PLATE 1 - GEOLOGIC MAP OF PORTIONS OF THE TALLASSEE, WHITEOAK FLATS, AND TAPOCO 7.5 MINUTE QUADRANGLES, TENNESSEE AND NORTH CAROLINA

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STRATIGRAPHIC COLUMNS

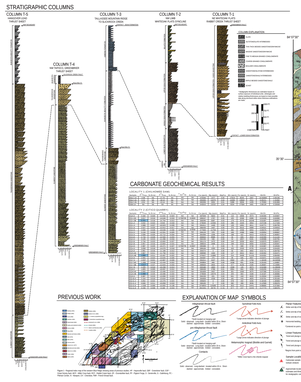
COLUMN T-5
TALLASSEE
COLUMN T-4
TALLASSEE
COLUMN T-3
TALLASSEE-WHITEOAK FLATS
COLUMN T-2
WHITEOAK FLATS
COLUMN T-1
WHITEOAK FLATS-TAPOCO
Quartzite
Quartz-mica schist
Garnet-mica schist
Kyanite-mica schist
Staurolite-mica schist
Chlorite-mica schist
Chlorite-quartz schist
Calcareous mica schist
Calcareous quartzite
Calcareous mica schist
Calcareous quartzite
Calcareous mica schist
Calcareous quartzite

PLATE 2 - STATION MAP

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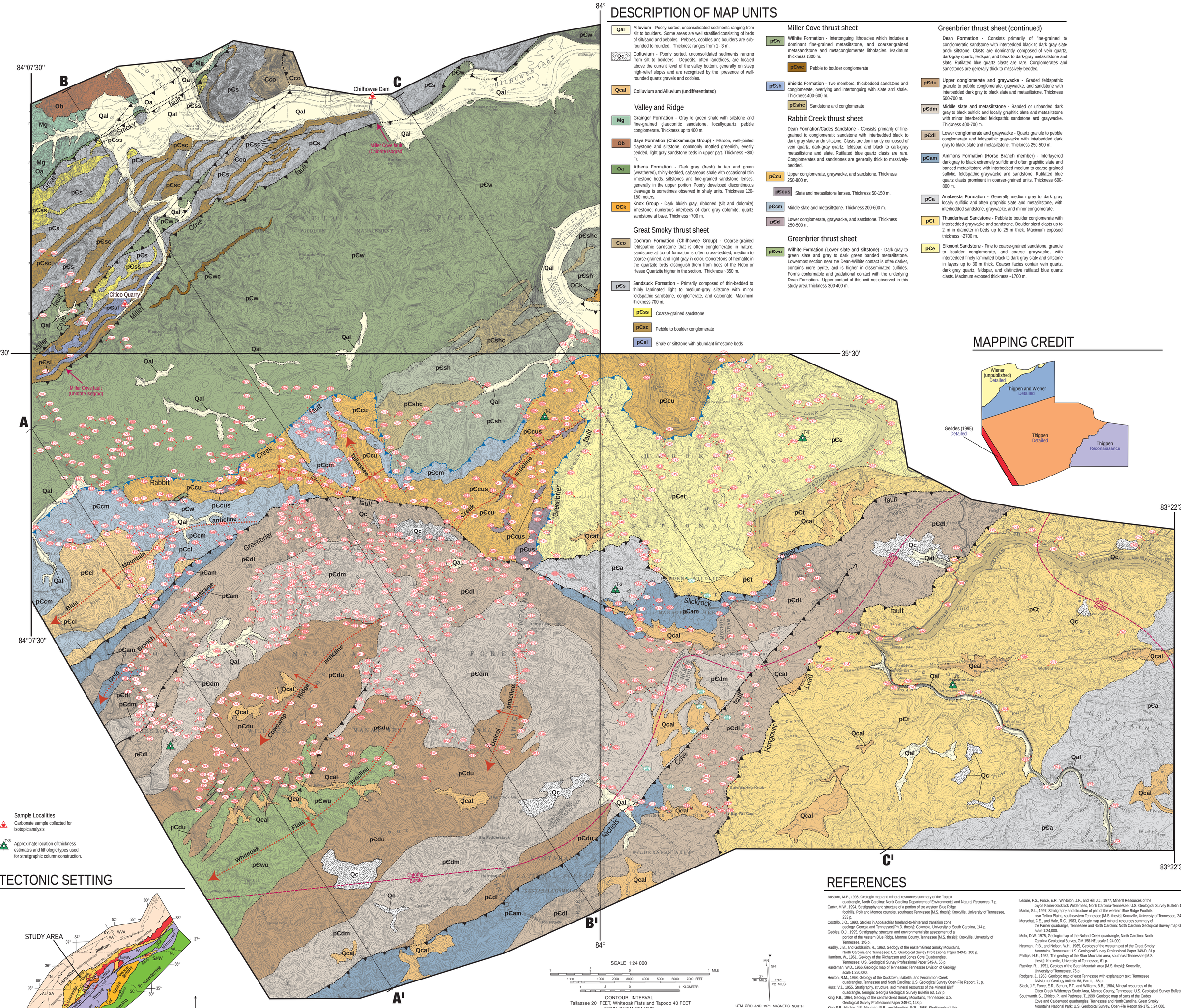


