

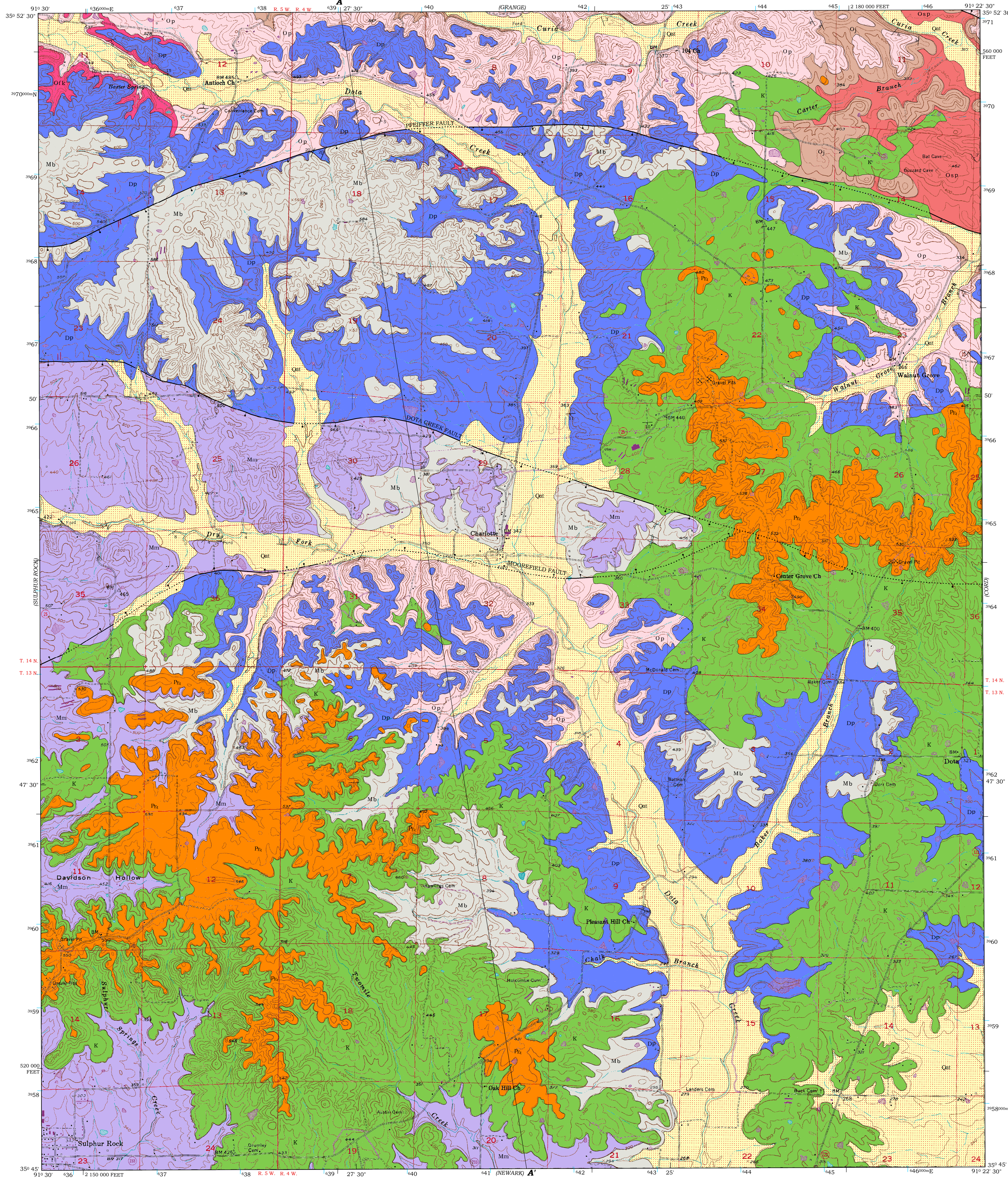


Geologic Map of the Charlotte Quadrangle, Independence County, Arkansas

