North Carolina Department of Environmental Quality
Division of Energy, Mineral and Land Resources
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North Carolina Geological Survey
Open File Report 2020-04

CORRELATION OF MAP UNITS

Quaternary
- Qal — alluvium
- Qtl — terrace deposits - low
- Qth — terrace deposits - high

Mesozoic
- Jd — diabase

Triassic Sedimentary Rocks
Deep River Basin: Sanford Sub-basin
- Trs — Sanford Formation
- Trc — Cumnock Formation
- Trpc, Trp — Pekin Formation

Neoproterozoic

Albemarle Arc Pluton (?)
- Zdi, Zabsi, Zgr

Aaron Formation
Youngest detrital zircons of ca. 588 and 578 Ma (Pollock et al., 2010 and Samson et al., 2001, respectively)
- Za

Hyco Formation - upper portion

Metamorphosed volcaniclastic sedimentary and pyroclastic rocks associated with Hyco Formation: upper portion
ca. 616 - 612 Ma (Wortman, et al., 2000; Bowman, 2010; and Bradley and Miller, 2011)
- Zhel, Zhime/pl, Zhable, Zhe/pl, Zhdlt (u)

Stratigraphic relations uncertain

INTRODUCTION

The Colon 7.5-minute Quadrangle lies in the east central-portion of the North Carolina Piedmont. The unincorporated communities of Colon and Farmville and portions of the City of Sanford are present within the quadrangle. The local transportation corridors of US HWY 15/501 and US HWY 1 cut across the quadrangle.

The Deep River controls the drainage in the quadrangle. The Rocky River, a major tributary of the Deep River, is present in the northern edge of the quadrangle. The southern portion of the quadrangle drains directly to the Deep River along named tributaries of Rocky Branch, Georges Creek, Copper Mine Creek, Little Buffalo Creek, Big Buffalo Creek, Purgatory Creek, Wallace Creek, Roberts Creek, Gum Fork and other unnamed tributaries. Natural exposures of crystalline and Triassic rocks primarily occur along these named and unnamed creeks. Rock exposure at road cuts, ridges, resistant finned-shaped outcrops and pavement outcrops locally occur outside of drainages. The elevations in the map area range from approximately 470 feet above sea level near the northwest corner of the quadrangle, to approximately 190 feet along the Deep River as it flows toward the east in the northeast corner of the quadrangle.

Geologic Background

Pre-Mesozoic crystalline rocks in the Colon Quadrangle are part of the redefined Hyco Arc (Hibbard et al., 2013) within the Neoproterozoic to Cambrian Carolina terrane (Hibbard et al., 2002; and Hibbard et al., 2006). In the region of the map area, the Carolina terrane can be separated into two lithotectonic units: 1) the Hyco Arc and 2) the Aaron Formation of the redefined Virgilina sequence (Hibbard et al., 2013). The Hyco Arc consists of the Hyco Formation which include ca. 633 to 612 Ma (Wortman et al., 2000; Bowman, 2010; Bradley and Miller, 2011) metamorphosed layered volcaniclastic rocks and plutonic rocks. Available age dates (Wortman et al., 2000; Bradley and Miller, 2011) indicate the Hyco Formation may tentatively be divided into lower (ca. 630 Ma) and upper (ca. 615 Ma) portions with an apparent intervening hiatus of magmatism. In northeastern Chatham County, Hyco Formation units are intruded by the ca. 579 Ma (Tadlock and Loewy, 2006) East Farrington pluton and associated West Farrington pluton. The Aaron Formation consists of metamorphosed layered volcaniclastic rocks with youngest detrital zircons of ca. 588 and 578 Ma (Pollock et al., 2010 and Samson et al., 2001, respectively). Hibbard et al. (2013) interprets an at least 24 million year unconformity between the Aaron and underlying Hyco Formation.

The southern portion of the quadrangle is underlain by Triassic-aged sedimentary rocks of the Deep River Mesozoic basin which is separated into three sub-basins (Durham, Sanford and Wadesboro). The Colon cross structure (Campbell and Kimball, 1923 and Reinemund, 1955), partially located within the quadrangle, is a constriction zone in the basin characterized by crystalline rocks overprinted by complex brittle faulting. The Colon cross-structure marks the transition between the Durham and Sanford sub-basins. The Colon Quadrangle contains the Triassic-aged units from oldest to youngest of the Pekin, Cumnock and Sanford Formations of the Sanford sub-basin. Detailed descriptions of the Triassic sediments is provided in Reinemund (1955). A detailed comparison of the Durham and Sanford sub-basins is provided in Clark et al. (2001). Dikes of Jurassic aged diabase intrude the Triassic sediments. Diabase dikes also intrude the crystalline rocks of the map area. Quaternary aged alluvium is present in most major drainages.

Folds

The Hyco Arc and Aaron Formation lithologies were folded and subjected to low grade metamorphism during the ca. 578 to 554 Ma (Pollock, 2007; Pollock et al., 2010) Virgilina deformation (Glover and Sinha, 1973; Harris and Glover, 1985; Harris and Glover, 1988; and Hibbard and Samson, 1995). In the map area, original layering of Hyco and Aaron Formation lithologies are observed ranging from shallowly to steeply dipping and are interpreted to be a result of open to tight folds that are locally overturned.

