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Geologic map of the northeast district within the northern Arkansas Mississippi Valley-Type mineral district, Sharp and Lawrence Counties, Arkansas

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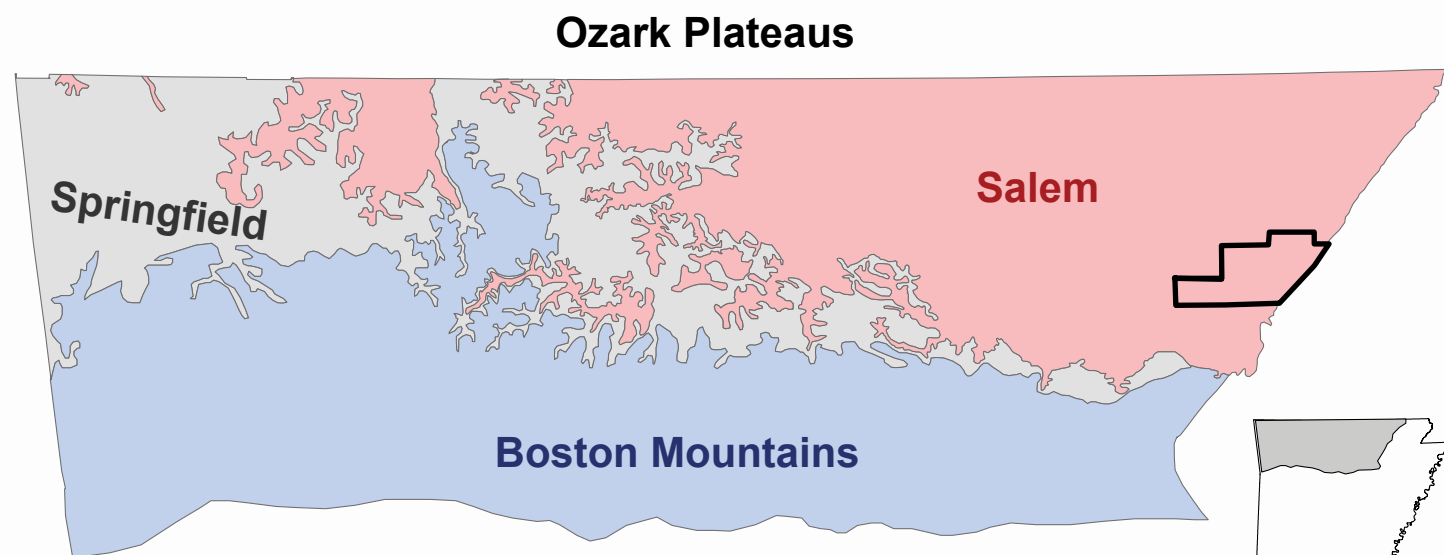
Introduction

This map depicts the surface geology of the northeast district within the northern Arkansas Mississippi Valley-Type mineral district. The district is divided into two major focus areas: the north-central district and the northeast district. The northeast district comprises portions of the 7.5-minute series topographic quadrangles including Poughkeepsie, Smithville, Salem, Black Rock, and Imboden.