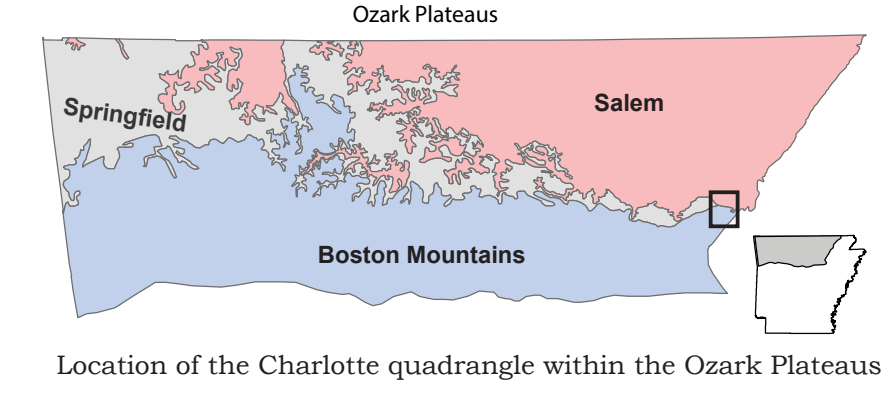
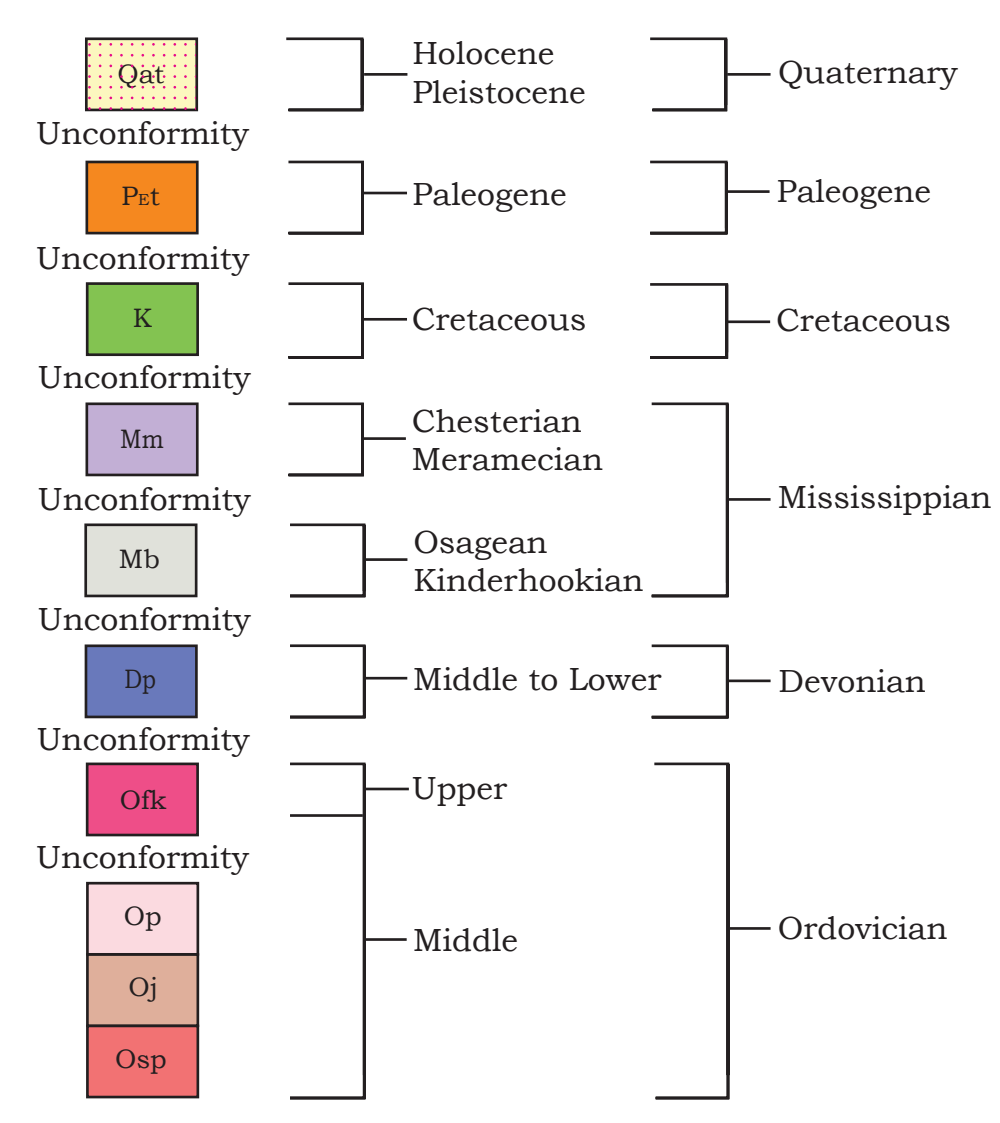
Richard S. Hutto, Thomas J. Liner, and John T. Gist