Preliminary stereogram analyses of data from two map scale synclines in the nearby Coleridge Quadrangle (Bradley et al, 2018), appears to indicate the presence of folds ranging from gentle to open. Subsequent domain analyses of primary bedding and layering in Hyco Formation and Aaron Formation units outside of the two synclines, indicate folds range from tight to open with the majority of the folds within the tight to close range. In general, it appears that the Hyco Formation and older portions of the Aaron Formation are more tightly folded compared to the Aaron Formation in the identified synclines in the Coleridge Quadrangle. This apparent range from gentle to tight folds is not well understood and may indicate: 1) normal disharmonic folding due to competency differences between units or 2) that the younger units within the synclines in Coleridge are more appropriately assigned to the Albemarle Arc lithologies and were deposited above an angular unconformity. More investigation is needed.

Locally, metamorphic foliations are present with shallow dips (less than 50 degrees). These areas with shallow dipping foliation are often associated with intense sericitization and foliation parallel quartz veining. This relationship is identical to deformation observed within the Bear Creek Quadrangle (Bradley et al., 2019) in the vicinity of the Glendon fault (approximately 13 miles on-strike to the southwest). These shallow dipping foliations are interpreted to be associated with local deformation and folding along interpreted high angle reverse faults similar to the Glendon fault.

Faults

The map area has localized evidence of deformation associated with high angle reverse faults similar to the Glendon Fault in the nearby Bear Creek Quadrangle (Bradley et al., 2019). These areas are identified based on shallow dipping foliations and hydrothermally altered rock.

The historic Clegg Copper Mine (Kerr and Hanna, 1893) is present within a quartz mineralized zone that is interpreted to have been a pre-metamorphic fault – the Copper Mine Fault (Babiker, 1978). The Copper Mine Fault is oriented parallel to later Mesozoic brittle faulting. Abundant evidence of brittle faulting at the outcrop-scale, map-scale and large-scale lineaments (as interpreted from hillshade LiDAR data) are present in the map area. The quadrangle includes the southwestern portion of the Colon cross-structure that marks the transition between the Durham and Sanford sub-basins. The brittle faulting and lineaments are interpreted to be associated with Mesozoic extension. Significant brittle faults within the quadrangle include the Indian Creek Fault, Gulf Fault and the Deep River Fault.

Past Work

Reinemund (1955), is an important work, that has laid the foundation for the geology with in the Triassic basin. For this mapping effort, Reinemund's maps were georeferenced to a digital elevation model from Hillshade LiDAR. Geologic contacts within the Triassic basin were digitized and modified if needed. Most of the geology south of the Deep River within the Triassic basin was digitized as presented by Reinemund.

The map area is located within the study area of Babiker (1978) who investigated the Clegg Copper Mine and conduced geologic mapping in the vicinity of the mine.

Mineral Resources

Copper Mines

Two historic copper deposits are present in the map area and include the Clegg Copper Mine and the Sloan Mine. Descriptions of the deposits are provided in Kerr and Hanna (1893), Berry (1943) and Carpenter (1976). Babiker (1978) conducted a detailed study of the Clegg Copper Mine.

The Clegg Copper Mine is present within a quartz mineralized zone along the Copper Mine Fault. The workings were reported to have been extensive and included four vertical shafts reaching a depth of 200 feet with mining ending in 1890 (Kerr and Hanna, 1893). Babiker (1978) reported multiple copper-bearing sulfides with chalcopyrite as the principal copper mineral with secondary minerals of chalcocite, covellite and malachite. The Clegg Copper Mine area appears to have been reclaimed with little evidence of past mining remaining.

Kerr and Hanna (1893) briefly mention the Sloan Mine as consisting of a two foot thick vein that was worked to a depth of 40 feet prior to 1888. Berry (1943) and Carpenter (1976) have limited information on the mine.

Clay Products

The red claystones of the Pekin and Sanford Formations continue to supply area brick manufactures raw material. In the 1950's, it was reported that 6 brick and tile producers were active in the map and nearby areas (Reinemund, 1955). It has been and continues to be an important location for clay products. Several abandoned and active clay pits are present in the map and are identified.

Coal Deposits

Coal has been mined within the map area since before the Revolutionary War – ca. 1750's. Reinemund (1955) estimates the total production in the Deep River Coal Field exceeded 1 million tons. The majority of the production was from two mines with extensive underground workings – the Carolina Mine and the Cumnock (also known as the Egypt) Mine. Reinemund (1955) provides an extensive review of the coal deposits and geology of the Deep River Coal Field.

Oil and Gas Potential

No natural gas exploration wells have been drilled within Colon Quadrangle, however several have been drilled in the adjacent Goldston Quadrangle. A summary of the natural gas potential of the Sanford sub-basin is provided in Reid et al. (2011). A compilation map showing seismic lines, drill holes and hydrocarbon shows is provided in Reid et al. (2010). An overview of the Triassic rift / lacustrine basins, their hydrocarbon potential in North Carolina, a regulatory framework overview and data access information can be found in Reid et al. (2018).

