GEOLOGICAL SURVEY

Geologic Map of the Grange Quadrangle, Independence and Sharp Counties, Arkansas

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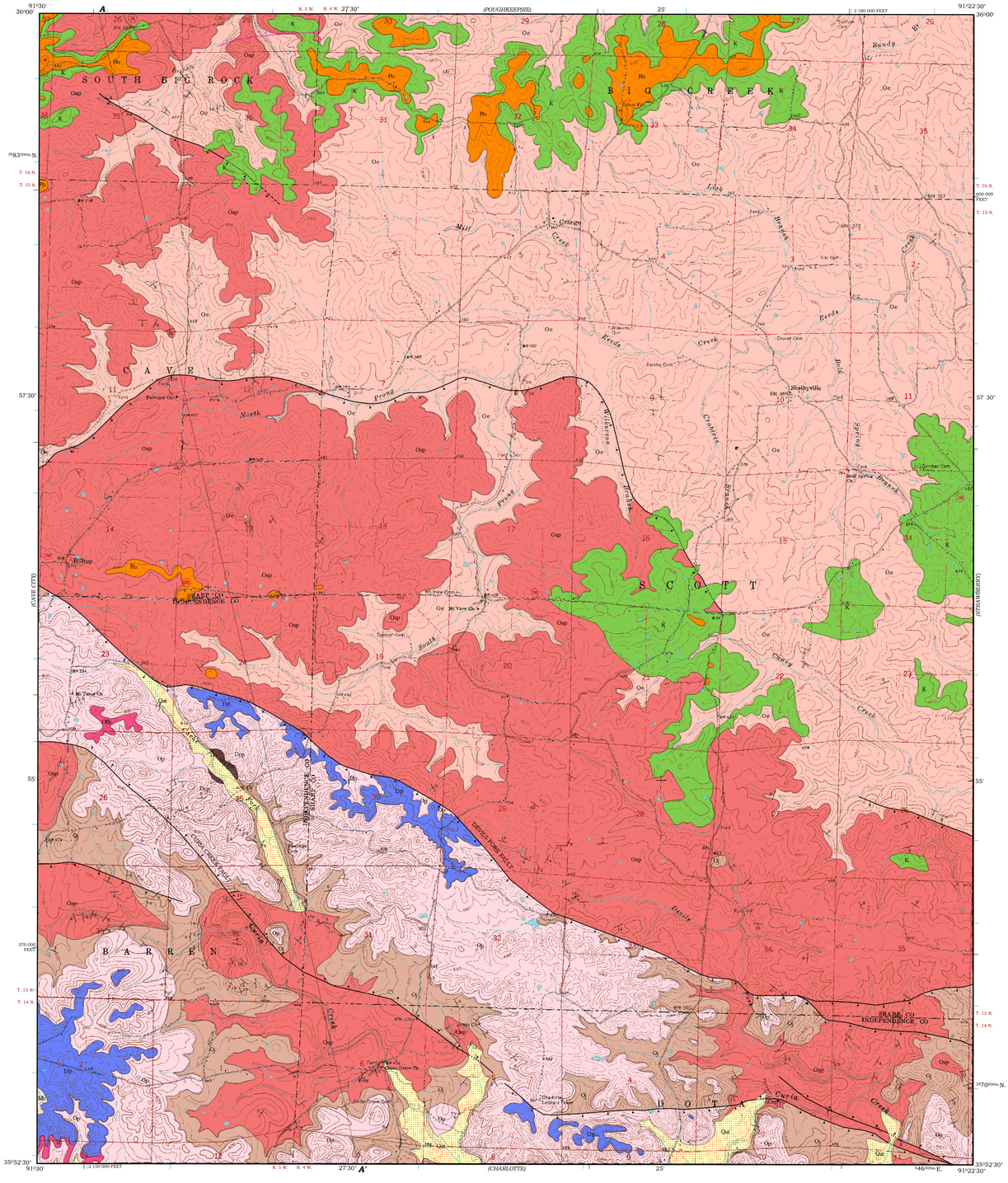
Digital Geologic Quadrangle Map
Grange Quadrangle, Arkansas
DGM-AR-00343



Correlation of Map Units

Qat	Holocene Pleistocene	Quaternary
Unconformity		
Pct	Paleogene	Paleogene
Unconformity		
K	Cretaceous	Cretaceous
Unconformity		
Mb	Osagean Kinderhookian	Mississippian
Unconformity		
Dcp, Dp	Upper to Lower	Devonian
Unconformity		
Ofk	Upper	Ordovician
Op, Oj, Osp	Middle	
Unconformity		
Oe		

Location of Grange quadrangle within the Ozark Plateaus Region.

Description of Map Units

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.