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Scott M. Ausbrooks, Director and State Geologist



Correlation of Map Units

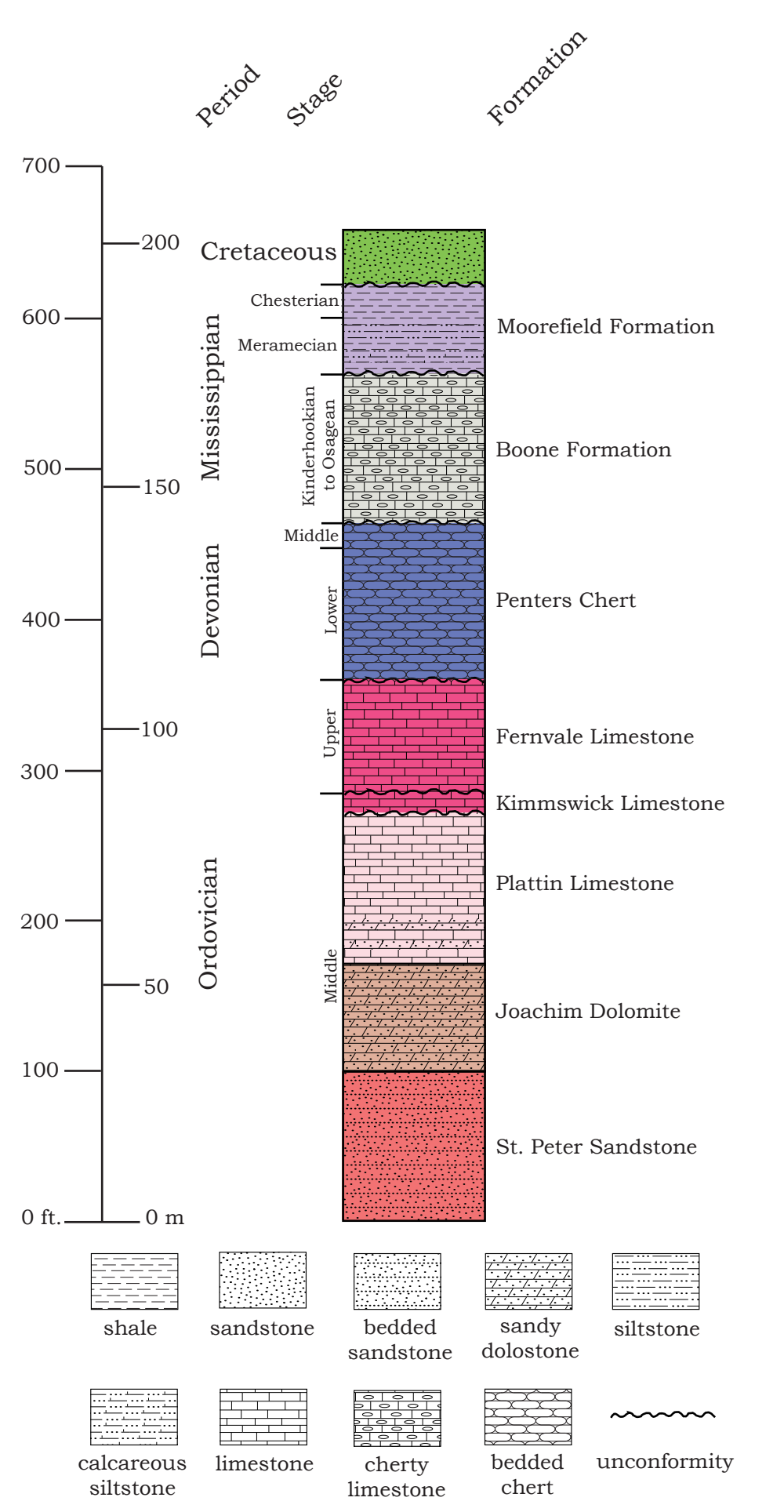


Location of the Charlotte quadrangle within the Ozark Plateaus.

Description of Map Units

- Qt** Alluvium and terrace deposits (Quaternary) - unconsolidated clay, silt, sand, and gravel, including deposits on one or more terrace levels along larger tributaries. Ranges from 10-15 feet (3-5 meters) thick.
- Pt** Terrace deposits (Paleogene?) - stranded gravel deposits that consist of unconsolidated, coarse sand- to cobble-sized angular to rounded chert and sparse sandstone on hillslopes 200-300 feet (60-91 meters) above nearby drainages. Previously assigned to the Tertiary (Glick 1954). Ranges from a veneer to 80 feet (24 meters) thick.
- K** Cretaceous (Cretaceous) - loosely consolidated, medium- to coarse-grained, dark-red sand interbedded with light-gray or red clay. Contains abundant iron-cemented beds and concretions in shapes common with Lewisburg banding. Highly prone to gully erosion. Upper surface is hummocky where overlain by gravel deposits. Unconformable with Paleozoic rocks below. Ranges from 40-80 feet (12-24 meters) thick.
- Mn** Moorefield Formation (Upper Mississippian, Chesterian, Meramecian) - fissile shale interbedded with very thin to thin-bedded siltstone and micrite. Shale is dark gray to black on fresh and weathered surfaces. Siltstone is dark gray to brown on fresh surfaces but weathers a light gray to buff color. Solutioning along joints is common in calcareous zones. Sparingly fossiliferous with mostly crushed brachiopods. Unconformable with the underlying Boone Formation. Ranges from 40-100 feet (12-30 meters) thick.
- Mb** Boone Formation (Lower Mississippian, Osagean, Kinderhookian) - fine-grained limestone interbedded with anastomosing and bedded chert. Light to medium gray on fresh surfaces but weathers dark gray. The chert varies in color from white to light gray in the upper section to dark gray or blue gray in the lower section. Springs, caves, and sinkholes are common. Red clay mixed with angular chert fragments from the Boone and the underlying Penters Chert form a thick regolith throughout the area. Unconformable with underlying formations. Ranges from 40-100 feet (12-30 meters) thick.