DESCRIPTION OF MAP UNITS

Qal — **Alluvium** - Poorly sorted, unconsolidated sediments ranging from silt to boulders. Some areas are well stratified consisting of beds of silt/sand and pebbles. Pebbles, cobbles and boulders are sub-rounded to rounded. Thickness ranges from 1 - 3 m.

Qc — **Colluvium** - Poorly sorted, unconsolidated sediments ranging from silt to boulders. Deposits, often landslides, are located above the current level of the valley bottom, generally on steep high-relief slopes and are recognized by the presence of well-rounded quartz gravels and cobbles.

Qcal — Colluvium and Alluvium (undifferentiated)

Valley and Ridge

Mg — **Grainger Formation** - Gray to green shale with siltstone and fine-grained glauconitic sandstone, locallyquartz pebble conglomerate. Thickness up to 400 m.

Ob — **Bays Formation (Chickamauga Group)** - Maroon, well-jointed claystone and siltstone, commonly mottled greenish, evenly bedded, light gray sandstone beds in upper part. Thickness ~300 m.

Oa — **Athens Formation** - Dark gray (fresh) to tan and green (weathered), thinly-bedded, calcareous shale with occasional thin limestone beds, siltstones and fine-grained sandstone lenses, generally in the upper portion. Poorly developed discontinuous cleavage is sometimes observed in shaly units. Thickness 120-180 meters.

OCk — **Knox Group** - Dark bluish gray, ribboned (silt and dolomite) limestone; numerous interbeds of dark gray dolomite; quartz sandstone at base. Thickness ~700 m.

Great Smoky thrust sheet

Ꞓco — **Cochran Formation (Chilhowee Group)** - Coarse-grained feldspathic sandstone that is often conglomeratic in nature, sandstone at top of formation is often cross-bedded, medium to coarse-grained, and light gray in color. Concretions of hematite in the quartzite beds distinguish them from beds of the Nebo or Hesse Quartzite higher in the section. Thickness ~350 m.

pꞒs — **Sandsuck Formation** - Primarily composed of thin-bedded to thinly laminated light to medium-gray siltstone with minor feldspathic sandstone, conglomerate, and carbonate. Maximum thickness 700 m.

- **pꞒss** — Coarse-grained sandstone
- **pꞒsc** — Pebble to boulder conglomerate
- **pꞒsl** — Shale or siltstone with abundant limestone beds

Miller Cove thrust sheet

pꞒw — **Wilhite Formation** - Intertonguing lithofacies which includes a dominant fine-grained metasiltstone, and coarser-grained metasandstone and metaconglomerate lithofacies. Maximum thickness 1300 m.

- **pꞒwc** — Pebble to boulder conglomerate

pꞒsh — **Shields Formation** - Two members, thickbedded sandstone and conglomerate, overlying and intertonguing with slate and shale. Thickness 400-600 m.