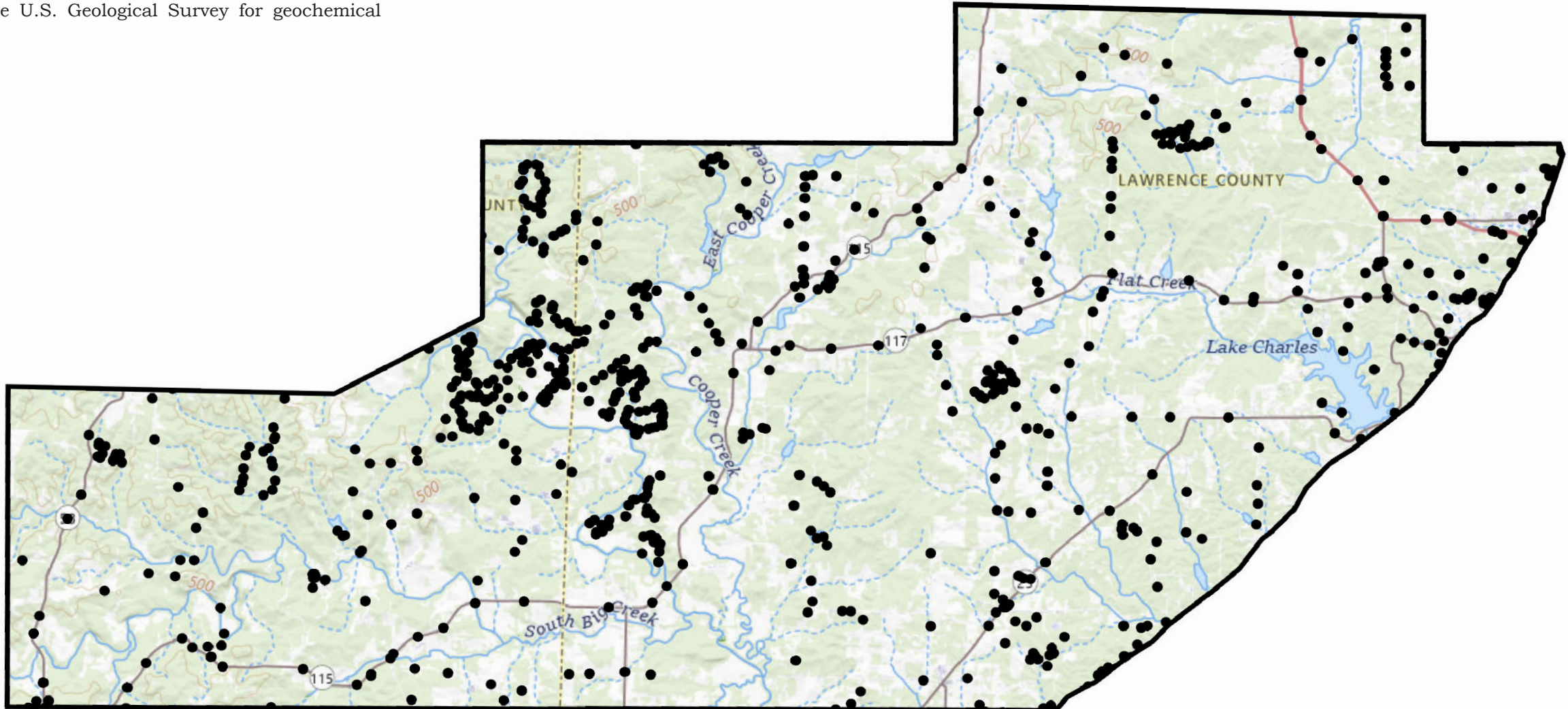
The northeast district is within the Salem Plateau of the Ozark Plateaus Province. Approximately 350 feet of Early to Middle Ordovician carbonate and clastic rocks, and Cretaceous clastic rocks are exposed in this area. The lower part of the Everton Formation on this map includes rocks that were divided into the Smithville limestone and the overlying Black Rock limestone on the Geologic Map of Arkansas (1929) and included in the upper part of the Powell on the Geologic Map of Arkansas (1974).

Lead mining started in 1851 and the earliest zinc mining in Arkansas began around 1858. The oldest zinc mines are in Sharp and Lawrence Counties. A smelter built during 1857 in Calistoga of Sharp County is thought to be one of the first zinc smelters in the country. Total production in the district is estimated to be 4,000 tons of mostly zinc (McKnight, 1935). Mining activity had ceased by 1930 leaving thirty-three abandoned lead and zinc mines in the northeast district.