Quaternary Deposits

Quaternary deposits in the Colon Quadrangle were previously mapped by Reinemund (1955), along with bedrock mapping; however, the mapping was conducted prior to 1:24,000 topographic map availability. The Quaternary mapping for this project utilized digital county soil survey parent material maps (Soil Survey Staff, 2019), high resolution LiDAR surface topography, data from Reinemund (1955), and new field observations (outcrops and hand augers). The Quaternary fluvial sediments were divided into 3 map units (modern floodplain and two terrace levels), similar in concept to mapping by Reinemund (1955).

The oldest and highest terrace deposits (Qth) contains fluvial deposits of an ancestral Deep River, which has since incised to its present level. The elevation of this terrace level ranges from as high as 305 feet to 240 feet asl, typically about 35 to 85 feet above the modern Deep River floodplain. There appear to be multiple terrace levels within this map unit that we chose to not differentiate because of the high degree of dissection and because lithological differences were not readily observed. Possible causes for the river's overall incision during the Quaternary include tectonic, glacial isostatic adjustment (forebulge of Laurentide Ice Sheet) and climatic processes. The age of deposits within the high terrace unit are speculatively middle Pleistocene based on the terrace height above the modern floodplain (Mills, 2000), degree of dissection, and weathering characteristics (Suther et al., 2011).

The low terrace deposits (Qtl) contain younger Deep River fluvial deposits, with terrace elevations ranging from 240 feet to 220 feet asl, typically about 10 to 15 feet above the modern Deep River floodplain. The age of deposits within the low terrace unit are speculatively late Pleistocene to early Holocene based on the terrace height above the modern floodplain (Mills, 2000; Suther et al., 2011). In some areas, the landforms appears to be a strath terraces with thin fluvial deposits (silty to sandy; < 4 feet thick) above residuum developed in Triassic bedrock. In other areas, the terrace may be the cut-and-fill variety, but thicknesses are unknown without test cores.

Alluvial deposits on the modern (Holocene) floodplain (Qal) consist mainly of silt loam to silty clay loam where exposed along the Deep River or its tributaries in the Triassic Basin. Fine to medium sand occurs in points bars and river channels, along smaller creeks in crystalline terrain (where it can be gravelly) and likely at depth from reworking of Pleistocene and older sediments. Along the Deep River valley, the modern floodplain ranges in elevation from about 225 feet asl to 195 feet asl (northeastern part of Colon Quadrangle). This map unit likely also includes very low terraces which are blanketed by modern overbank flood deposits from times of high water levels.

DESCRIPTION OF MAP UNITS

All pre-Mesozoic rocks in the map area have been metamorphosed to at least the chlorite zone of the greenschist metamorphic facies. Many of the rocks display a weak or strong metamorphic foliation. Although subjected to metamorphism, the rocks retain relict igneous, pyroclastic, and sedimentary textures and structures that allow for the identification of protolith rocks. As such, the prefix "meta" is not included in the nomenclature of the pre-Mesozoic rocks described in the quadrangle. Dikes of Jurassic-aged diabase intrude the crystalline rocks and Triassic sediments of the map area. Triassic-aged sediments and Jurassic diabase dikes are not metamorphosed. Quaternary aged alluvium is present in most major drainages.

Map units of metavolcanic and metavolcaniclastic rocks include various lithologies that when grouped together are interpreted to indicate general environments of deposition. The dacitic lavas and tuffs unit is interpreted to represent dacitic domes and proximal pyroclastics. The andesitic to basaltic lavas (with tuffs or conglomerates) units are interpreted to represent eruption of intermediate to mafic lava flows and associated pyroclastic and/or epiclastic deposits. The epiclastic/pyroclastic units are interpreted to represent deposition from the erosion of dormant and active volcanic highlands. Some of the metavolcaniclastic units within the map area display lithologic relationships similar to dated units present in northern Orange and Durham Counties. Due to these similarities, the metavolcanic and metavolcaniclastic units have been tentatively separated into upper and lower portions of the Hyco Formation; geochronologic data in the map area is needed to confirm this interpretation. A review of the regional lithologies is summarized in Bradley (2013).

Unit descriptions common to Rice et al. (2020) and Bradley et al. (2014) from the Goldston and Pittsboro geologic maps, respectively were used for conformity with on strike units in neighboring quadrangles. Unit descriptions and stratigraphic correlations were maintained from adjacent mapping in Orange County (Bradley et al., 2016). The nomenclature of the International Union of Geological Sciences subcommission on igneous and volcanic rocks (IUGS) after Le Maitre (2002) is used in classification and naming of the units. The classification and naming of the rocks is based on relict igneous textures, modal mineral assemblages, or normalized mineral assemblages when whole-rock geochemical data is available. Pyroclastic rock terminology follows that of Fisher and Schminke (1984).

Sedimentary Units

dg - Disturbed ground: consists of fill in highway embankments, railway embankments, and mine spoil piles, as well as areas of removed earth in mined-out-areas (former coal mines).