- **pꞒshc** — Sandstone and conglomerate

Rabbit Creek thrust sheet

Dean Formation/Cades Sandstone - Consists primarily of fine-grained to conglomeratic sandstone with interbedded black to dark gray slate andn siltstone. Clasts are dominantly composed of vein quartz, dark-gray quartz, feldspar, and black to dark-gray metasiltstone and slate. Rutilated blue quartz clasts are rare. Conglomerates and sandstones are generally thick to massively-bedded.

- **pꞒcu** — Upper conglomerate, graywacke, and sandstone. Thickness 250-800 m.
- **pꞒcus** — Slate and metasilstone lenses. Thickness 50-150 m.
- **pꞒcm** — Middle slate and metasiltstone. Thickness 200-600 m.
- **pꞒcl** — Lower conglomerate, graywacke, and sandstone. Thickness 250-500 m.

Greenbrier thrust sheet

pꞒwu — **Wilhite Formation (Lower slate and siltstone)** - Dark gray to green slate and gray to dark green banded metasiltstone. Lowermost section near the Dean-Wilhite contact is often darker, contains more pyrite, and is higher in disseminated sulfides. Forms conformable and gradational contact with the underlying Dean Formation. Upper contact of this unit not observed in this study area.Thickness 300-400 m.

Greenbrier thrust sheet (continued)

Dean Formation - Consists primarily of fine-grained to conglomeratic sandstone with interbedded black to dark gray slate andn siltstone. Clasts are dominantly composed of vein quartz, dark-gray quartz, feldspar, and black to dark-gray metasiltstone and slate. Rutilated blue quartz clasts are rare. Conglomerates and sandstones are generally thick to massively-bedded.

pꞒdu — **Upper conglomerate and graywacke** - Graded feldspathic granule to pebble conglomerate, graywacke, and sandstone with interbedded dark gray to black slate and metasiltstone. Thickness 500-700 m.

pꞒdm — **Middle slate and metasiltstone** - Banded or unbanded dark gray to black sulfidic and locally graphitic slate and metasiltstone with minor interbedded feldspathic sandstone and graywacke. Thickness 400-700 m.

pꞒdl — **Lower conglomerate and graywacke** - Quartz granule to pebble conglomerate and feldspathic graywacke with interbedded dark gray to black slate and metasiltstone. Thickness 250-500 m.

pꞒam — **Ammons Formation (Horse Branch member)** - Interlayered dark gray to black extremely sulfidic and often graphitic slate and banded metasiltstone with interbedded medium to coarse-grained sulfidic, feldspathic graywacke and sandstone. Rutilated blue quartz clasts prominent in coarser-grained units. Thickness 600-800 m.

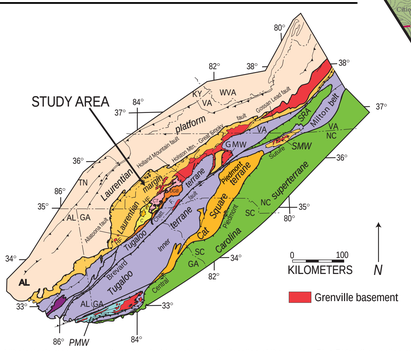
pꞒa — **Anakeesta Formation** - Generally medium gray to dark gray locally sulfidic and often graphitic slate and metasiltstone, with interbedded sandstone, graywacke, and minor conglomerate.

pꞒt — **Thunderhead Sandstone** - Pebble to boulder conglomerate with interbedded graywacke and sandstone. Boulder sized clasts up to 2 m in diameter in beds up to 25 m thick. Maximum exposed thickness ~2700 m.

pꞒe — **Elkmont Sandstone** - Fine to coarse-grained sandstone, granule to boulder conglomerate, and coarse graywacke, with interbedded finely laminated black to dark gray slate and siltstone in layers up to 30 m thick. Coarser facies contain vein quartz, dark gray quartz, feldspar, and distinctive rutilated blue quartz clasts. Maximum exposed thickness ~1700 m.