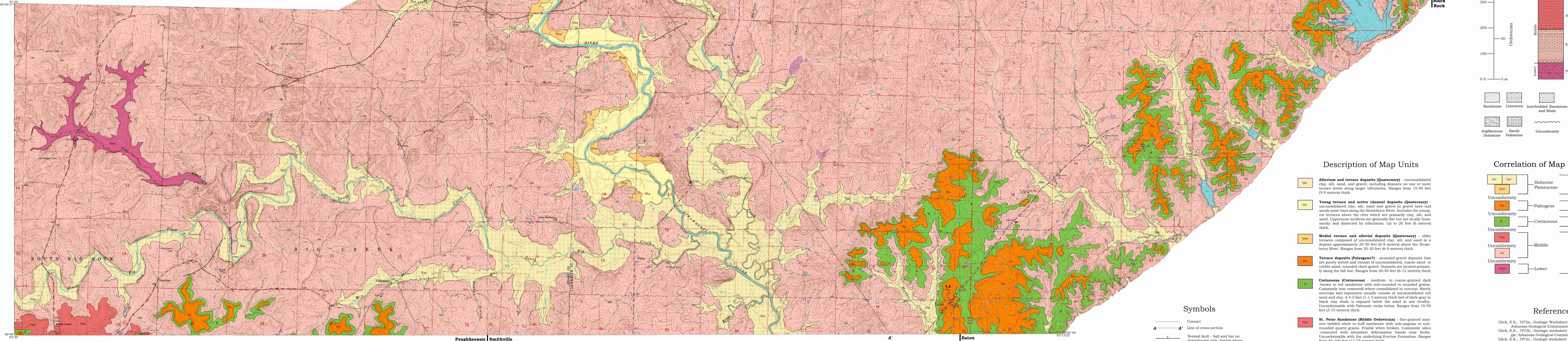
Click [Glick, 1972a, d., 1974] mapped the area in preparation for the 1:500,000-scale Geologic Map of Arkansas. Field work for the current project was conducted for the Earth Mapping Resources Initiative (EMRI) to investigate zinc as a critical mineral resource. New field data was recorded on a portable GPS data collector and uploaded to a geodatabase. Approximately one hundred samples were collected for petrographic analysis and eighty-seven samples were collected and submitted to the U.S. Geological Survey for geochemical analysis.



Location of the mapping area at the eastern margin of the Ozark Plateaus Region.



Shaded relief map of the area showing the location of data collector sites.