Terrace deposits (Paleogene?) - gravel deposits that consist of unconsolidated, coarse sand -to cobble-sized sub-rounded, to rounded chert and sandy red to white clay. Ranges 40-80 feet (12-24 meters) thick.

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 consistent with liesegang banding. Upper surface is hummocky where overlain by gravel deposits. Unconformable with Paleozoic rocks below. Ranges from 20-60 feet (6-18 meters) thick.

Boone Formation (Lower Mississippian, Osagean and Kinderhookian) - fine-grained limestone interbedded with anastomosing and bedded chert. Light to medium gray on fresh surfaces but usually weathers to dark gray. The chert varies in color from white to light gray in the upper portion to dark gray or blue gray in the lower portion. Springs, caves, and sinkholes are common. A thick regolith of angular chert fragments in a red clay matrix is present throughout the quadrangle. Unconformable with the underlying Penters Chert. Ranges from 20-40 feet (6-12 meters) thick.

Chattanooga Shale (Upper Devonian) - clay shale that is black on fresh surfaces and weathers dark gray to black. Locally contains thin siltstone beds and abundant limonite concretions. Unconformable with the underlying Penters Chert. Penters Chert is included where Chattanooga is mapped seperately. Up to 20 feet (6 meters) thick.

Penters Chert (Lower to Middle Devonian) - medium- to thick bedded chert. Gray and white banding is common and red, orange, and white mottling is also typical. Commonly brecciated and highly fractured. Contains drusy quartz and manganese oxide coatings. Sandstone boulders are locally preserved above or in place of the chert. Sandstone is clean, white, silica-cemented, and contains chert fragments. Residual chert boulders are present on hilltops. Historically mined for manganese. Unconformable with the underlying Fernvale Limestone. Ranges from 20-60 feet (6-18 meters) thick.

Fernvale Limestone (Upper-Middle Ordovician) - medium- to coarsely crystalline limestone. Medium- to thick- or massive -bedded. Light pink to reddish on fresh surfaces, and weathers dark gray to brown. Fossils include barrel-shaped crinoids, brachiopods, bryozoans, and corals. Caves and sinkholes are abundant. Manganese oxide is present in nodules and thin horizontal zones within the upper section. Unconformable with the underlying Plattin Limestone where present. Ranges from 20-40 feet (6-12 meters) thick.

Kimmswick Limestone (Middle Ordovician) - medium crystalline, gray to white, stylolitic limestone. Locally contains chert fragments. Unconformable with the underlying Plattin Limestone. Up to 20 feet (6 meters) thick.

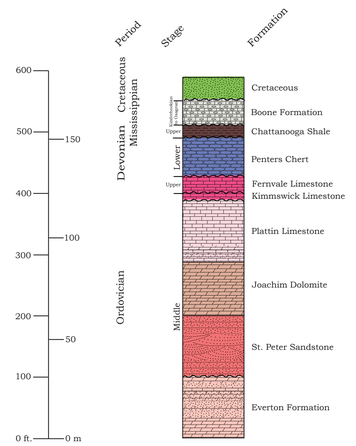
Plattin Limestone (Middle Ordovician) - very thin- to medium-bedded micritic to finely crystalline limestone. Light to medium gray on fresh surfaces but weathers white to light gray and is locally mottled. Contains gastropods, brachiopods, bryozoans and stromatolites. Horizontal and vertical trace fossils are locally infilled with silt, especially in the upper section. Very thin shale layers are present in the top of the unit. Interbedded dolostone is present in the lower section. 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.

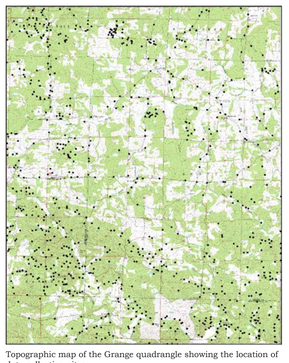
Joachim Dolomite (Middle Ordovician) - fine to medium-crystalline sandy dolostone that is thin- to medium-bedded. Medium to dark gray on fresh surfaces, but weathers light gray to white. Mudcracks are common. Locally contains calcite blebs and veins, stromatolites, and dolostone breccia. Contains solutionally enlarged fractures, caves, and springs. A thin oolitic interval is present near the top of the unit. Conformable with the underlying St. Peter Sandstone. Ranges from 20-80 feet (6-24 meters) thick.

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 silica-cemented 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. Sandstone pipes are present locally near monoclines or faults. Sinkholes and caves are common. Unconformable with the underlying Everton Formation. Ranges from 20-100 feet (6-30 meters) thick.

Everton Formation (Middle Ordovician) - interbedded dolostone, sandy dolostone, sandstone, and limestone. Dolostone is thin-to medium-bedded and fine to coarsely crystalline. Medium gray on fresh surfaces, but weathers light gray and is locally mottled. Locally petroliferous when broken and contains calcite blebs and mudcracks. Sandstone is very thin to medium bedded and locally silica cemented. Quartz grains are fine to coarse and sub-rounded to well-rounded. The Everton Formation was mined for lead and zinc at two locations on the Grange quadrangle. Up to 100 feet (30 meters) thick.

