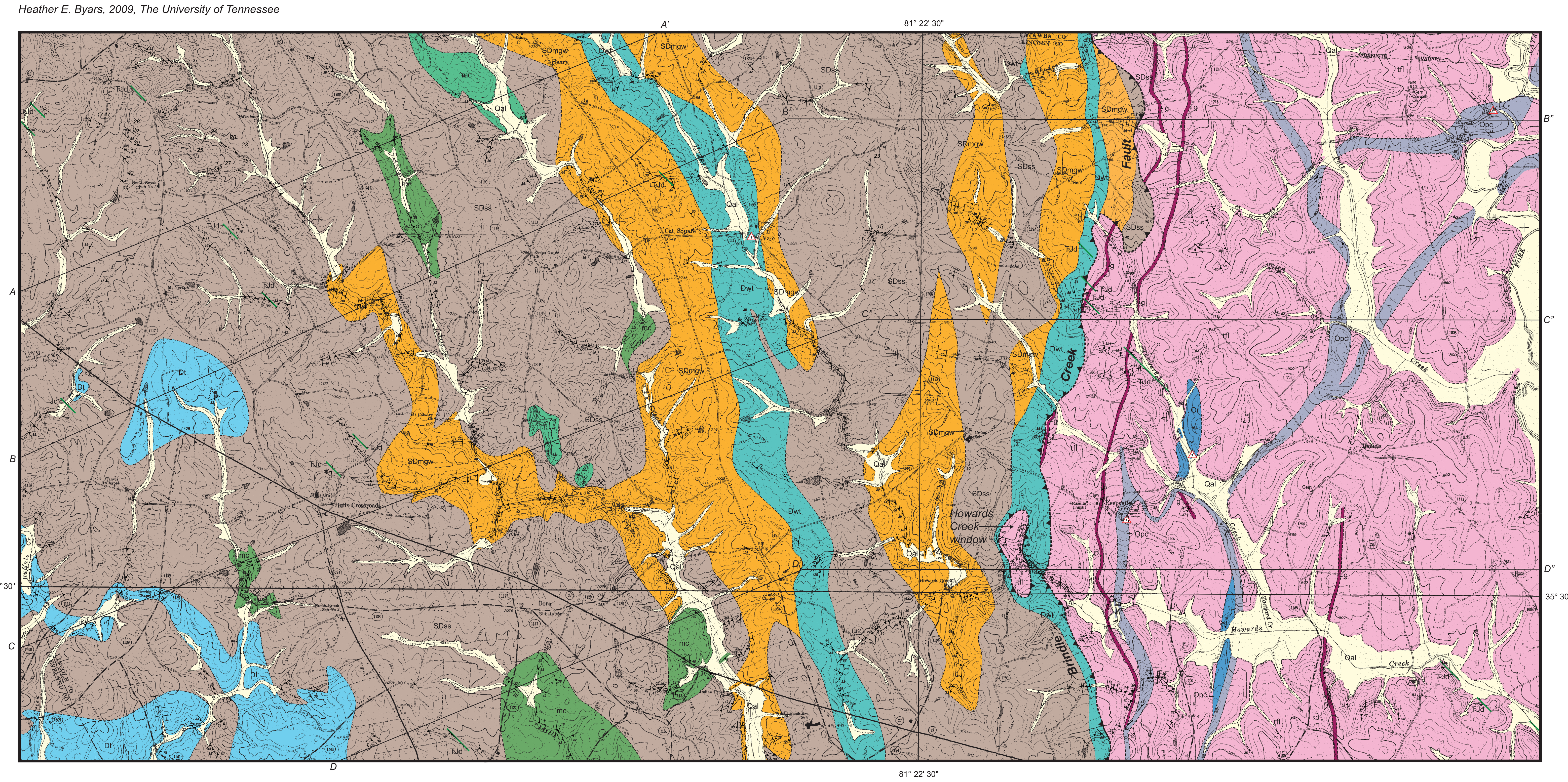
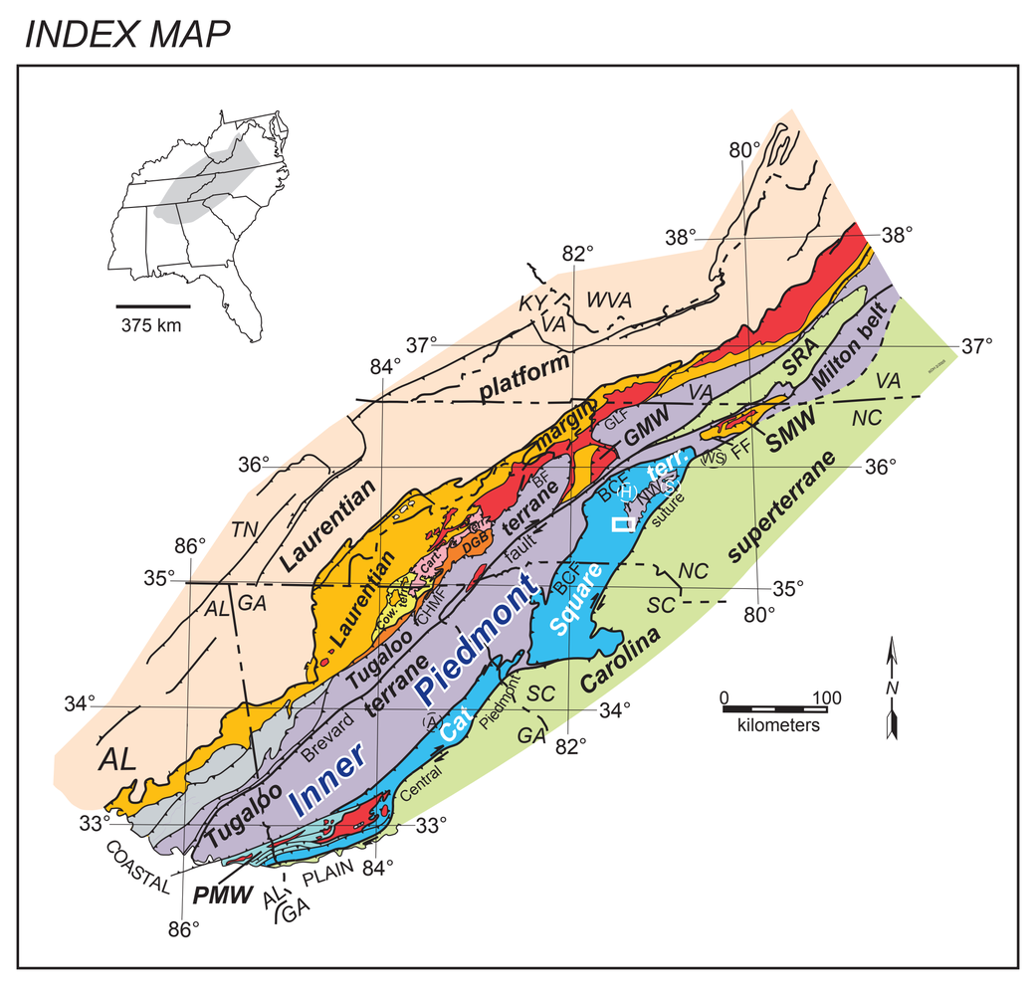
Plate 1: Geologic map of the western boundary of the Newton window in portions of Banoak, Reepsville, Cherryville, and Lincolnton West 7.5-minute quadrangles, Catawba, Lincoln, and Cleveland Counties, North Carolina