Qal - Modern (Holocene) floodplain deposits: silt loam to silty clay loam, with fine to medium sand deposits in point bars and channels deposits in the Deep River valley; smaller tributaries in the Carolina terrane can have more sandy or gravelly alluvium; brown to gray; soft; crudely stratified; observed as much as 10 feet thick, but likely thicker in the Deep River Valley. Includes very low terraces that are periodically inundated by modern floods. Contains weak to moderately developed soil profiles. Structural measurements depicted on the map within Qal represent outcrops of crystalline rock inliers surrounded by alluvium.

Qtl – Quaternary low terrace deposits: silt loam to clay loam to sand, with some gravelly zones near unit base; yellowish brown to brown; in some areas, difficult to differentiate from high levels of modern floodplain; ranges from 2 feet to several feet thick or more; some areas are strath terraces with thin terrace deposits over red, clayey residuum developed into Triassic bedrock. [this unit is similar in concept to Qg2 of Reinemund (1955)]

Qth – Quaternary high terrace deposits: silt loam to sandy loam to gravelly loamy sand (up to 40 % gravel); yellowish brown to reddish brown; gravel consists primarily of white, rounded to subrounded quartz pebbles, with rare cobbles; the fluvial depositional sequence generally fines upwards, with gravelly zones typically revealed along eroding slopes; total thickness of map unit is typically 2 to 10 feet; may consist of a lag deposit in strath terraces over a red, silty clay to clay residuum developed into fine-grained Triassic bedrock. Mapped areas may include multiple, undifferentiated high terrace levels. Contains E and Bt horizons of an Ultisol soil profile, with significant alteration extending several feet into the unit. May exhibit crude stratification or cross bedding at depth. [this unit is similar in concept to Qg3 of Reinemund (1955)]

Triassic Sediments

Trs – Sanford Formation: Mainly red to brown, locally purple, coarse-grained, arkosic sandstones and conglomerates. Subordinate amounts of claystone, siltstone and fine-grained sandstone (Reinemund, 1955).

Trc – Cumnock Formation: Gray and black claystone, shale and siltstone. Gray sandstone. Contains beds of coal and carbonaceous (organic-rich) shale (Reinemund, 1955). Includes coal horizons.

Trp – Pekin Formation: Gray, Brown to maroon, white mica bearing, interbedded mudstones, siltstones arkosic sandstones and locally conglomerates. Outcrops and boulders of float identified as part of Pekin Formation are strongly indurated compared to sediments identified as part of the Durham sub-basin. Identified as the Pekin Formation by Reinemund (1955).

Trpc – Conglomerate of the Pekin Formation: Reddish-brown to dark brown to purplish-red, irregularly bedded, poorly sorted, cobble to boulder conglomerate. Clasts are chiefly miscellaneous felsic and intermediate metavolcanic rocks and quartz. Typically present adjacent to border faults. Outcrops and boulders of float identified as part of Pekin Formation are strongly indurated compared to conglomerates identified as part of Durham sub-basin. Identified as the Pekin Formation-basal conglomerate by Reinemund (1955).

Intrusive and Metaintrusive Units

Jd – Diabase: Black to greenish-black, fine- to medium-grained, dense, consists primarily of plagioclase, augite and may contain olivine. Locally has gabbroic texture. Occurs as dikes up to 100 ft wide. Diabase typically occurs as spheriodally weathered boulders with a grayish-brown weathering rind. Red station location indicates outcrop or boulders of diabase. Purple station locations indicate outcrop or boulders of gabbroic textured diabase.

Zdi – Diorite: Mesocratic (CI~50), greenish-gray to grayish-green, fine- to medium-grained, metamorphosed, hypidiomorphic granular diorite. Major minerals include plagioclase and amphibole. Plagioclase crystals are typically sericitized and saussuritized. Amphiboles are typically altered to chlorite and actinolite masses. Includes microdiorite textured rock. Locally, amphiboles are acicular up to 1 cm long.

Zgr – Granite: Leucocratic, locally pale pink; medium- to coarse-grained, equigranular metamorphosed granite and granodiorite; locally contains epidote and/or chlorite clots possibly pseudomorphic after hornblende.

Metavolcanic and Metavolcaniclastic Units

Zabsi - Andesitic to basaltic shallow intrusive: Grayish-green to light green, ranges from aphanitic to plagioclase porphyritic and locally amphibole/pyroxene porphyritic, metamorphosed, andesite to basalt. May exhibit a granular-textured groundmass with microdioritic to microgabbroic texture (visible with 7x hand lens). Dark green to black colored amphibole/pyroxene phenocrysts, when present, occurs as masses (up to 4 mm). Interpreted to intrude Hyco and Aaron Formations. May be an apophysis of the Zdi unit in map area. Occurs as spheroid-shaped boulders and massive outcrop in map area.