Description of Map Units

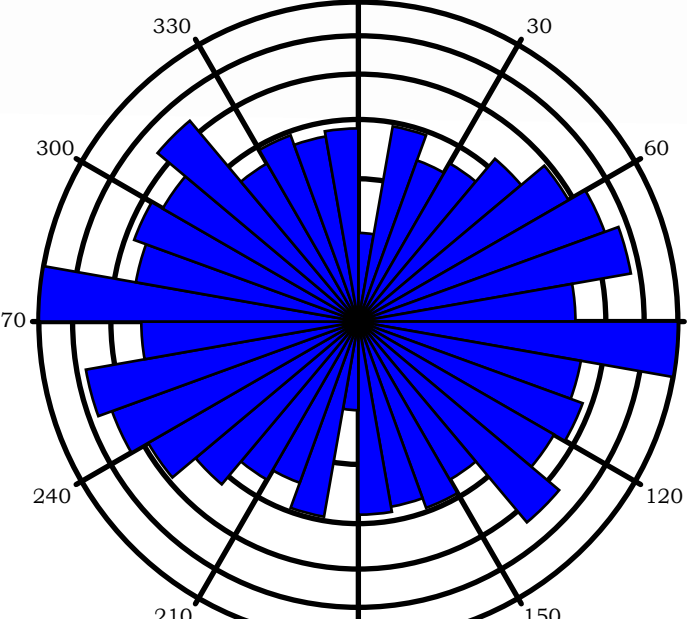
- Qa** Alluvium and terrace deposits (Quaternary) - unconsolidated clay, silt, sand, and gravel, including deposits on one or more terraces. Ranges from 15-40 feet (5-9 meters) thick.
- Qy** Young terrace and active channel deposits (Quaternary) - unconsolidated clay, silt, sand and gravel in gravel bars and sandy point bars along the Strawberry River. Includes the youngest terrace above the river which are primarily clay, silt, and sand. Uppermost surfaces are generally flat but are locally hummocky and dissected by tributaries. Up to 20 feet (6 meters) thick.
- Qm** Medial terrace and alluvial deposits (Quaternary) - older terraces composed of unconsolidated clay, silt, sand, and gravel. A deposit approximately 20-30 feet (6-9 meters) above the Strawberry River. Ranges from 20-40 feet (6-12 meters) thick.
- Te** Terrace deposits (Pleistocene?) - stranded gravel deposits that are poorly sorted and consist of unconsolidated, coarse sand- to cobble-sized, rounded chert gravel. Deposits are located primarily along the fall line. Ranges from 20-40 feet (6-12 meters) thick.
- C** Cretaceous (Cretaceous) - medium- to coarse-grained dark brown to red sandstone with sub-rounded to rounded grains. Commonly iron cemented where consolidated in outcrop. Rarely outcrops and exposures usually consist of unconsolidated red sand and clay. A 4-6 foot (1-1.5 meters) thick bed of dark gray to black clay shale is exposed below the sand at one locality. Unconformable with Paleocene rocks below. Ranges from 10-50 feet (3-15 meters) thick.
- St** St. Peter Sandstone (Middle Ordovician) - fine-grained massive bedded white to buff sandstone with sub-angular to sub-rounded quartz grains. Fracture when broken. Commonly silica cemented, with abundant deformation bands. Rarely faulted. Unconformable with the underlying Everton Formation. Ranges from 40-100 feet (12-33 meters) thick.
- Ev** Everton Formation (Middle Ordovician) - interbedded dolomite, sandy dolomite, sandstone, limestone, chert, and shale. Dolomite is thin to thick bedded, light gray to buff and fine-grained to medium crystalline on fresh surfaces. Clay to black on weathered surfaces. Commonly sandy with floating sand grains and abundant sand stringers. Calcite and dolomite vugs are common in the dolomite throughout the area. Sandstones are fine- to medium-grained thin- to medium-bedded buff to white and friable when the bed can be silica cemented. Massive chert boulders and sandstone boulders commonly cap the hills in the western part of the district. In some locations the top of the formation consists of a sandy red clay regolith. In a few locations this regolith contains high-walled gastropods 0.5 inches (1.3 centimeters) in length. The lower Everton contains discontinuous very fine-grained, gray limestone with approximately 12 feet (4 meters) of interbedded light-gray dolomite, green shale, and green sandstone. The beds of green shale and sandstone are deposited together as 3 inch (7 centimeters) beds that are separated by 2-3 feet (1 meter) thick beds of medium bedded dolomite. In two locations the base of the formation is marked by a fine-grained or finely-crystalline gray limestone that features large silified gastropods up to 3 inches (8 centimeters) in length. The limestone is light gray to white on weathered surfaces. Abundant druse quartz, dolomite, sphalerite and galena are common in mineralized areas. Pyrite mineralization along sand stringers and calcite veins were observed across the area. Unconformable with the underlying Powell Formation. Ranges from 10-200 feet (3-61 meters) thick. All mines in this district are within the Everton Formation.
- P** Powell Formation (Early Ordovician) - fine-grained light-gray to greenish-gray dolomite. Thin- to massive-bedded. Mostly sand free and commonly argillaceous. Laminated white to light gray on fresh surfaces. In a few exposures floating sand and grains were present along bedding planes. Light gray to white on weathered surfaces. Contains chert nodules that are dark gray to dark blue to black. Large calcite vugs and veins were observed in one area. Brachiopods were observed at one location. Operculum 1 inch (2.5 centimeters) in length were noted in a red clay regolith in the northern part of the mapping area. Ranges from 10-70 feet (3-21 meters) thick.

Symbols

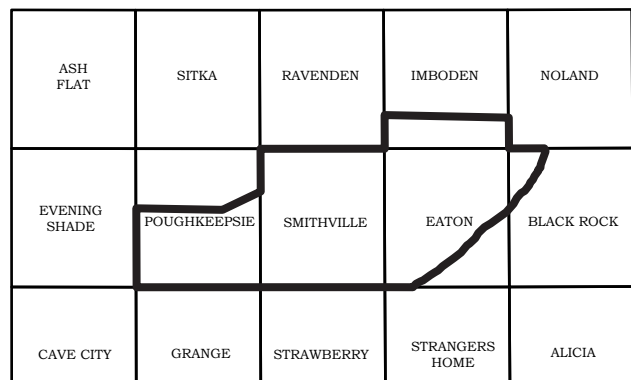
- Contact
- Line of cross-section
- Normal fault - ball and bar on downthrown side. Dotted where concealed.
- Strike and dip
- Abandoned mine or quarry
- Prospect (pit or small open cut)
- Vertical mine shaft
- Sample locality