MAPPING CREDIT

TECTONIC SETTING



re 2 - Lithotectonic map of the southern Appalachians showing the location of the western Blue Ridge (Laurentian margin) southeast of Laurentian platform and the location of the map area within the terrane map. Areas in dark red are Mesoproterozic (Grenvillian) thonous basement massifs. PMW - Pine Mountain Window, SMW - Sauratown Mountains Window, SRA - Smith River allochton, GMW - odfather Mountain Window, DGB - Dahlonega Gold belt, C - Cowrock terrane, CT - Cartoogechaye terrane, Chatt. f. - Chattahoochee , HF - Hayesville fault.

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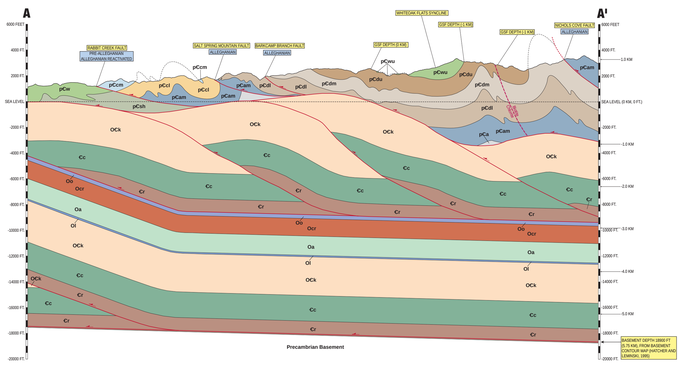
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WHITEOAK FLATS SYNCLINE
OSF DEPTH 1.5 KM
OSF DEPTH 2 KM
NICHOLS COVE FAULT
ALLEGHANIAN
HOBBS CREEK FAULT
PRE ALLEGHANIAN
ALLEGHANIAN REACTIVATED
SALT SPRING MOUNTAIN FAULT
ALLEGHANIAN
BOWLCAMP BRANCH FAULT
ALLEGHANIAN
OSF DEPTH 2 KM
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pCcus
pCcu
pCdu
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pCdl
pCcm
pCcl
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pCcl
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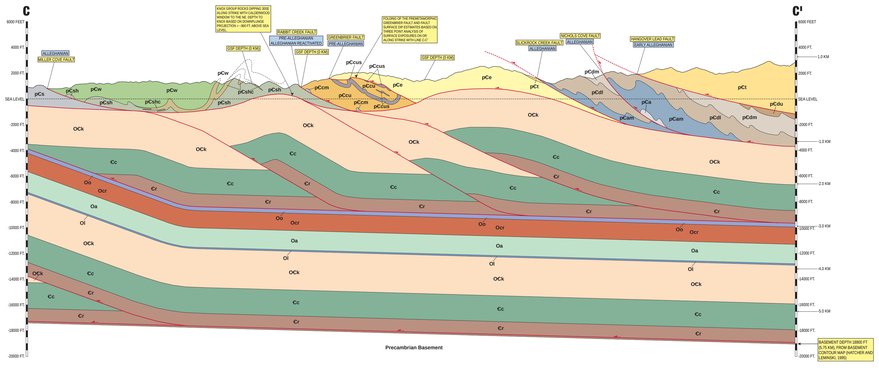
Precambrian Basement
BASEMENT DEPTH 18000 FT
(5.75 KM, FROM BASEMENT
CONTOUR MAP SWITCHER AND
LEMMON, 1995)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3.0 KM
4.0 KM
5.0 KM
ALLEGHANIAN
MILLER COVE FAULT
ROCK GROUP ROCKS DIPPING SOUTH ALONG STRIKE WITH CALDERWOOD FAULT, ALLEGHANIAN, ROCK DATA BASED ON OBVIOUS PROJECTION > 500 FT. ABOVE SEA LEVEL