Aaron Formation

Za – Aaron Formation: Distinctive metasedimentary package that ranges from fine-grained siltstones to coarse-grained sandstones, pebbly sandstones and conglomerates. Siltstones are similar in appearance to Hyco Formation lithologies. The sandstones, pebbly sandstones and conglomerates (classified as litharenite, feldspathic litharenite and lithic feldsarenite by Harris (1984)) are distinctive and commonly contain rounded to subrounded clasts of quartz ranging from sand- to gravel-sized. In the sandstones, feldspar is the most prominent mineral grain; quartz varies from sparse to abundant in hand sample. Lithic clasts are typically prominent and range from sand- to gravel-size. Harris (1984), performed a detailed sedimentary study of the Aaron Formation to the west of the map area. Harris (1984) interpreted the Aaron Formation to have been deposited by turbidity currents in a retrogradational submarine fan setting.

Hyco Formation – Upper Portion

Zhel - Epiclastic rocks and lavas: Conglomerate, conglomeratic sandstone, sandstone, siltstone and mudstone. Siltstones and mudstones typically display bedding ranging from mm-scale up to 10 cm, bedding layers traceable for several feet locally, may exhibit soft sediment deformation. Locally tuffaceous with a relict vitric texture. Locally contain interbedded dacitic to basaltic lavas. Conglomerates and conglomeratic sandstones typically contain subrounded to angular clasts of dacite in a clastic matrix. Deposition interpreted as distal from volcanic center, in deep water(?), and via turbidite flows.

Zhime/pl - Mixed intermediate to mafic epiclastic-pyroclastic rocks with interlayered intermediate to mafic lavas: Grayish-green to green, locally with distinctive reddish-gray or maroon to lavender coloration; metamorphosed: conglomerate, conglomeratic sandstone, sandstone, siltstone and mudstone. Lithologies are locally bedded; locally tuffaceous with a cryptocrystalline-like groundmass. Siltstones are locally phyllitic. Locally contain interbedded intermediate to mafic lavas identical to the Zhable unit. Contains lesser amounts of fine- to coarse tuff and lapilli tuff with a cryptocrystalline-like groundmass. Pyroclastics, lavas, and epiclastics are mainly intermediate to mafic in composition. Minor dacitic lavas and tuffs present. Silicified and/or sericitized altered rock are locally present. Conglomerates and conglomeratic sandstones typically contain subrounded to angular clasts of andesite and basalt in a clastic matrix. Generally interpreted to have been deposited proximal to active intermediate to mafic composition volcanic centers and/or record the erosion of proximal intermediate to mafic composition volcanic centers after cessation of active volcanism.

Zhable – Andesitic to basaltic lavas with interlayered epiclastic rocks: Light green, gray-green, gray, and dark gray; typically unfoliated, amygdaloidal, plagioclase porphyritic, amphibole/pyroxene porphyritic and aphanitic; metamorphosed: andesitic to basaltic lavas and shallow intrusions. Hyaloclastic texture is common and imparts a fragmental texture on some outcrops and float boulders. Contains lesser amounts of grayish-green, light green, and light gray to white; metamorphosed conglomerate, conglomeratic sandstone, sandstone, siltstone and mudstone.

Zhe/pl - Mixed epiclastic-pyroclastic rocks with interlayered dacitic lavas: Grayish-green to greenish-gray, locally with distinctive reddish-gray or maroon to lavender coloration; metamorphosed: conglomerate, conglomeratic sandstone, sandstone, siltstone and mudstone. Lithologies are locally bedded; locally tuffaceous with a cryptocrystalline-like groundmass. Siltstones are locally phyllitic. Locally contain interbedded dacitic lavas identical to Zhdlt unit (not present in quadrangle). Contains lesser amounts of fine- to coarse tuff and lapilli tuff with a cryptocrystalline-like groundmass. Pyroclastics, lavas, and epiclastics are mainly felsic in composition. Minor andesitic to basaltic lavas and tuffs present. Silicified and/or sericitized altered rock are locally present. Conglomerates and conglomeratic sandstones typically contain subrounded to angular clasts of dacite in a clastic matrix. Portions of the Zhe/pl unit are interpreted to have been deposited proximal to active volcanic centers represented by the Zhdlt unit but are also interpreted to record the erosion of proximal volcanic centers after cessation of active volcanism.

Zhdlt (u) – Dacitic lavas and tuffs of the upper portion of the Hyco Formation: Greenish-gray to dark gray, siliceous, metamorphosed: aphanitic dacite, porphyritic dacite with plagioclase phenocrysts, and flow banded dacite. Dacite with hyaloclastic textures are common. Welded and non-welded tuffs associated with the lavas include: greenish-gray to grayish-green, fine tuff, coarse plagioclase crystal tuff and lapilli tuff. Locally, interlayers of immature conglomerate and conglomeratic sandstone with abundant dacite clasts are present. The dacites are interpreted to have been coherent extrusives or very shallow intrusions associated with dome formation. The tuffs are interpreted as episodic pyroclastic flow deposits, air fall tuffs or reworked tuffs generated during formation of dacite domes. Wortman et al. (2000) reports an age of 615.7+3.7/-1.9 Ma U-Pb zircon date for a dacitic tuff from the unit in the Rougemont quadrangle.

