DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF LAND RESOURCES
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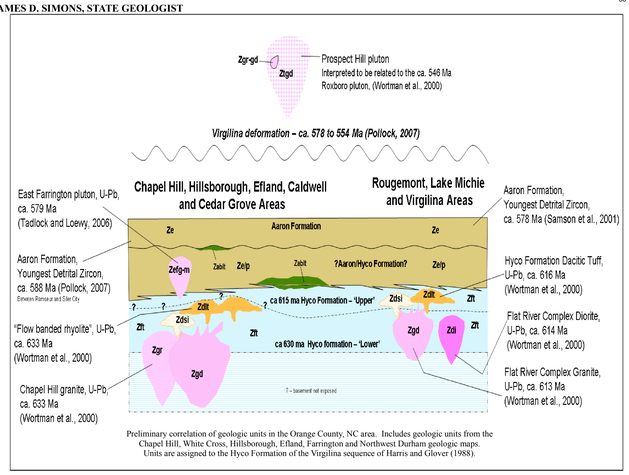
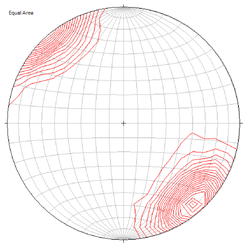
This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program

NORTH CAROLINA GEOLOGICAL SURVEY
OPEN FILE REPORT 2010-02 Revision-01 (2010)

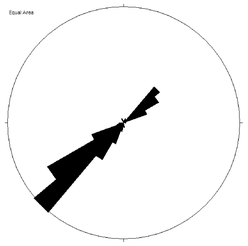
GEOLOGIC MAP OF THE CEDAR GROVE 7.5-MINUTE QUADRANGLE, ORANGE, PERSON AND CASWELL COUNTIES, NORTH CAROLINA
NCGS OPEN FILE REPORT 2010-02 Revision - 01 (2010)



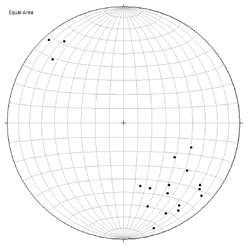
Preliminary correlation of geologic units in the Orange County, NC area. Includes geologic units from the Chapel Hill, White Cross, Hillsborough, Efland, Farrington and Northwest Durham geologic maps. Units are assigned to the Hyco Formation of the Virgilina sequence of Harris and Glover (1988).



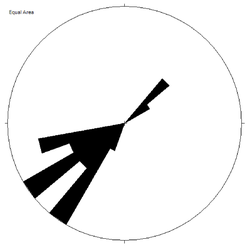
Equal Area Schmidt Net Projection of Contoured Poles to Foliation, and Cleavage
Contour Interval = 2% N = 205



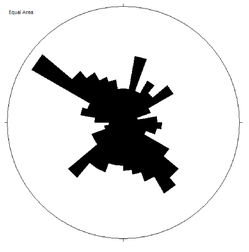
Unidirectional Rose Diagram of Foliations and Cleavage
N = 205 Outer Circle= 25% Mean dir = 223



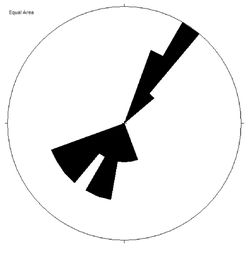
Equal Area Schmidt Net Projection of Poles to Primary Layering, Bedding, and Welding/Compaction Foliation.
N =19



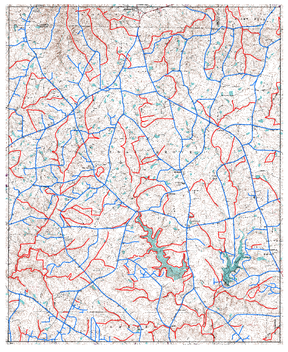
Unidirectional Rose Diagram of Primary Layering, Bedding, Welding/Compaction Foliation.
N = 19; Outer circle = 21%; Mean dir = 233