OSF DEPTH 2 KM
RABBIT CREEK FAULT
PRE ALLEGHANIAN
ALLEGHANIAN REACTIVATED
OSF DEPTH 2.5 KM
CHESNUTBURR FAULT
PRE ALLEGHANIAN
FOLDING OF THE PENNSYLVANIAN-ORDOVICIAN FALL FAULT SURFACE OF ESTIMATED BASED ON DIP OF ROCKS ON BOTH SIDES OF FAULT (EXPOSURES OCCUR ALONG STRIKE WITH LINE C-C'
OSF DEPTH 2.5 KM
SLAUGHTER CREEK FAULT
ALLEGHANIAN
NICHOLS COVE FAULT
ALLEGHANIAN
HANCOCK FAULT
EARLY ALLEGHANIAN
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pCcus
pCcus
pCe
pCe
pCt
pCdm
pCdl
pCs
pCam
pCdm
pCdu
OCk
Cc
Cr
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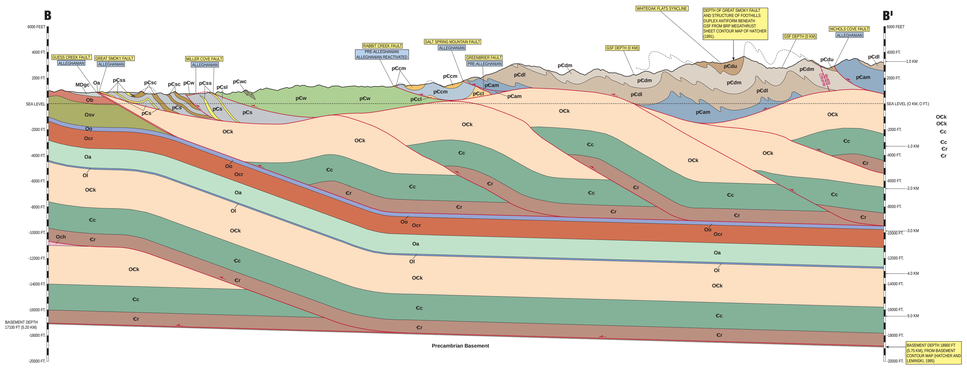
Precambrian Basement
BASEMENT DEPTH 18000 FT
(5.75 KM, FROM BASEMENT
CONTOUR MAP SWITCHER AND
LEMMON, 1995)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4.0 KM
5.0 KM
BASEMENT DEPTH
17100 FT (5.20 KM)
SOUTH CREEK FAULT
ALLEGHANIAN
GREAT SMOKY FAULT
ALLEGHANIAN
MILLER COVE FAULT
ALLEGHANIAN
RABBIT CREEK FAULT
PRE ALLEGHANIAN
ALLEGHANIAN REACTIVATED
SALT SPRING MOUNTAIN FAULT
ALLEGHANIAN
CHESNUTBURR FAULT
PRE ALLEGHANIAN
OSF DEPTH 2 KM
WHITEOAK FLATS SYNCLINE
DEPTH OF GREAT SMOKY FAULT AND STRUCTURE OF FOOTWALL DUPLEX ANTIFORM BENEATH SYNCLINE, BASED ON BASEMENT SHEET CONTOUR MAP OF WATCHER (1991).
OSF DEPTH 2 KM
NICHOLS COVE FAULT
ALLEGHANIAN
MDpc
Oa
pCcs
pCcc
pCcc
pCw
pCcs
pCcl
pCcc
pCw
pCcl
pCcm
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Precambrian Basement
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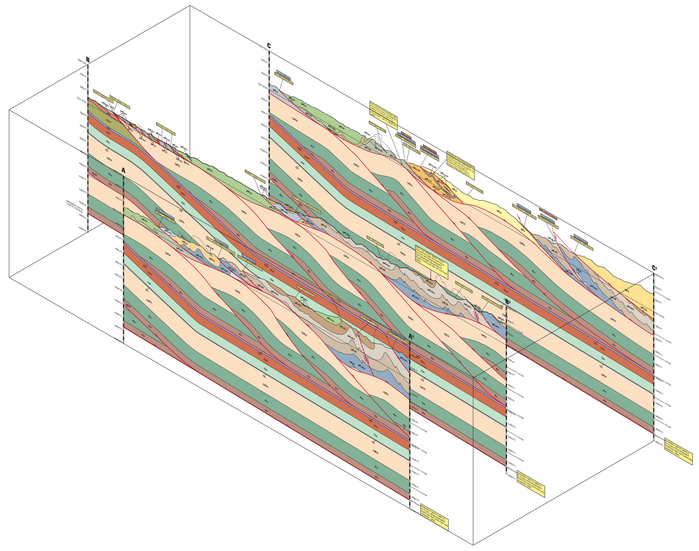

