GEOLOGICAL SURVEY

Geologic Map of the Sandtown Quadrangle
Izard, Independence, and Sharp Counties, Arkansas

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2022
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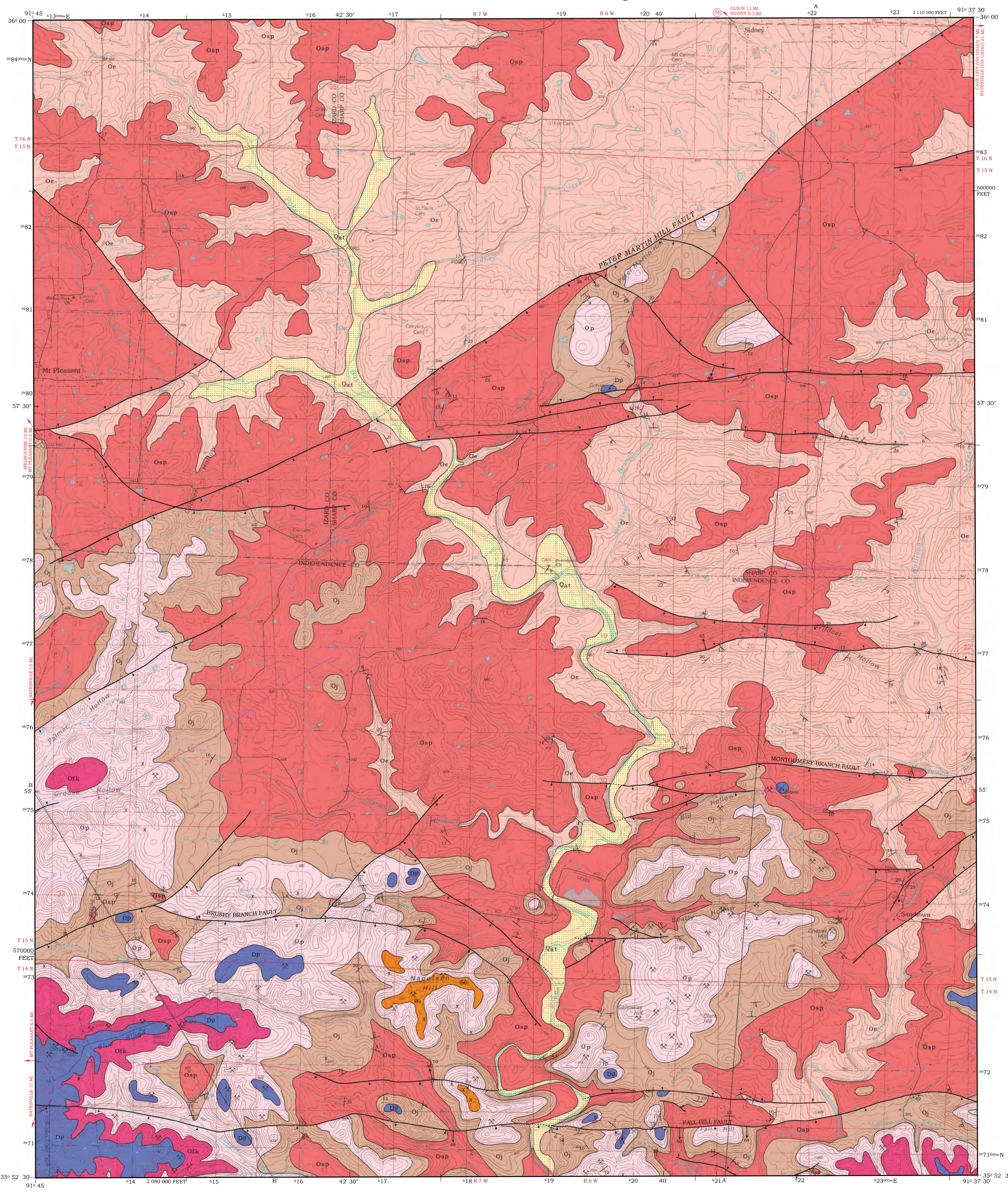


The topographic base is a collarless Digital Raster Graphic (DRG). The DRG is a scanned image of a U.S. Geological Survey standard series topographic map published in 1942. It was photorevised from aerial photographs taken in 1986, field checked in 1987, and edited in 1989.