- Road Classification**
- Heavy duty
- Medium duty
- Light duty
- Unimproved dirt

Joint Frequency



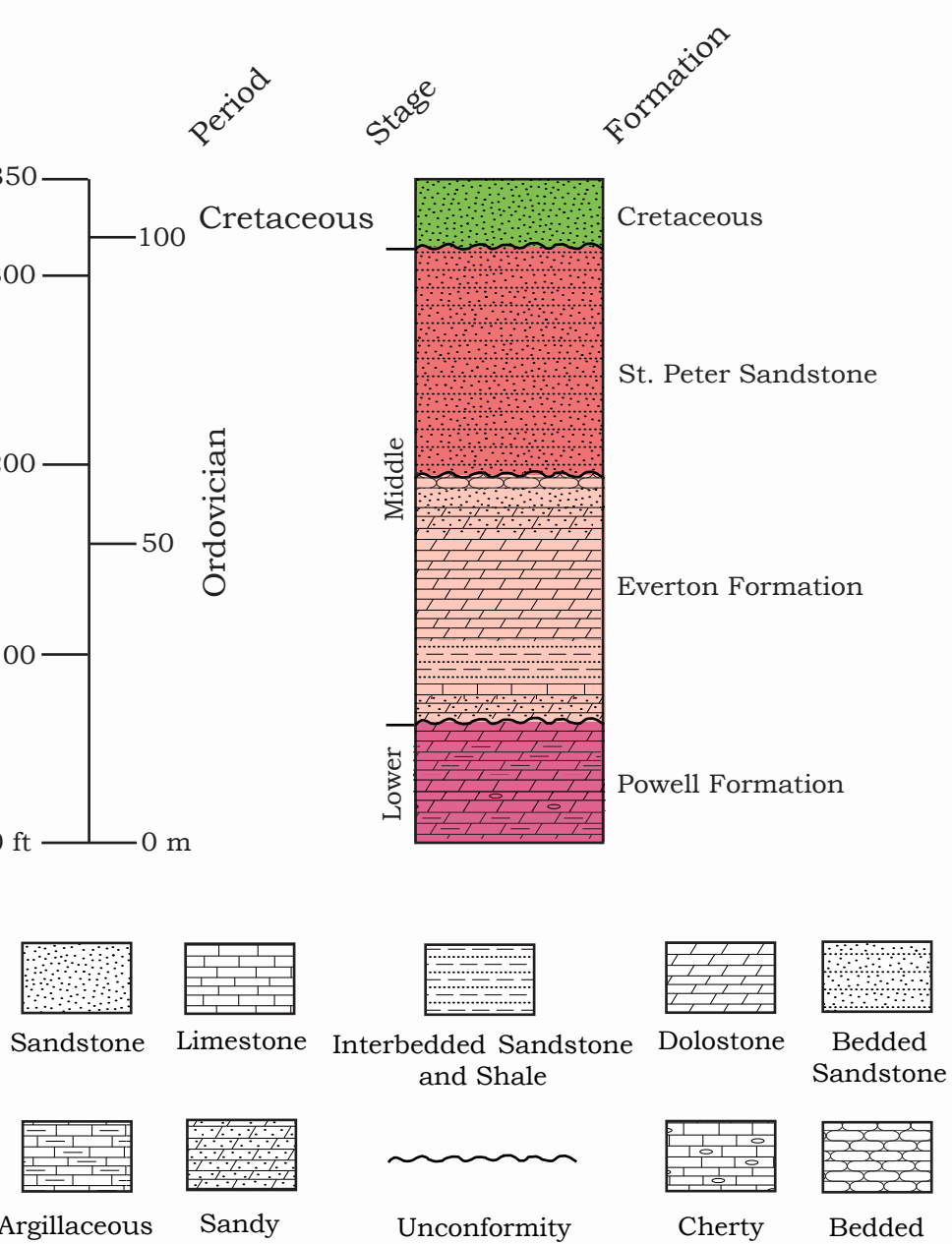
Rose diagram of the joint frequency of joints recorded in the area.