PLATE 4 - BEDROCK GEOLOGIC MAP OF THE WESTERN BLUE RIDGE PROVINCE BETWEEN THE LITTLE TENNESSEE AND HIWASSEE RIVERS, SOUTHEAST TENNESSEE AND SOUTHWEST NORTH CAROLINA

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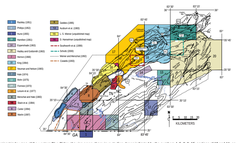
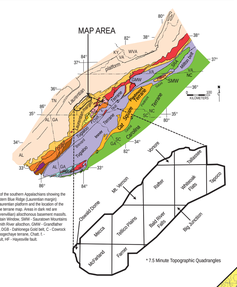
Geology by L. S. Wiener, M. W. Carter, S. L. Martin, D. J. Geddes, J. R. Thigpen, and T. F. McKinney

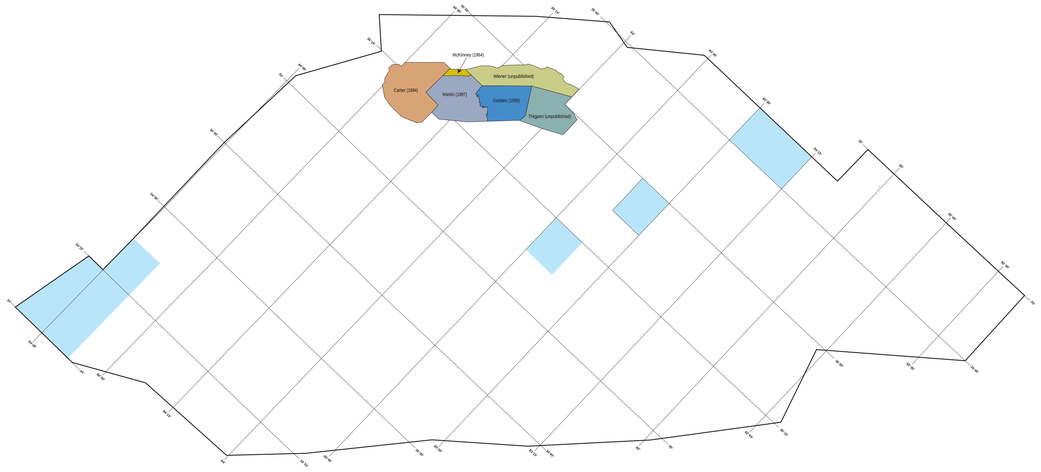
PREVIOUS WORK



Regional index map of the western Blue Ridge showing areas of previous studies. Areas indicated by the numbers 4, 5, 8, 9, 10, portions of 10 and 11, and the area outlined by the solid blue line were completed for the main map. HF - Hayesville fault, GBF - Greenbriar fault, GSF - Great Smoky fault, MCF - Miller Cove fault, RCF - Rabbit Creek fault, CF - Cionodefee fault, GCF - Gum Creek fault, RF - Pigeon Forge, S - Sevierville, G - Gatlinburg, FC - Fibrous Center, N - Newport, CH - Cherokee, FBR - French Broad river, D - Dandridge, M - Murphy, TP - Tellico Plains, C - Cosby, GSMNP - Great Smoky Mountains National Park, W - Walland.