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

100-meter Universal Transverse Mercator grid ticks, zone 15 shown in blue. 1927 North American Datum.

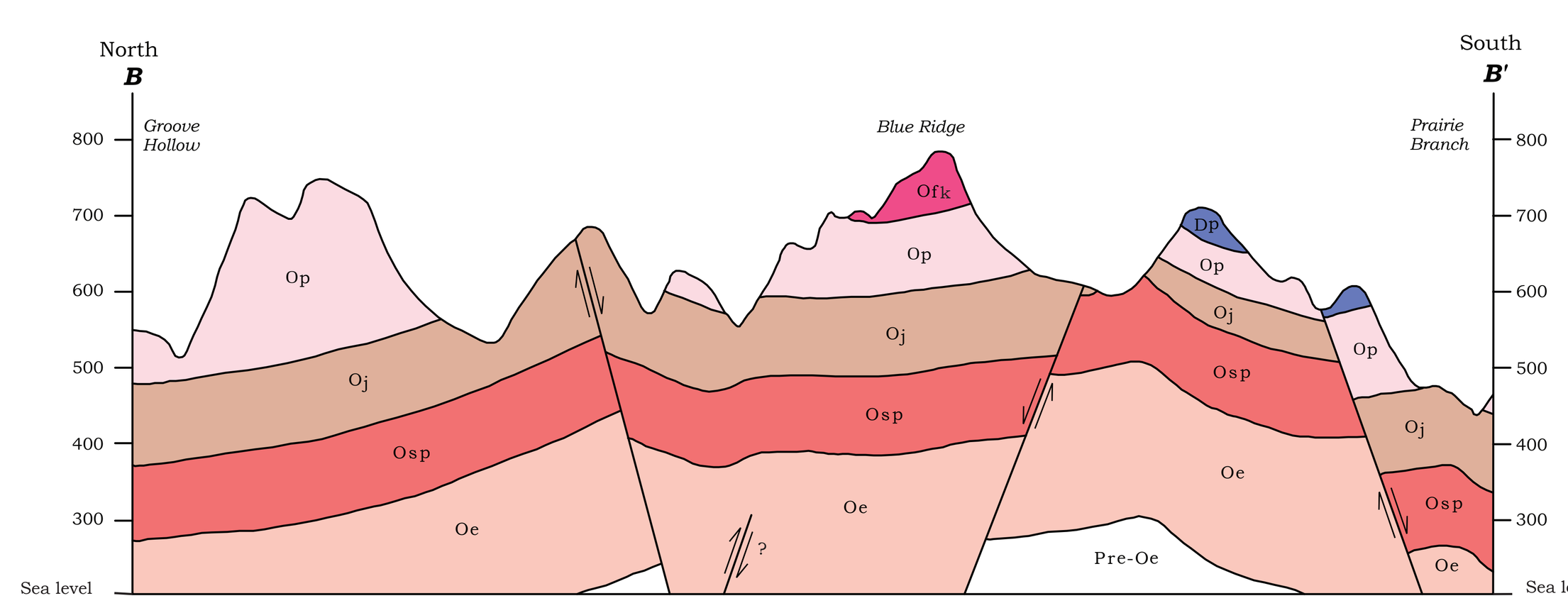
Approximate mean declination 2020

SCALE 1:24 000

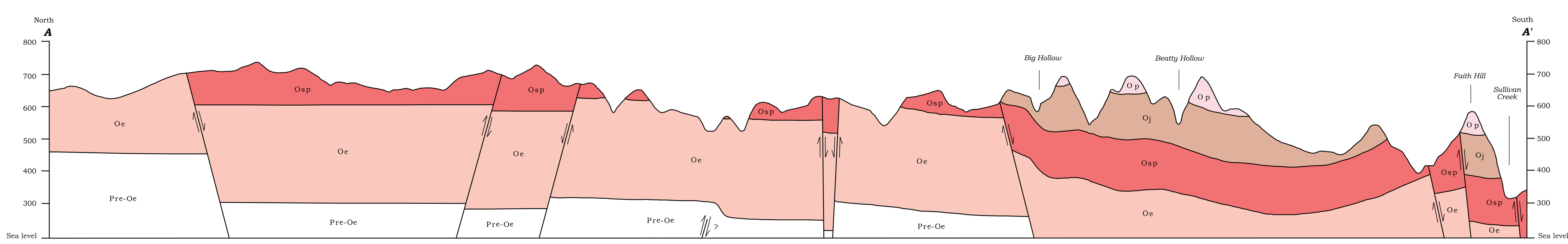
Contour Interval 20 Feet
National Geodetic Vertical Datum of 1929