Altered by the North Carolina Geological Survey for use with map.
Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 17S
This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.
Imagery....NAIP, June 2016 - November 2016
Roads.... U.S. Census Bureau, 2016
Names....GNIS, 1980 - 2017
Hydrography....National Hydrography Dataset, 1899 - 2018
Contours....National Elevation Dataset, 2008
Boundaries....Multiple sources; see metadata file 2017 - 2018
Wetlands....FWS National Wetlands Inventory 1983

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
MN 8°57' 159 MILS; GN 1°3' 19 MILS

U.S. National Grid
100,000 - m Square ID
PV
Grid Zone Designation
17S

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

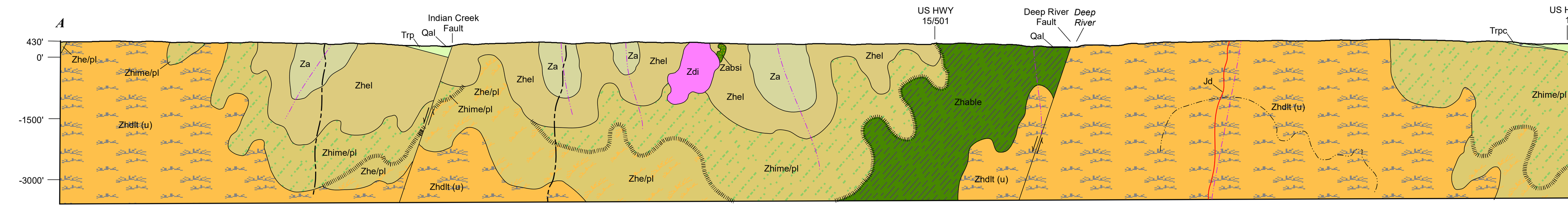
This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

QUADRANGLE LOCATION

ADJOINING QUADRANGLES
1 Siler City NE
2 Pittsboro
3 Merry Oaks
4 Goldston
5 Moncure
6 White Hill
7 Sanford
8 Broadway

ROAD CLASSIFICATION
Expressway; Local Connector; Secondary Hwy; Local Road; Ramp; 4WD; Interstate Route; US Route; State Route