- Dp** Penters Chert (Lower to Middle Devonian) - medium to thick bedded chert. Gray and white banding is common but red, orange, and white mottling is also present. Commonly brecciated and highly fractured. Contains drusy quartz and manganese oxide coatings. Chert is present as residual boulders on hillslopes. Unconformable with the underlying Ferraville Limestone. Ranges from 20-120 feet (6-37 meters) thick.
- Ok** Ferraville Limestone (Upper-Middle Ordovician) - medium- to coarse crystalline limestone. Medium to thick or massive bedded. Light pink to reddish on fresh surfaces, and weathers dark gray to brown. Contains barrel-shaped crinoids, brachiopods, bryozoans, and corals. Caves and sinkholes are abundant. The top of this unit is heavily solutioned. Unconformable with the underlying Kimmswick Limestone where present. Ranges from 20-80 feet (6-24 meters) thick.
- Op** Plattin Limestone (Middle Ordovician) - very thin- to medium-bedded micritic to finely crystalline limestone. Light to medium gray on fresh surfaces but weathers white to light gray and is locally mottled. Contains gastropods, brachiopods, bryozoans, and stromatolites. Horizontal and vertical trace fossils are locally infilled with silt, especially in the upper section. Very thin shale layers are present in the top of the unit. Interbedded dolomite is present in the lower section making it difficult to locate the lower contact. Limestone glades containing abundant solutionally enlarged orthogonal joint sets are present throughout the area. Sinkholes and springs are abundant. Conformable with the underlying Joachim Dolomite. Ranges from 20-100 feet (6-30 meters) thick.
- Oj** Joachim Dolomite (Middle Ordovician) - fine- to medium-crystalline sandy dolomite that is thin to medium bedded. Medium to dark gray on fresh surfaces but weathers light gray to white. Mudcracks are common. Locally contains calcite blebs and veins, stromatolites, and dolomite breccia. Caliche is present at one location. Contains solutionally enlarged fractures, caves, and springs. A thin, siliceous interval is present near the top of the unit. Conformable with the underlying St. Peter Sandstone. Ranges from 40-60 feet (12-18 meters) thick.
- Osp** St. Peter Sandstone (Middle Ordovician) - fine-grained, thin- to massive-bedded sandstone. Commonly cross-bedded. Quartz grains are sub-angular to sub-rounded. White to light gray on fresh surfaces but weathers light brown. Friable when broken. Commonly siliceous and quartzitic near faults. Balds or glades are common. Long ridges or walls composed of tightly spaced deformation bands commonly stand in relief along faults. Sinkholes and caves are common. Ranges from 40-120 feet (12-37 meters) thick.