Quadrangle location

Secondary highway
Light duty road
Unimproved road



Scale:
Horizontal: 1 Inch = 2000 Feet
Vertical: 1 Inch = 200 Feet (Exaggeration: 10x)



Scale:
Horizontal: 1 Inch = 2000 Feet
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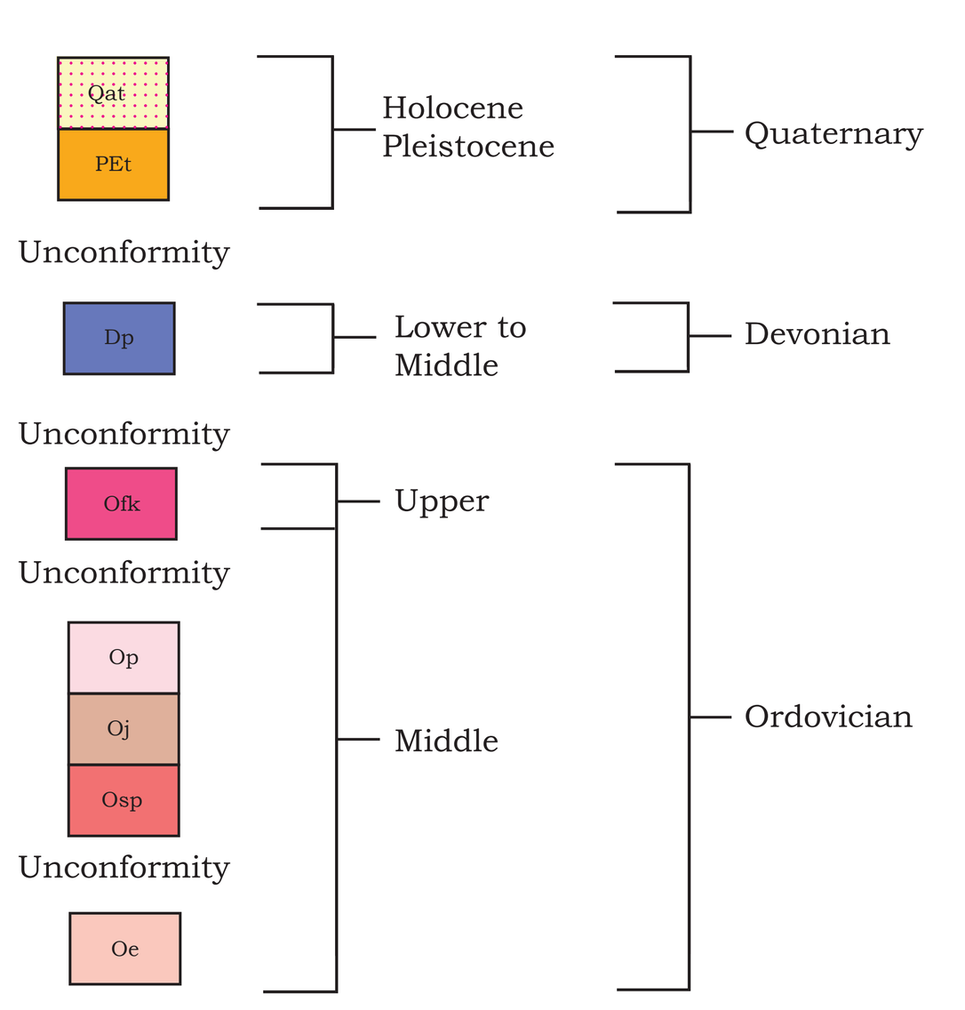
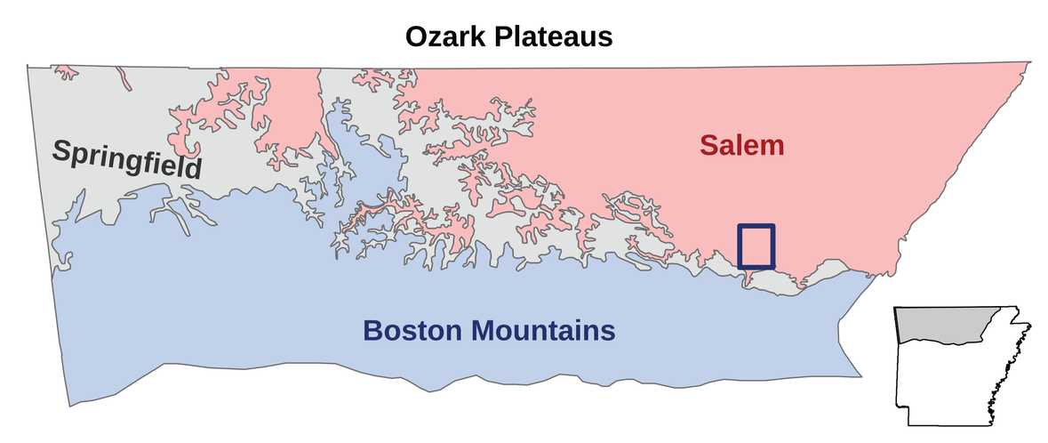
Correlation of Map Units