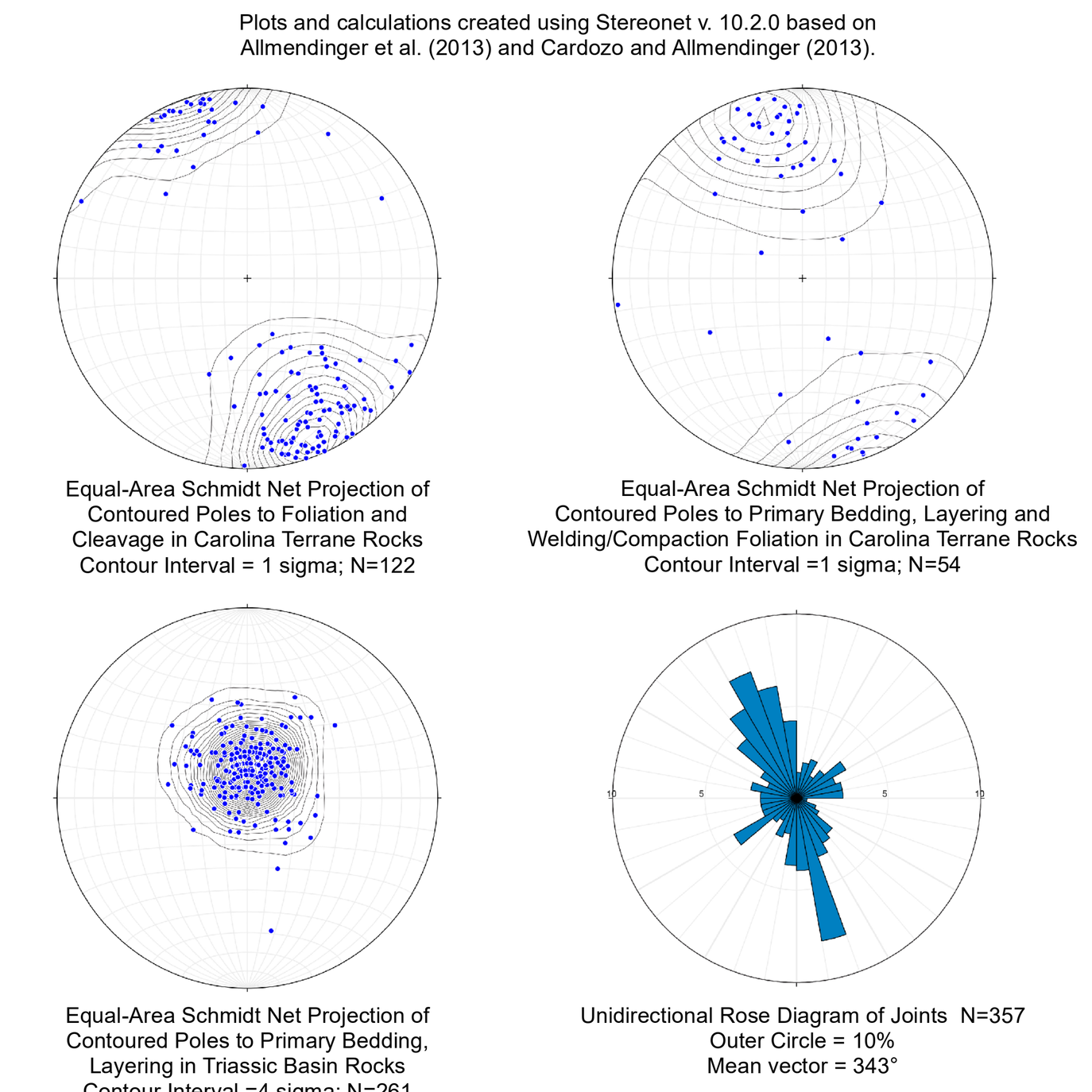
COLON, NC
2019



no vertical exaggeration for bedrock units
Qal thickness exaggerated to be visible

Equal-Area Schmidt Net Projections and Rose Diagram

Plots and calculations created using Stereonet v. 10.2.0 based on Allmendinger et al. (2013) and Cardozo and Allmendinger (2013).



Equal-Area Schmidt Net Projection of Contoured Poles to Foliation and Cleavage in Carolina Terrane Rocks Contour Interval = 1 sigma; N=122

Equal-Area Schmidt Net Projection of Contoured Poles to Primary Bedding, Layering and Welding/Compaction Foliation in Carolina Terrane Rocks Contour Interval =1 sigma; N=54

Equal-Area Schmidt Net Projection of Contoured Poles to Primary Bedding, Layering in Triassic Basin Rocks Contour Interval =4 sigma; N=261

Unidirectional Rose Diagram of Joints N=357
Outer Circle = 10%
Mean vector = 343°

EXPLANATION OF MAP SYMBOLS

CONTACTS, FAULTS, AND OTHER FEATURES

- inferred contact
- concealed contact
- inferred gradational contact
- inferred diabase contact
- concealed diabase contact
- inferred fault
- concealed fault
- lineament - lidar inferred
- fault-high angle reverse - Identity or existence questionable, location approximate
- fold axis - inferred (anticline)
- overturned fold axis - inferred (syncline)
- coal bed (Reinemund, 1955)
- conglomerate beds within Pekin and Sanford Formations (Reinemund, 1955)
- A — A' cross section line
- coal underground workings outline (Reinemund, 1955)

IN CROSS SECTION

- contact
- inferred fold axis
- fold form lines
- topographic profile
- diabase inferred
- lineament - lidar inferred
- gradational contact

PLANAR AND LINEAR FEATURES

- strike and dip of bedding or layering
- strike and dip of bedding or layering (multiple observations at one location)
- strike of vertical bedding or layering
- strike and dip of Triassic bedding (from USGS PP 246)
- welding/compaction foliation
- strike and dip of foliation
- strike and dip of foliation (multiple observations at one location)
- strike and dip of cleavage
- strike and dip of cleavage (multiple observations at one location)
- fault plane
- strike and dip of inclined joint
- strike and dip of inclined joint surface (multiple observations at one location)
- strike of vertical joint
- strike of vertical joint surface (multiple observations at one location)
- quartz vein
- bearing and plunge of crenulation lineation
- bearing and plunge of slickenline
- observation station location
- diabase station location
- horizontal Triassic bedding

PROSPECTS, QUARRIES AND OTHER FEATURES

Brick Clay

- CLY Clay pit-brick clay, active (DEQ, DEMLR permitted mines database)
- CLY Clay pit-brick clay, abandoned, (DEQ, DEMLR permitted mines database and Reinemund, 1955)

Coal

- Coal pits – abandoned (Reinemund, 1955)
- 1 Carolina Mine – abandoned with extensive underground workings (Reinemund, 1955)
- 2 Cumnock Mine - abandoned with extensive underground workings (Reinemund, 1955)
- 3 McIvor Mine - abandoned (Reinemund, 1955)
- Mine shafts (Reinemund, 1955)
- Old shaft (Reinemund, 1955)

Gravel

- SDG Gravel pit - abandoned

Copper Mines

- 4 Clegg Copper Mine - abandoned (Babiker, 1978 and Reinemund, 1955)
- 5 Sloan Copper Mine - abandoned (Babiker, 1978)