Stratigraphic Column





Topographic map of the Grange quadrangle showing the location of data collection sites.

Introduction

This map depicts the surface geology of the Grange quadrangle, a USGS 7.5-minute series topographic map. The south half of the quadrangle was mapped for the Earth Mapping Resources Initiative (EMRI) and the north half was mapped for the STATEMAP program from 2019-2022. In this area, approximately 580 feet (177 meters) of Middle Ordovician to Early Mississippian and Cretaceous carbonate and clastic rocks are exposed.

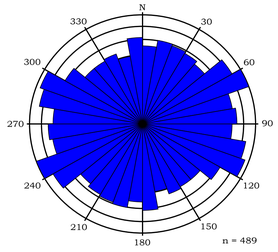
The area spans the Springfield and Salem Plateaus within the Ozark Plateaus Province. Generally, the rock formations dip gently southward with local variations due to monoclines and normal faults. Karst features such as springs, caves, and sinkholes are common throughout the area.

Glick (1973) mapped the Grange quadrangle in preparation for the 1:500,000-scale Geologic Map of Arkansas. New field data was recorded on a portable GPS data collector and uploaded to a geodatabase. Representative rock samples were also collected for lithologic description and petrographic analysis.

Symbols

- Contact
- A — A' Line of cross-section
- Normal fault - ball and bar on downthrown side. Dashed where inferred. Dotted where concealed.
- Monocline
- Strike and dip
- x Prospect
- Vertical mine shaft

Joint Frequency



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

Dolomite, Sphalerite, and Galena in brecciated dolostone of the Everton Formation. Golconda Prospect.

References

Glick, E.E., 1973, Geologic map of the Grange quadrangle, Independence and Sharp Counties, Arkansas: Arkansas Geological Survey Geologic Worksheet, 1 sheet, 1:24,000.

Acknowledgments: This map was produced for the Earth Mapping Resources Initiative and STATEMAP grant programs administered by the U.S. Geological Survey under Cooperative Agreement Award G19AC00261 and G22AC00358. A special thanks to Mr. and Mrs. Allen, Fayton Poff, Michael Mobley, Mr. Edwardson, Mr. King, Mr. Rose, and Wildcat Ranch, LLC. for access to their properties and sharing their knowledge of the local area.

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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https://www.geology.arkansas.gov/maps-and-data/geologic_maps/geologic-quadrangle-maps-for-arkansas-1-24k-scale.html

Suggested citation for this map:
Liner, T.J., Hutto, R.S., and Gist, J.T., 2023, Geologic map of the Grange quadrangle, Independence and Sharp Counties, Arkansas: Arkansas Geological Survey, Digital Geologic Map, DGM-AR-00343, 1 sheet, 1:24,000.

Map and cross section digitized by Jerry Clark.

The topographic base is a collarless Digital Raster Graphic (DRG). The DRG is a scanned image of a U.S. Geological Survey 7.5-minute series topographic map published in 1961.

10,000-foot grid based on Arkansas coordinate system, north zone.

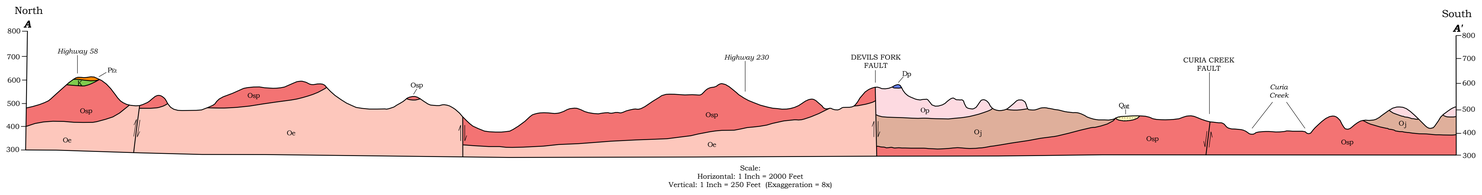
1000-meter Universal Transverse Mercator grid, zone 15. 1927 North American Datum.

0°49' W
TRUE NORTH
MAGNETIC NORTH
Approximate mean declination 2023

SCALE 1:24 000
1 MILE
1 KILOMETER
1000 FEET
Contour Interval 20 Feet
National Geodetic Vertical Datum of 1929

ARKANSAS
Quadrangle Location

Road Classification
Light duty road
Unimproved dirt



Scale:
Horizontal: 1 Inch = 2000 Feet
Vertical: 1 Inch = 250 Feet (Exaggeration = 8x)