Heather E. Byars, 2009, The University of Tennessee

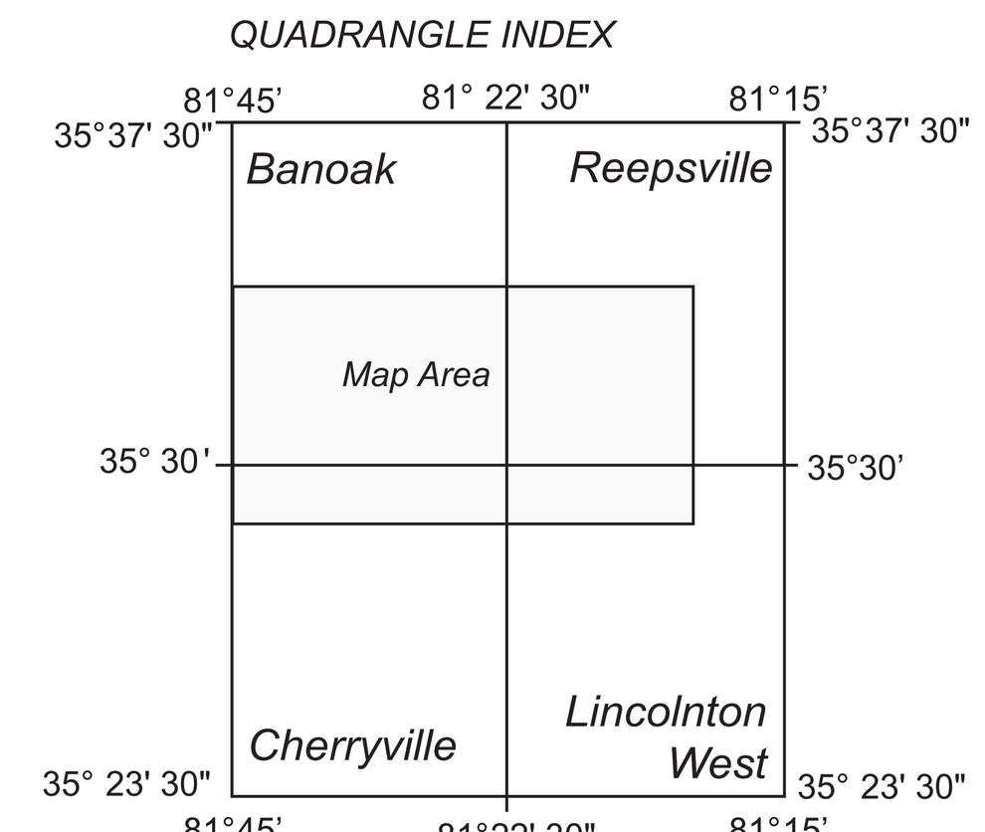


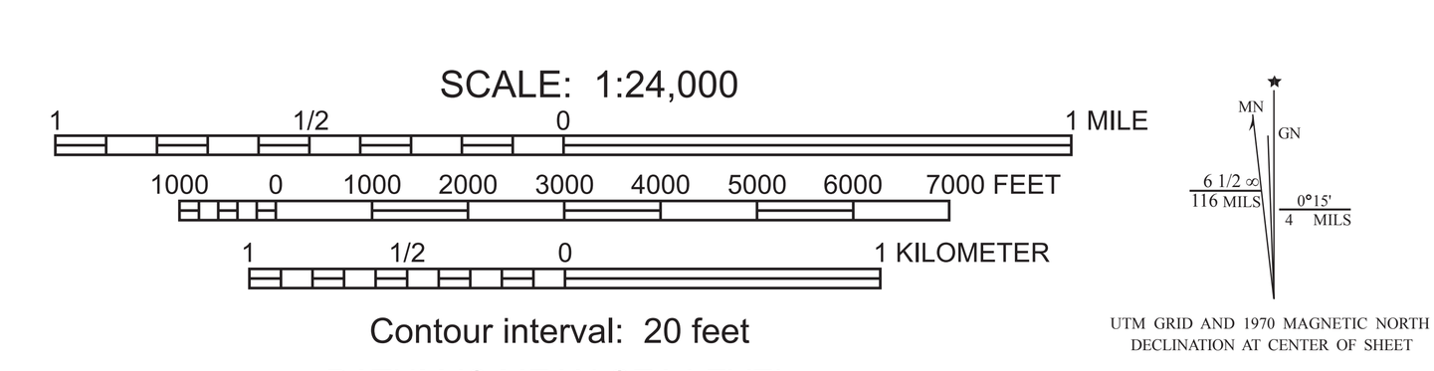
INDEX MAP



Map area enclosed by white rectangle. BCF-Brindle Creek fault. BF-Burnsville fault. Cart. Terr.-Cartoogechaye terrane. CHMFChattahoochee-Holland Mountain fault. Cow. Terr.-Cowrock terrane. DGB-Dahlonega fold belt. FF-Forbrush fault. GLF-Gossan Lead fault. GMW-Grandfather Mountain window. NW-Newton window. SRA-Smith River allochthon, a possible outlier of the Carolina superterrane or Cat Square terrane rocks. SMW-Sauratown Mountains window. PMW-Pine Mountain window. Light gray-Probably western Tugaloo terrane rocks in Alabama and Georgia. Purple-Ordovician Elkahatchee Quartz Diorite. A-Athens, GA. H-Hickory, NC. S-Statesville, NC. WS-Winston-Salem, NC. From Merschat and Hatcher (2007).

QUADRANGLE INDEX





Contour interval: 20 feet

DATUM IS MEAN SEA LEVEL

Field Review conducted on April 9, 2008 by:
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DESCRIPTION OF MAP UNITS

Quaternary

Qal/Qc — Poorly sorted, unconsolidated stream sediments, and colluvial material ranging from silt to boulders. Localized 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 to 10 m.

Jurassic

ŦJd — Diabase Dike–Dark gray, fine-grained, ophitic texture, composed of olivine, clinopyroxene, plagioclase, and opaque minerals.