- DH-A-2 diamond drill hole (Reinemund, 1955)
- 2011 CGS field trip stops

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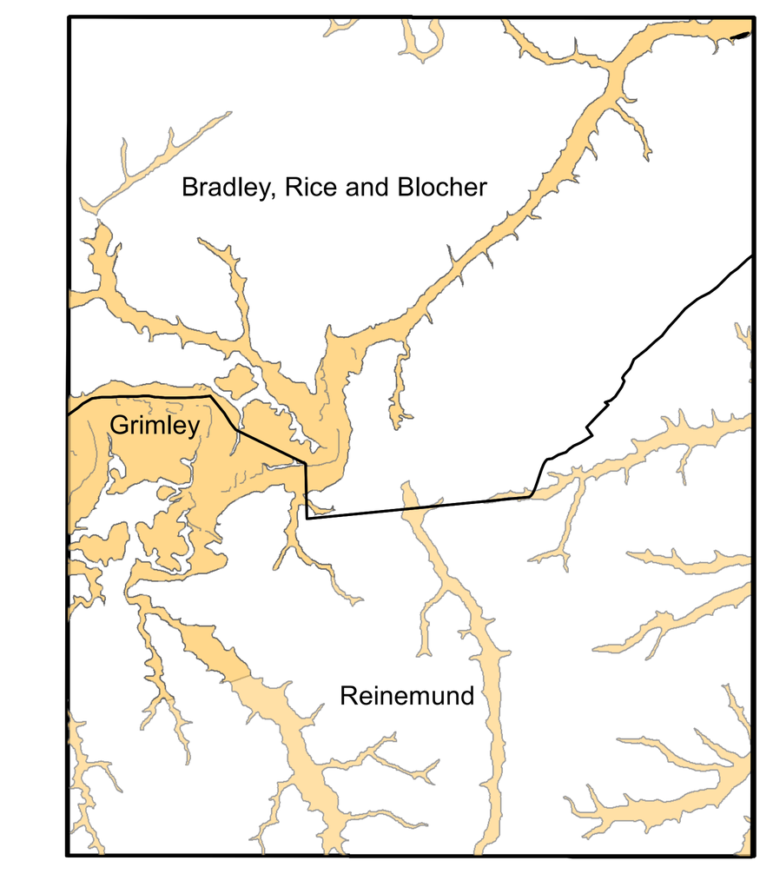
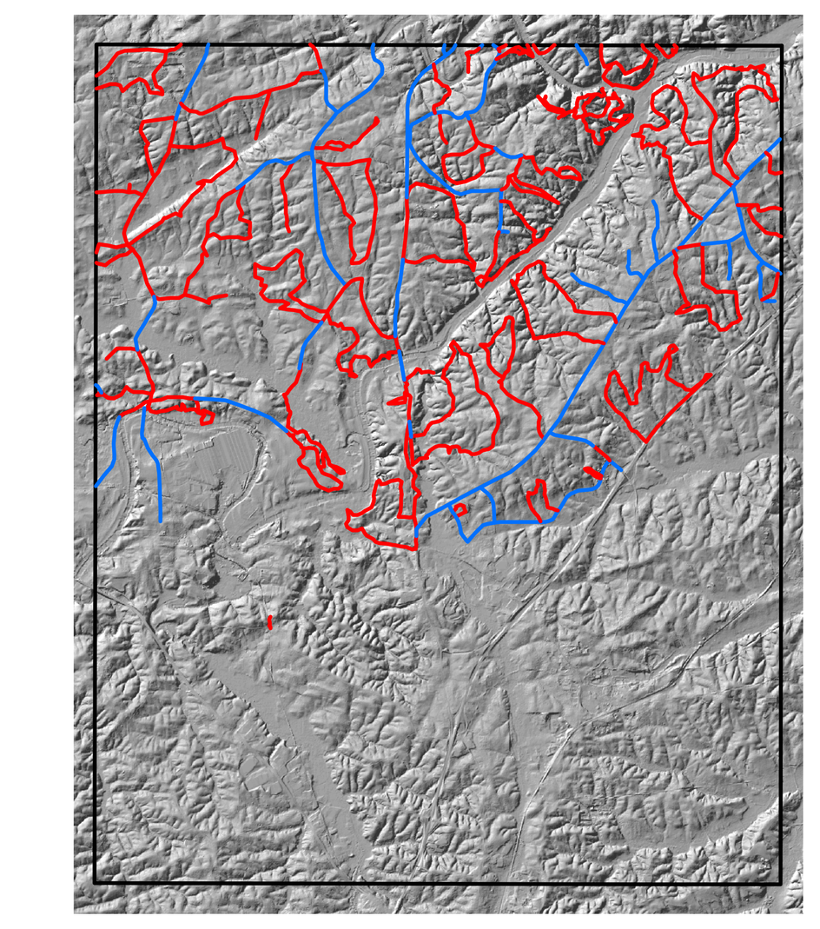


TRAVERSE MAP

Hillshade derived from a 20 foot LiDAR digital elevation model. Red and blue lines show paths of field traverses.



by car
by foot

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Colon Base Map Information:
Base map is from USGS 2019 GeoPDF of the Colon 7.5-minute quadrangle. Air photo, map collar and select features removed. Bounds of GeoPDF based on 7.5-minute grid projection in UTM 17S; North American Datum of 1983 (NAD83).

Geologic Map of the Colon 7.5-Minute Quadrangle, Lee and Chatham Counties, North Carolina

By
Philip J. Bradley, Aaron K. Rice, David A. Grimley and William B. Blocher

Geologic data collected in June 2019 through May 2020.

Map preparation, digital cartography and editing by
Michael A. Medina, Philip J. Bradley and Aaron K. Rice

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