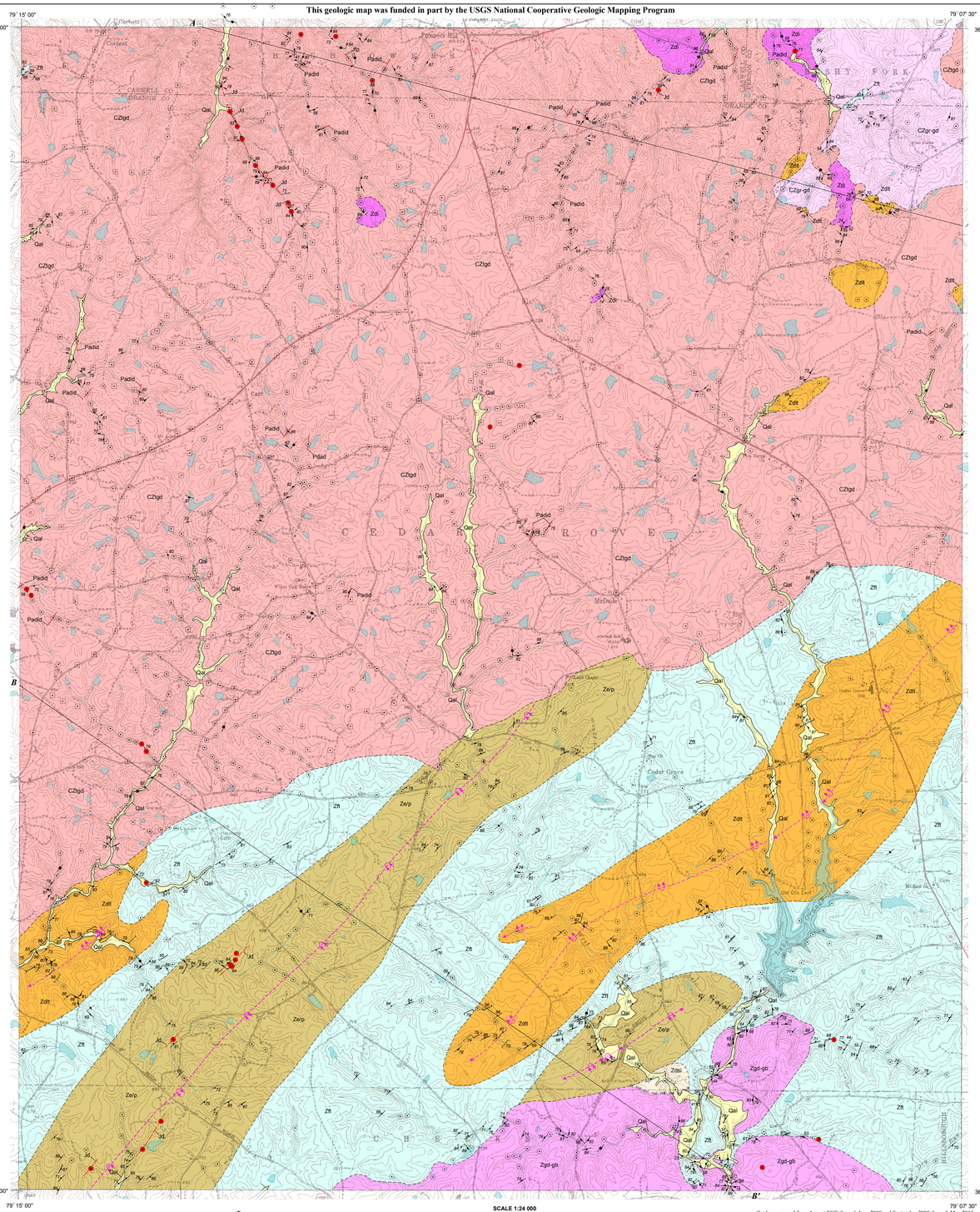
Unidirectional Rose Diagram of Joints
N = 344 Outer Circle = 7%
Mean Direction = 210



Unidirectional Rose Diagram of Pdad and Padid Dike Trends
N = 20 Outer Circle = 15%
Mean Direction = 208



TRAVERSE MAP
traverse by foot
traverse by car



Base topographic map is digital raster graphic image of the Cedar Grove 7.5-minute quadrangle (1967), North Carolina State Plane NAD 83 meters coordinate system, Lambert Conformal Conic projection.