Location of Sandtown quadrangle within the Ozark Plateaus

Introduction

This map illustrates the surface geology of the Sandtown quadrangle which was previously mapped by Ernest E. Glick in 1973. This quadrangle is part of a larger area chosen to highlight the outcrop belt of the Cason Formation which was mined historically for phosphate and manganese, and has become the subject of renewed interest due to recent analyses indicating that it contains a significant percentage of rare earth elements (Emsbo et al., 2015; Grosz et al., 1995).

Approximately 650 feet (198 meters) of Middle Ordovician to Middle Devonian strata are exposed throughout this quadrangle on the Salem Plateau. The area is mostly covered by Ordovician sandstone, dolostone, and limestone. Devonian Penters Chert is present only on hilltops in the southern portion of the quadrangle.

Quaternary terrace and alluvium deposits are present along Poke Bayou and Sullivan Creek, but only the larger deposits are illustrated on the map. Older terraces are located on and around Napoleon Hill in the southern part of the map.

Several normal faults are present throughout the quadrangle. The majority of faults strike east to west or southwest to northeast and dip to the north, south, or southeast. Most were located where deformation band clusters and ridges were prominent within the St. Peter Sandstone.

This area was heavily prospected for manganese in the late 1800's until the 1950's (Miser, 1922, Stroud et al, 1981). Most mining was concentrated at the top of the Fernvale and included mining of the Cason Formation. Other units that were mined for manganese were the Penters Chert, Lafferty Limestone, and the top of the Plattin Limestone.

Description of Map Units

Qat — **Alluvium and terrace deposits (Quaternary)** - Unconsolidated clay, silt, sand and gravel including deposits on one or more terrace levels along the larger tributaries. Ranges from approximately 10 to 15 feet (3-5 meters) thick.

PEt — **Terrace deposits (Paleogene?)** - stranded gravel deposits scattered throughout the quadrangle. Deposits consist of unconsolidated, coarse sand- to cobble-sized angular to rounded chert and sparse sandstone on hilltops 200-300 feet (60-91 meters) above nearby drainages. Historically these deposits were assigned to the Tertiary (Glick, 1973). Ranges from a veneer to approximately 80 feet (24 meters) thick.

Dp — **Penters Chert (Early to Middle Devonian)** - A gray to red, orange, and white mottled chert, commonly brecciated, that is medium to massive bedded and highly fractured. Contains manganese oxide coatings. Locally, clean white sandstone is preserved as masses above or in place of the chert. The sandstone is silica-cemented and contains chert fragments. The chert was mined for manganese. It is present as residual boulders on the tops of hills in the southern portion of the quadrangle. This unit was previously mined for manganese. Unconformable with the underlying Fernval Limestone. The Cason Formation was seen at only one location in the southwestern portion of the quadrangle: center of Section 10, Township 14N, Range 7W. Ranges from 20-60 feet (6-18 meters) on the tops of hills.