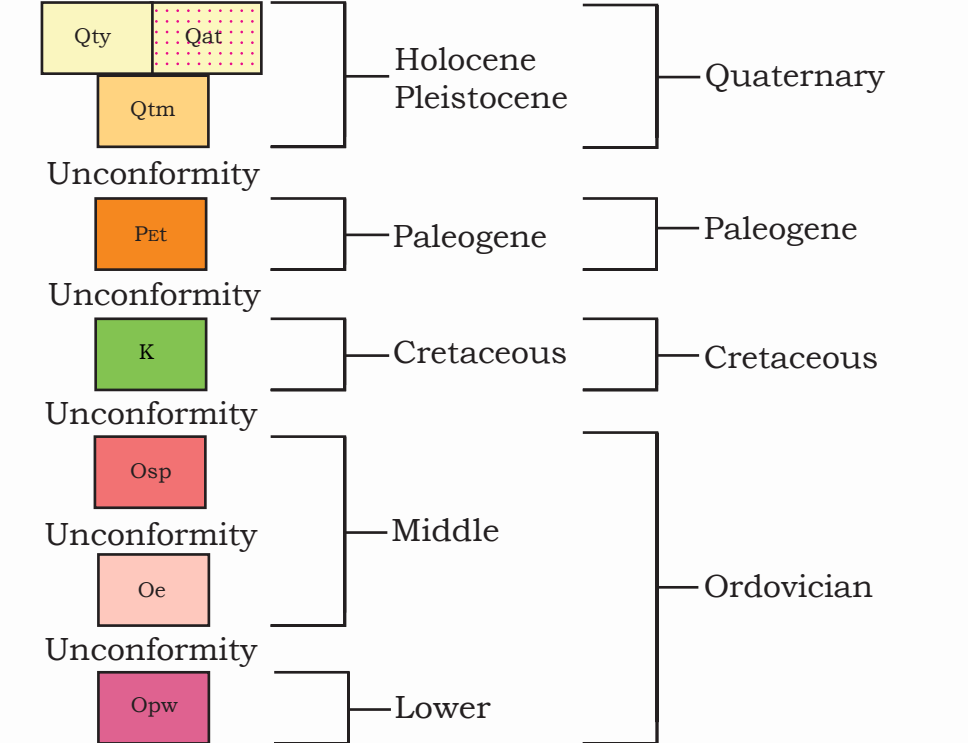
Location of map and adjacent quadrangles.

Digital Geologic Map
northern Arkansas Mississippi Valley-Type mineral district
DGM-NARMT-NE-1

Stratigraphic Column



Correlation of Map Units



References

- Glick, E.E., 1972a, 1972b, Geologic Worksheet of the Eaton quadrangle, Arkansas Geological Commission, 1 sheet, 1:24,000.
- Glick, E.E., 1972c, Geologic worksheet of the Imboden quadrangle, Arkansas Geological Commission, 1 sheet, 1:24,000.
- Glick, E.E., 1972d, Geologic worksheet of the Poughkeepsie quadrangle, Arkansas Geological Commission, 1 sheet, 1:24,000.
- Glick, E.E., 1974, Geologic worksheet of the Smithville quadrangle, Arkansas Geological Commission, 1 sheet, 1:24,000.
- Glick, E.E., 1974, Geologic worksheet of the Black Rock quadrangle, Arkansas Geological Commission, 1 sheet, 1:24,000.
- McKnight, E.T., 1935, Zinc and lead deposits of northern Arkansas, U.S. Geological Survey Bulletin 853, 31 p.

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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:

http://www.geologicarkansas.gov/docs/pdf/maps-and-data/geologic_maps/DGM-NARMT-NE-1.html

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Map and cross-section digitized by Megan Easter and Brian Kohler.