SCALE 1:24 000

1 0.5 0 1 Miles
1,000 500 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet
1 0.5 0 1 Kilometers

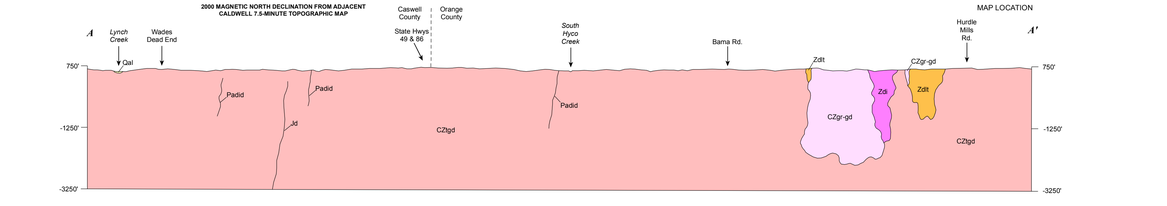
CONTOUR INTERVAL 10 FEET

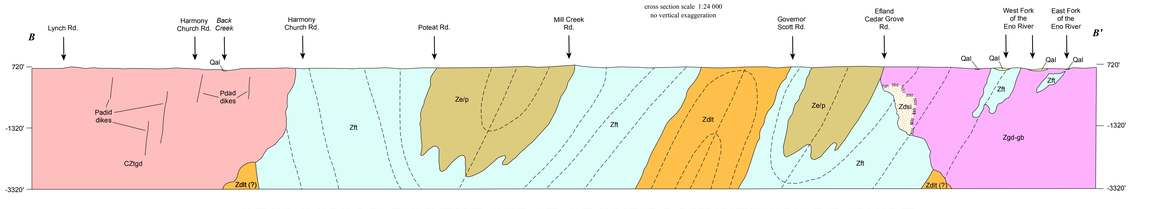
2000 MAGNETIC NORTH DECLINATION FROM ADJACENT CALDWELL 7.5-MINUTE TOPOGRAPHIC MAP

MN GN
6 1/2° 1° 09'
151 MILS 20 MILS

Geology mapped from August 2008 through June 2009 and September 2009 through May 2010.

MAP LOCATION





cross section scale 1:24 000
no vertical exaggeration

GEOLOGIC MAP OF THE CEDAR GROVE 7.5-MINUTE QUADRANGLE, ORANGE, PERSON and CASWELL COUNTIES, NORTH CAROLINA

By
Heather D. Hanna, Philip J. Bradley and Norman K. Gay

Digital representation by Michael A. Medina, Heather D. Hanna and Philip J. Bradley
2010

DESCRIPTION OF MAP UNITS

All pre-Mesozoic rocks of the Cedar Grove quadrangle 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.

The nomenclature of the International Union of Geological Sciences subcommission on igneous and volcanic rocks (IUGS) after Streckeisen (1973 and 1979) 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. Past workers in the Cedar Grove quadrangle and adjacent areas (Allen and Wilson, 1968 and Newton, 1983) have used various nomenclature systems for the igneous rocks. The raw data of these earlier workers was recalculated and plotted on ternary diagrams and classified based on IUGS nomenclature. Pyroclastic rock terminology follows that of Fisher and Schminke (1984).

Sedimentary Units

Qal – Alluvium: Unconsolidated poorly sorted and stratified deposits of angular to subrounded clay, silt, sand and gravel- to cobble-sized clasts, in stream drainages. May include point bars, terraces and natural levees along larger stream floodplains. Structural measurements depicted on the map within Qal represent outcrops of crystalline rock inliers surrounded by alluvium.