Cat Square terrane

METAIGNEOUS ROCKS

Middle to Late Devonian

Dwt — Walker Top Orthogneiss [~355 Ma (U-Pb SHRIMP); Byars et al., 2008; ~360 Ma (U-Pb SHRIMP); Mapes 2002]–Medium to dark gray, garnet-bearing, megacrystic quartz-biotite-plagioclase-alkali feldspar gneiss, ranging from protomylonite to mylonite. Sheared alkali feldspar megacrysts contain ubiquitous mantled (myrmekitic) rims and are aligned subparallel to the foliation. Matrix consists of fine- to medium-grained alkali feldspar, biotite, plagioclase, and quartz. Locally contains enclaves of amphibolite, migmatitic metagraywacke, and aluminous schist. Contains xenolith of charnockite at Vale [~365 Ma (U-Pb SHRIMP); Byars et al., 2008]. Charnockite is a dark, brown-green, two pyroxene-bearing, megacrystic quartz-biotite-plagioclase-alkali feldspar gneiss with minor amounts of hornblende and garnet.

Dt — Toluca Granite [~378 Ma (U-Pb SHRIMP); Mapes, 2002]–Light gray, medium-grained, granoblastic, plagioclase-alkali feldspar-quartz-muscovite-biotite-garnet gneiss.

mc — Mafic complex–Undifferentiated bodies of peridotite, metagabrro, amphibolite, and metadiorite. Age and provenance currently unknown.

a — Amphibolite–Dark gray to black, fine- to medium-grained, plagioclase-hornblende gneiss. Felsic and garnet contents vary. Age and provenance currently unknown.

METASEDIMENTARY ROCKS

Late Silurian to Early Devonian

SDmgw — Metagraywacke–Light to dark gray, fine- to medium-grained porphyroblastic ± garnet muscovite-alkali feldspar-plagioclase-biotite-quartz gneiss. Subordinate amounts of garnet-quartz-biotite-muscovite schist occur locally. Contains interlayers and boudins of mica schist, sillimanite mica schist, and calc-silicate. Calc-silicate is a gray, fine- to medium-grained, porphyroblastic epidote-clinozoisite-biotite-hornblende-quartz gneiss with trace amounts of muscovite and sillimanite.

SDss — Sillimanite schist–Silver-blue-gray to medium gray, fine- to medium-grained porphyroblastic sillimanite-garnet-quartz-biotite-muscovite schist. Garnet size ranges from 1 to 10 mm. Layered migmatite (metasandstone) parallel to the foliation 1 cm to 1 m thick, consisting of quartz-feldspar ± garnet ± biotite ± muscovite ± sillimanite. Large quartz-muscovite pegmatites are typically located within this unit.

Eastern Tugaloo terrane

METAIGNEOUS ROCKS

Ordovician

Or — Reepsville orthogneiss [~426 Ma (U-Pb SHRIMP)]–Light to dark gray, fine- to medium-grained, garnet-biotite-quartz-plagioclase-alkali feldspar gneiss. Felsic layers range from 1 to 50 mm.

Opc — Pott Creek mylonite [~447 Ma (U-Pb SHRIMP)]–Light to dark gray, fine- to medium-grained, garnet-bearing, quartz-biotite-plagioclase-alkali feldspar gneiss. Feldspar porphyroclast sizes from 2 to 85 mm.

METASEDIMENTARY ROCKS

Neoproterozoic to Cambrian (?)

tfl, g — Lower Ashe–Tallulah Falls Formation biotite gneiss and schist–Dark gray, fine- to medium-grained, inequigranular migmatitic plagioclase-biotite-quartz gneiss and muscovite-biotite schist. Contains amphibolite layers and amphibolite gneiss boudins. Gondite (g) –Tannish pink, fine- to medium-grained, equigranular rock, composed mostly of quartz with pale-pink garnets. Occurs as 0.15 to 0.6 m layers within tfl. Weathered rock is medium to dark brown or black.

EXPLANATION

Contacts

Lithologic contact: solid where exactly located, long-dashed where located within 15 m, short-dashed where approximately located, and dotted where inferred.

Brindle Creek fault (Neoacadian, ~350 Ma (Merschat and Hatcher, 2007): solid where exactly located, long-dashed where located within 15 m, short-dashed where approximately located, and dotted where inferred. Teeth located on hanging wall.

Linear Structures

- Trend and plunge of mineral lineation
- Trend and plunge of mesoscopic open antiform
- Trend and plunge of mesoscopic open synform
- Trend and plunge of mesoscopic overturned antiform
- Trend and plunge of mesoscopic overturned synform

(NOTE: Where structural symbols are combined, the intersection marks the point of observation.)

Planar Structures

- Strike and dip of foliation; inclined, vertical

Map Symbols

- Location of electron microprobe sample
- Location of sample collected for SHRIMP analysis
- Location of abandoned mine or quarry

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North Carolina Geological Survey