Ofk — **Fernvale Limestone (Upper-Middle Ordovician)** - A medium-to coarsely crystalline limestone. Medium-to thick- or massive-bedded. Light-pink to reddish on fresh surfaces, but weathers dark-gray to brown. Contains 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 portion of the limestone. The top of this unit contains manganese mines at many locations. Unconformable with the underlying Kimmswick Limestone. Approximately 100 feet (30 meters) exposed in the southern part of the quadrangle.
Kimmswick Limestone (Middle Ordovician) - A medium crystalline gray to white stylolitic limestone. Locally contains chert fragments. Contains brachiopods, bivalves, crinoids, horizontal trace fossils, and *Prismostylus*, a type of red algae formerly known as *Tetradium* (Steel-Petrovich, 2011). Unconformable with the underlying Plattin Limestone. Approximately 20 feet (6 meters) thick when present.

Op — **Plattin Limestone (Middle Ordovician)** - A 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, bryozoans, and horizontal trace fossils. Very thin shale layers are present in the top of the unit. Interbedded dolostone is present in the lower portion making it difficult to locate the lower contact. Limestone glades containing abundant solutionally enlarged joints are present thoughout the outcrop area. Sinkholes and springs are abundant. The top of the unit contains manganese prospects at various locations. Conformable with the underlying Joachim Dolomite. Ranges from 80-200 feet (24-61 meters) thick.

Oj — **Joachim Dolomite (Middle Ordovician)** - A fine-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 veins, calcite blebs, 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 60 -100 feet (18-30 meters) thick.

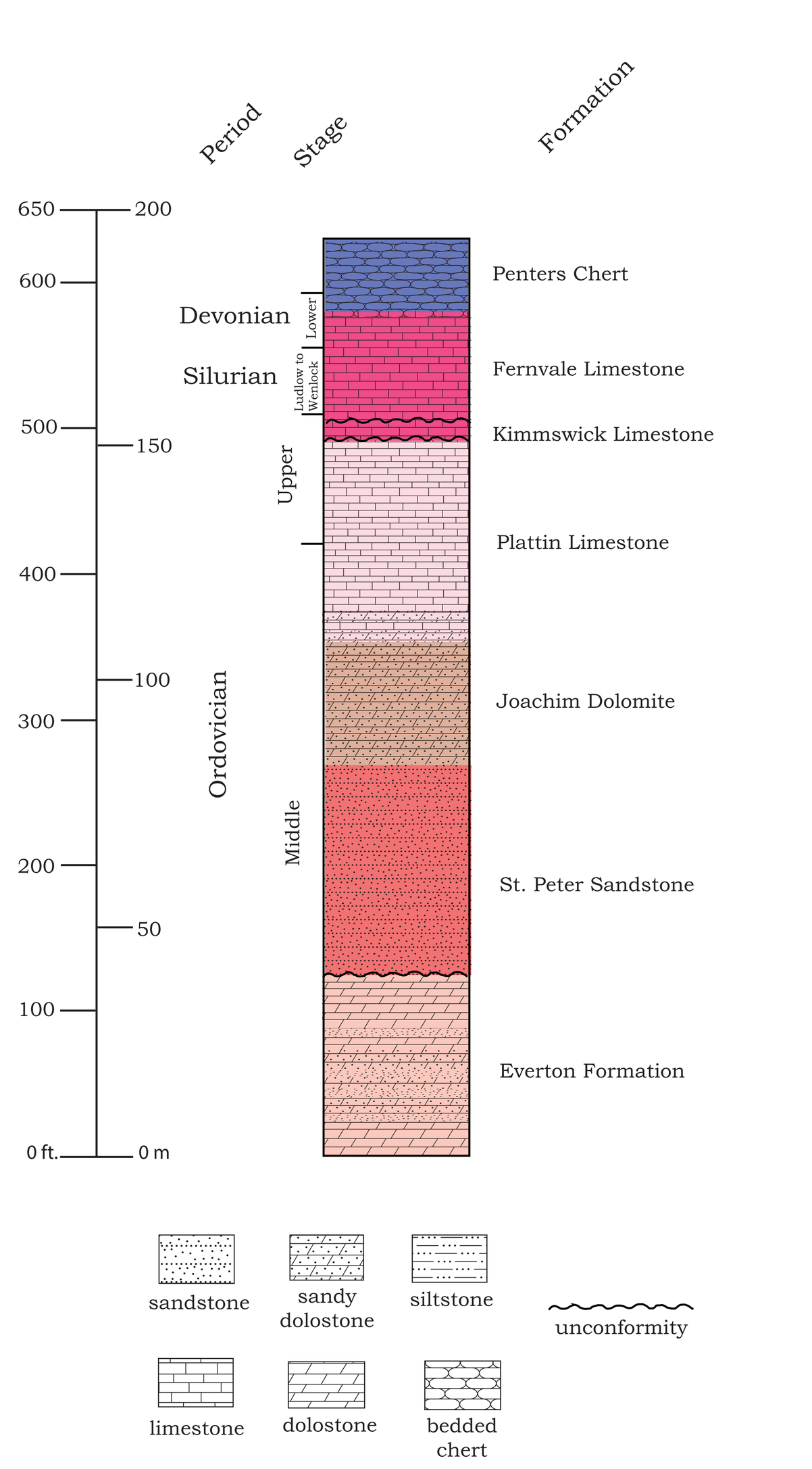
Osp — **St. Peter Sandstone (Middle Ordovician)** - A fine-grained thin- to massive- cross-bedded sandstone. Quartz grains are sub-angular to sub-rounded. White to light-gray on fresh surfaces, but weathers light brown. Commonly case hardened or silica cemented near faults but friable when broken. Balds or glades, and sinkholes are common. Ridges of deformation bands are prominent at faults. Sandstone pipes are present near faults. Unconformable with the underlying Everton Formation. Ranges from 80-200 feet (24-61 meters) thick.