Intrusive and Meta-Intrusive Units

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

Jfp – Felsic porphyry: Dark gray, aphanitic groundmass with fine-grained disseminated quartz. Feldspar phenocrysts range from 2 to 5 mm. Weathered surfaces display pockmarked texture from weathering of feldspar phenocrysts and/or mineral filled amygdules. Dike trends are inferred.

Pdad – Dacitic dikes: Dark gray to gray, finely crystalline, and locally weakly plagioclase porphyritic dacite dikes ranging from less than one foot to several feet wide. Dike trends are inferred.

Padid – Andesite to diorite dikes: Melanocratic to Mesocratic (CI ~50 to greater than 50), dark green to green gray, aphanitic to medium-grained, metamorphosed andesite to diorite. Andesites and diorites are locally plagioclase porphyritic. Typically occur in map area as resistant spheroidal boulders. Locally maybe basaltic to gabbroic. Dike trend lines indicated were strike of dike measured in outcrop or interpreted from adjacent stations. Occur as infestation in Zgd unit and are present in many more locations than displayed on map. Dike trends are inferred.

CZtgd – Propect Hill tonalitic granodiorite pluton: Unfoliated to locally very weakly foliated, leucocratic (CI less than 10), very light gray to yellowish gray, medium- to coarse-grained, hypidiomorphic granular, metamorphosed tonalitic granodiorite to tonalite. Mafic minerals present in rock are most commonly biotite intergrown with chlorite and/or hornblende intergrown with actinolite. Biotite books (± magnetite intergrowths) up to 2 cm commonly occur in north of Cedar Grove Quadrangle. Locally muscovite bearing. Cross cutting pegmatitic dikes of similar mineralogy present in some areas. Locally biotite forms (magmatic?) foliation. Weathering of rock produces distinctive coarse quartz sand grains in soil. Andesite to diorite dikes (Zadid) are common throughout the pluton and typically occur as resistant spheroidal boulders. Pluton map pattern truncates Virgilina sequence volcanics and pluton contains foliated xenoliths of volcanic rocks; as such, the pluton is interpreted to be related to the Ca. 546 ma Roxboro pluton (Wortman et al., 2000).

CZgr-gd – Granite to granodiorite of the Prospect Hill pluton: Composite pluton of dominantly medium-grained, hornblende granodiorite; lesser amounts of medium-grained hornblende diorite, plagioclase porphyritic granodiorite, fine-grained granodiorite, and diorite; minor amounts of fine-grained gabbro. Fine-grained granodiorite and diorite are typically green in hand sample from saussuritization of plagioclase. Hornblende is typically altered to chlorite and actinolite masses.

Zdi – Diorite: Mesocratic (CI~50), medium gray, fine- to medium-grained, hypidiomorphic granular diorite. Major minerals include plagioclase and hornblende. Plagioclase crystals are typically sericitized and saussuritized and can occur as phenocryst up to 2 cm diameter. Hornblende is typically altered to chlorite and actinolite masses. Locally hornblende forms (magmatic?) foliation. Includes minor green, fine-grained microdiorite to andesite. Dikes attributed to CZtgd unit intrude diorite bodies locally.

Zgd-gb – Granodiorite to gabbro: Composite pluton of dominantly medium-grained, hornblende granodiorite; lesser amounts of medium-grained hornblende diorite, plagioclase porphyritic granodiorite, fine-grained granodiorite, and diorite; minor amounts of fine-grained gabbro. Fine-grained granodiorite and diorite are typically green in hand sample from saussuritization of plagioclase. Hornblende is typically altered to chlorite and actinolite masses.

