocrysts typically constitute less than 5 percent of the rock. Medium to dark bluish gray, porphyritic, aphanitic metarhyolite containing very light gray to very pale orange or pinkish gray feldspar laths. Phenocrysts are up to 0.2 inches long, rectangular, and make up more than 5 percent of the rock. Minimum aggregate thickness is estimated at 500 to 800 feet (Fauth, 1977).

Interbanded Metabasalt, Metarhyolite and Tuffaceous Phyllite
Zcrp
Interlayered greenish-gray, granular phyllite, pale purplish-gray, to very light gray, tuffaceous phyllite, greenish-gray metabasalt, and dark gray metarhyolite. Medium greenish gray phyllite contains small elongate felspathic laths and is commonly interbedded with thin bands (1 to 4 inches) of gray metarhyolite or metabasalt. Gray phyllites typically are tuffaceous and volcanoclastic. Especially well-developed in the Harbaugh Valley. Estimated thickness 1000 to 1,500 feet.

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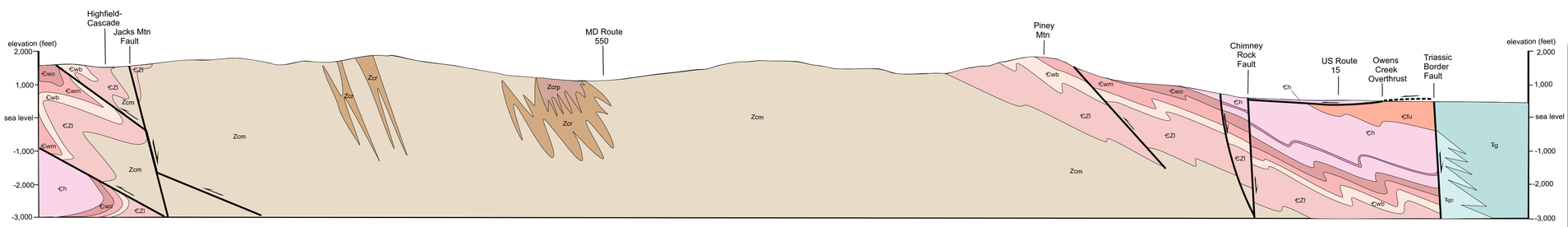

Explanation of Map Symbols

Contacts
Geologic contacts; definite and approximate. Dotted where concealed.

Planar Features
inclined bedding (strike and degree of dip shown)
horizontal bedding
vertical bedding
flow banding and volcanic layering
foliation/cleavage (strike and degree of dip shown)
vertical foliation/cleavage (strike shown)
inclined joint (strike and degree of dip shown)
vertical joint (strike shown)

Faults
Fault; high angle. D refers to down thrown side, U to the up thrown side. Dotted where concealed.
Fault; overthrust. Saw tooth pattern on up thrown block. Dotted where concealed.
A A' Cross section line

Base Map Symbols

Transportation
Primary route, class 1 (divided lanes)
Primary route, class 1 (undivided)
Secondary route, class 2
Light duty road or street, class 3

Topography
Topographic index contour (100- ft interval)
Topographic intermediate contour (20-ft interval)

Hydrography
Stream
Spring
Water body (eg. lakes, ponds, rivers)

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Governor

Boyd K. Rutherford
Lieutenant Governor

DEPARTMENT OF NATURAL RESOURCES
Jeannie Haddaway-Riccio
Secretary

MARYLAND GEOLOGICAL SURVEY
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