Stratigraphic Column



Introduction

This map depicts the surface geology of the Charlotte quadrangle, a 7.5-minute series USGS topographic quadrangle. The area was mapped through the Earth Mapping Resources Initiative (EMRI) and the STATEMAP component of the National Cooperative Geologic Mapping Program (NCGMP).

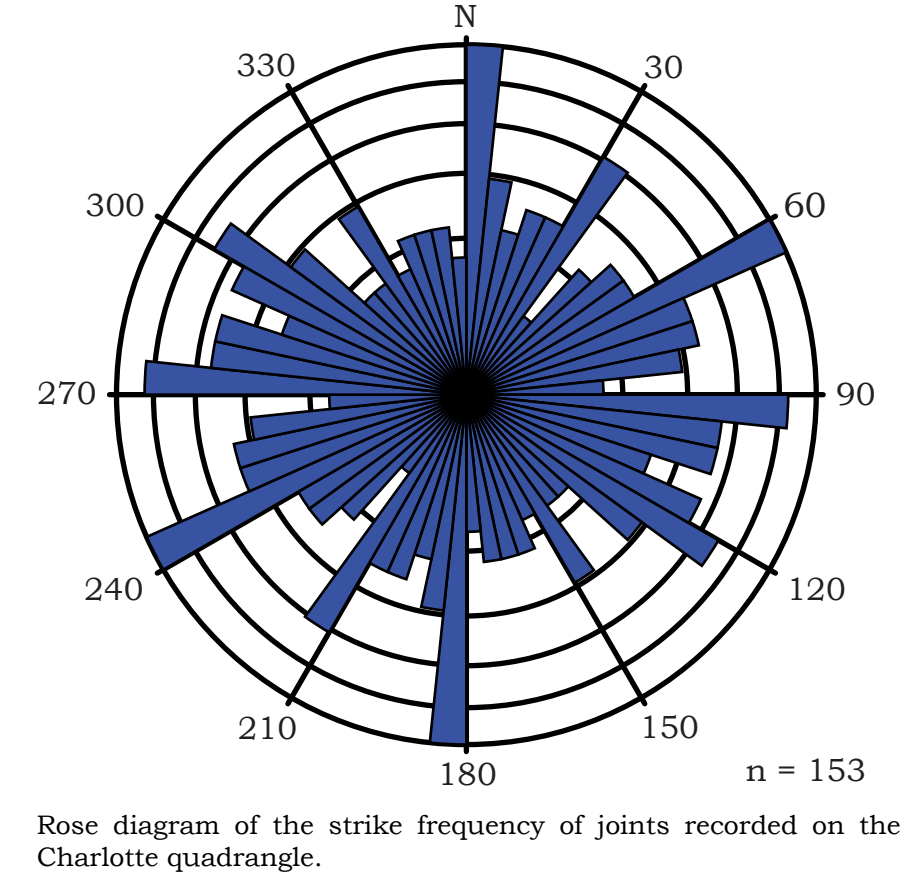
In the area, approximately 600 feet (182 meters) of Middle Ordovician through Middle Mississippian and Cretaceous carbonate and clastic sedimentary rocks crop out. The area lies on the south flank of the Ozark Dome. The area is underlain by the Springfield and Salem Plateaus of the Ozark Plateaus physiographic province. A small area in the southeast corner of the map is part of the Mississippi River alluvial plain. Regional dip is very gently to the south with local variations due to structures. Three east-west trending faults were observed in the area of the map, the Pfeiffer and Dots Creek Faults are downthrown to the south and the Moorefield Fault is downthrown to the north. Between the Dots Creek and Moorefield faults, displacement along the fault planes has formed a graben that brings Middle Mississippian rocks into contact with Devonian rocks on the north side and Ordovician rocks to the south. Cretaceous sand and clay deposits capped by Paleogene terrace gravels cover much of the quadrangle. Karst features such as springs, disappearing streams, caves, and sinkholes are common throughout the area.

The geology of the Charlotte quadrangle was mapped by Glick (1973) in preparation for the 1:500,000-scale Geologic Map of Arkansas. This map builds on previous work but uses more detailed stratigraphy and depicts structure in greater detail. The geologic information on this map is based