Oe — **Everton Formation (Middle Ordovician) -** Consists primarily of interbedded dolostone, sandy dolostone, and sandstone. Dolostone is thin to medium bedded and finely to coarsely crystalline. It is medium- gray on fresh surfaces, but weathers light-gray and contains mud cracks. Locally, the dolostone is petroliferous, contains calcite blebs, and is mottled. Sandstone is very thin to medium bedded and locally silica-cemented. Quartz grains are fine to coarse and sub-rounded to well-rounded. Approximately 100-200 feet (30-61 meters) exposed on this quadrangle.

Symbols

- Contact
- A—A' Line of cross-section
- Normal fault - ball and bar on downthrown side. Arrow shows dip direction and dip of fault plane. Dashed where inferred. Dotted where concealed.
- Monocline
- Anticline
- Inclined bedding showing strike and dip
- Mine, pit, or quarry
- Prospect pit or small open cut
- Vertical mine shaft

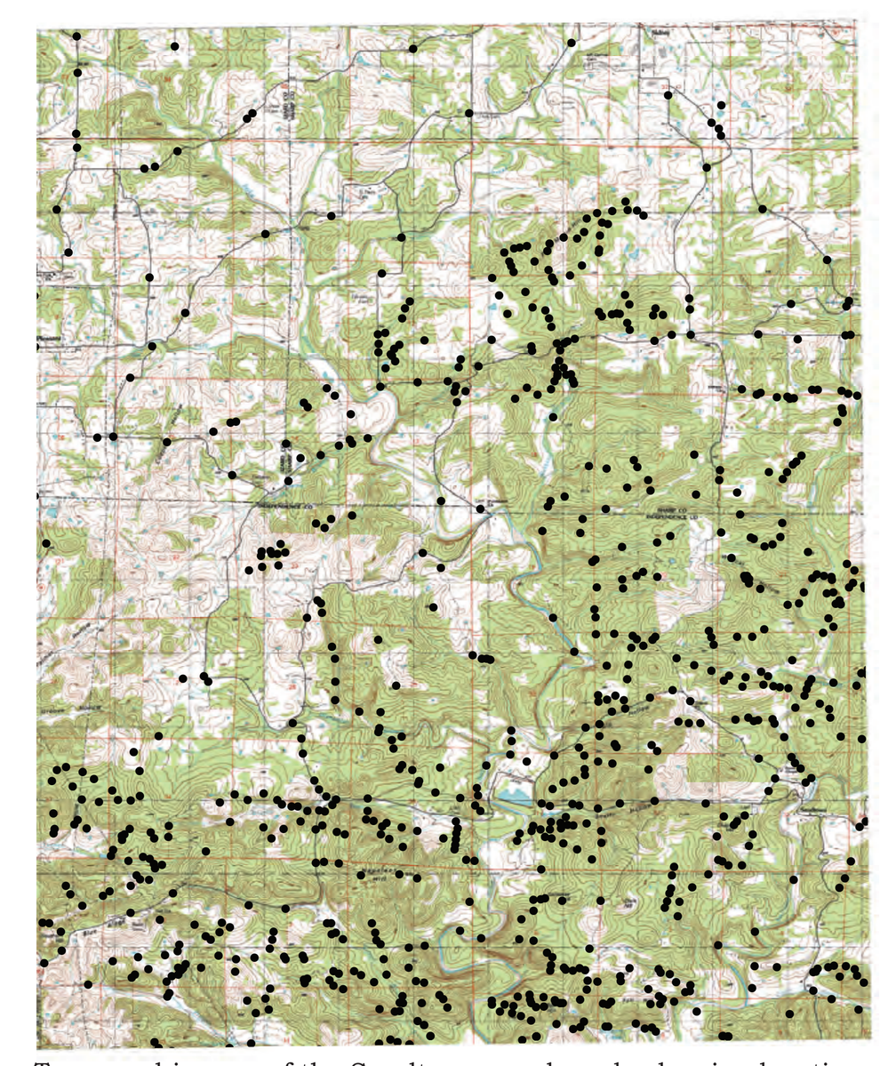
Stratigraphic Column



A sinkhole bound on the south (left side of photo) by a sandstone deformation band fault ridge.

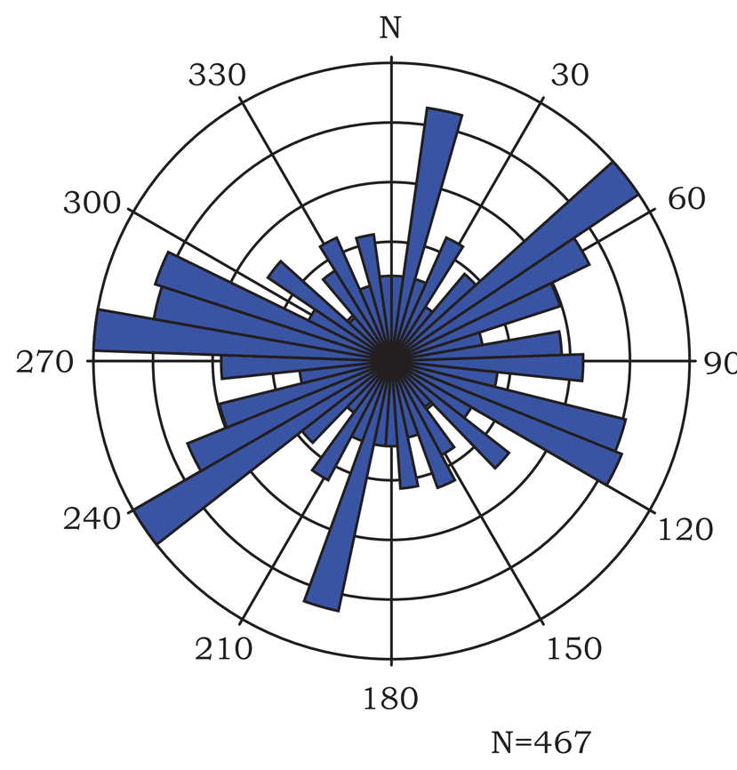
A large boulder of the St. Peter Sandstone, containing deformation bands along an un-named fault.

A large boulder of iron manganese in an old manganese mining district.



Topographic map of the Sandtown quadrangle showing locations of data collection points.

Joint Frequency



Rose diagram of strike frequency of joints recorded within the Sandtown quadrangle.

Paleogene? gravels preserved on Napoleon Hill.

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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 work continues and new information is collected, the contacts, structures, and other features depicted on this map may be changed.

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Map digitized by Jerry Clark.