Zdsi – Dacitic shallow intrusive: Grayish-green to light green, plagioclase porphyritic dacite with a granular-textured groundmass to very fine-grained granodiorite (with intrusive texture visible with 7x hand lens). Contains lesser amounts of fine- to medium grained granodiorite. Plagioclase phenocrysts typically range from 1 mm to 4 mm. Black colored amphibole, when visible, occurs as phenocrysts (less than 1 mm to 1 mm) and as intergrowths with plagioclase. Amphibole intergrowths distinguish rock from fine-grained tuffs. Enclaves of dark gray, plagioclase porphyritic dacite are common and at times give rock a psuedo-clastic appearance. Locally andesite to diorite and xenoliths of tuffs are present.

Metavolcanic Units

Ze/p - Mixed epiclastic-pyroclastic rocks: Mixed epiclastic-pyroclastic rocks: Grayish-green to greenish-gray; tuffaceous sandstones, conglomeratic sandstones, siltstones and minor phyllite. The siltstones typically are weakly phyllitic. Contains lesser amounts of fine to coarse tuff and lapilli tuff. Minor andesitic to basaltic lavas and tuffs present. Silicified and/or sericitized altered rock similar to Zat unit are present near contacts with other units. Distinctive plagioclase + quartz crystal tuff present in lower zones of unit near contact with Zft unit.

Zft - Felsic tuffs: Grayish- green to greenish-gray and silvery-gray, massive to foliated, volcaniclastic pyroclastic rocks consisting of fine- to coarse tuffs, lapilli tuffs and minor welded tuffs. Layering ranges from massive to thinly bedded. Contains lesser amounts of volcaniclastic sedimentary rocks consisting of volcanic sandstones, and greywackes with minor siltstones and phyllite. Minor andesitic to basaltic lavas and tuffs. Distinctive plagioclase + quartz crystal tuff present in unit in higher stratigraphic zones near the Ze/p unit.

Zdlt - Dacitic lavas and tuffs: Distinctive dark-gray to black, siliceous, cryptocrystalline dacite, porphyritic dacite with plagioclase ± quartz phenocrysts, and flow banded dacite. Welded and non-welded tuffs associated with the lavas include: greenish-gray to grayish-green, fine tuff, coarse plagioclase crystal tuff; lapilli tuff; and tuff breccia. The dacites are interpreted to have been coherent magma that were extrusive 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) report a 632.9 +2.6/-1.9 Ma zircon date from a sample within the unit in the Chapel Hill quadrangle.

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EXPLANATION OF MAP SYMBOLS

CONTACTS

Lithologic contacts - Distribution and concentration of structural symbols indicates degree of reliability.

- contact - location inferred
- contact - location concealed
- gradational contact - location inferred
- diabase dike - location inferred
- in cross section, interpreted fold form lines of non-cylindrical asymmetric folds
- A ——— A' cross section line
- inferred fold hinge of plunging overturned anticline; dotted where concealed
- inferred fold hinge of plunging overturned syncline; dotted where concealed
- inferred fold hinge of doubly plunging overturned syncline; dotted where concealed
- in cross section, inferred axial trace of large-scale fold

PLANAR FEATURES

Observation sites are centered on the strike bar or are at the intersection point of multiple symbols.
Planar feature symbols may be combined with linear features.

- strike and dip of primary bedding and layering
- strike and dip of overturned primary bedding and layering
- strike and dip of primary volcanic compaction and/or welding foliation
- strike and dip of foliation
- vertical foliation
- diabase station location
- strike and dip of cleavage
- vertical cleavage
- strike and dip of spaced cleavage
- strike and dip of high strain foliation
- strike and dip of magmatic (?) foliation defined by aligned biotite or amphibole within the Prospect Hill pluton
- observation station location
- strike and dip of foliation of xenolith within Prospect Hill pluton
- vertical foliation of xenolith within Prospect Hill pluton
- strike and dip of joint
- vertical joint
- observation station location in tonalitic granodiorite unit with conspicuous coarse quartz grains in soil

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program, award number 08HQAG0100 and G09AC00183. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.