INDEX AND TECTONIC MAP


MAP AREA
Valley and Ridge
Blue Ridge
Inner Piedmont
Brevard Zone
Suwannee Suture
Alabama
Georgia
Tennessee
Carolina
Talladega
Cartersville
Hollins Line
Ocoee Supergroup
Great Smoky Group
Snowbird Group
Unaka
Ocoee Supergroup
Great Smoky Group
Snowbird Group
Unaka
Blue Ridge Thrust
Great Smoky Fault
Hayesville Fault
Fort Mountain Fault
Nantahala Fault
Rabun Bald Fault
Mountain City Fault
Holland Mtn. Fault
Fontana Fault
Rocky Face Fault
Big Ivy Fault
Miller Cove Fault
Greenbriar Fault
Rabbit Creek Fault
Gum Creek Fault
Cionodefee Fault
Chattahoochee Fault
Pine Mountain Window
Soque River Window
Sandy Springs Window
Cartersville Fault
Allatoona Fault
Ft. Mountain Fault
Rocky Face Fault
Great Smoky Fault
Hayesville Fault
Greenbriar Fault
Miller Cove



GEOLOGIC MAP OF THE WESTERN BLUE RIDGE AND PORTIONS OF THE EASTERN BLUE RIDGE AND VALLEY AND RIDGE PROVINCES IN SOUTHEAST TENNESSEE, SOUTHWEST NORTH CAROLINA, AND NORTHERN GEORGIA

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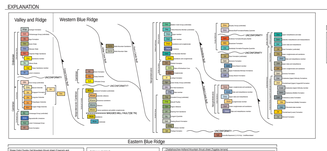
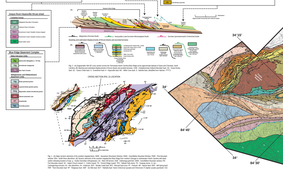
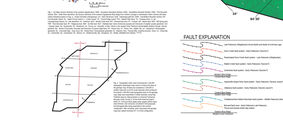
Partially compiled from previous compilations by J.R. Thigpen, R.D. Hatcher, Jr., D.J. Settles, S. Southworth, S.C. Whisner, C.E. Merschat, L.S. Wiener, and B. Cattanach

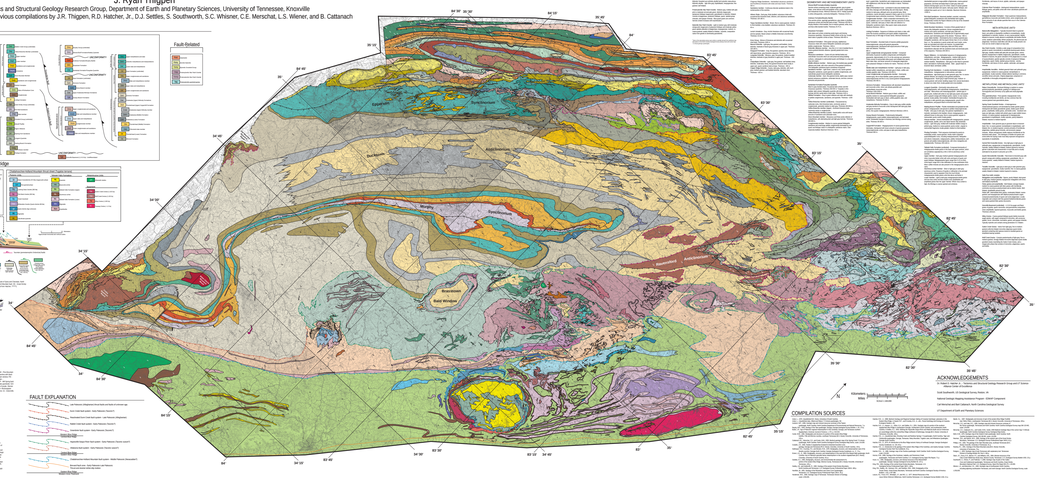
EXPLANATION



Eastern Blue Ridge






Knoxville
Sevierville
Newport
Asheville
Hot Springs
Bryson City
Franklin
Blairsville
Ellijay
Blue Ridge
Ducktown
Copperhill
Hiwassee
Ocoee
Nantahala
Cowee
Tallulah
Rabun Bald
Brasstown Bald
Blue Ridge
Mineral Bluff
Ellijay
Cartersville
Rome
Dalton
Chattanooga
Knoxville
Kingsport
Bristol
Asheville
Hot Springs
Bryson City
Franklin
Blairsville
Ellijay
Blue Ridge
Mineral Bluff