on field observations that were made between July 2019 and April 2022. Field data was recorded on a portable GPS data collector and uploaded to a geodatabase. This map builds on previous work but uses more detailed stratigraphy and depicts structure in greater detail.

Symbols

- Contact
- Line of cross-section
- Normal fault - ball and bar on downthrown side. Dashed where inferred. Dotted where concealed.
- Strike and dip
- Mine
- Pit

Joint Frequency



Rose diagram of the strike frequency of joints recorded on the Charlotte quadrangle.

References

- Glick, E.E., 1954, Geologic map of the Charlotte quadrangle, Independence County, Arkansas: Arkansas Geological Survey Geologic Worksheet, 1 sheet, 1:24,000.
- Steele-Petrovich, H.M., 2011, Replacement name for Tetradium Dana, 1846, Journal of Paleontology, vol. 85, 4, pp. 802-803.

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Limitations: This map, like all geologic maps, is based on interpretations which were made from the data available at the time it was created. As new information is collected, the features depicted on this map may be changed.

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This map is also available at: <https://www.geology.arkansas.gov/maps-and-data/geologic-maps/geologic-quadrangle-maps-for-arkansas-1:24k-scale.html>

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Hutto R.S., Liner, T.J., and Gist, J.T., 2022, Geologic map of the Charlotte quadrangle, Independence County, Arkansas: Arkansas Geological Survey, Digital Geologic Map, DGM-AR-00151, 1 sheet, 1:24,000.



Solutioned orthogonal joints in the Moorefield Formation in Dots Creek.



Rounded chert cobbles in Paleogene terrace gravels above hummocky surface of Cretaceous sand and clay.

