



Alabaster caverns



Chimney Rock



Gypsum sinkhole



Ouachita Mountains



Gypsum mine



Pumpjack



Copper mill at Creta



Lady Cave

EARTH SCIENCES AND MINERAL RESOURCES OF OKLAHOMA

EARTH SCIENCES AND MINERAL RESOURCES OF OKLAHOMA

Kenneth S. Johnson and Kenneth V. Luza, *Editors*

2008

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Chimney Rock.....	Woodward
Gypsum sinkhole.....	Harper
Ouachita Mountains.....	Le Flore
Gypsum mine.....	Comanche
Pumpjack.....	Oklahoma
Copper mill at Creta.....	Jackson
Lady Cave.....	Washita

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Granite in Wichitas.....	Comanche
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and sediments) and by lack of a subsoil. Typically these soils are on recently flooded river bottoms or eroded areas that are shallow over rock.

Eolian—Pertaining to the wind; especially said of sediments modified or deposited by the wind.

Epicenter—The point on the earth's surface directly above the focus (hypo-center) of an earthquake.

Era—A large division of geologic time consisting of two or more geologic periods.

Erosion—The natural processes of weathering, disintegration, dissolving, and removal of rock and earth material, mainly by water and wind.

Focus—The point within the earth at which the first motion of an earthquake originates (same as hypocenter).

Fossil—Remains or traces of a prehistoric animal or plant.

Gabbro—A dark-colored, coarse-grained igneous rock formed from magma that cooled beneath the earth's surface. Oklahoma gabbros are dark gray or black.

Geology—The study of the earth, including its structure, history, landforms, and resources.

Geomorphic province—A large region of similar landforms, resulting from erosion of rocks and/or deposition of sediments that are somewhat uniform in nature and structure.

Glass sand—High-purity quartz sand suitable as a raw material in manufacturing glass.

Granite—A light-colored, coarse-grained igneous rock formed from magma that cooled beneath the earth's surface. Oklahoma granites are mostly light gray, pink, red, and brown.

Gypsum—A sedimentary rock consisting of the mineral gypsum, CaSO₄•2H₂O, formed by chemical precipitation from evaporating sea water.

Hogback—A sharp ridge formed by layers of hard rock that dip steeply downward.

Hydrocarbon—Any gaseous, liquid, or solid organic compound consisting solely of carbon and hydrogen. See crude oil, natural gas, and petroleum.

Hypocenter—Same as "focus."

Igneous rock—Rock formed by cooling and solidification of hot molten material called magma. Magma that flows onto the earth's surface (lava) cools rapidly to form fine-grained rocks, whereas magma that solidifies several miles beneath the surface cools slowly to form coarse-grained rocks.

Inceptisols—Soil order identified by subsoil texture, color, and structure that are very similar to surface layers. Surface and subsoil properties are similar to physical and chemical properties of the parent rock and sediments from which the soil formed.

Karst—A type of topography that is formed when limestone, gypsum, and other water-soluble rocks are dissolved to produce sinkholes, caves, and underground drainage.

Lignite—A brownish-black, low-grade coal.

Limestone—A sedimentary rock consisting mostly of the mineral calcite, CaCO₃, formed mainly from lime muds and fossil fragments.

Loam—Soil material that is 7–27% clay particles, 28–50% silt particles, and less than 52% sand particles.

Magma—Molten rock material generated within the earth.

Marine—Refers to sediments deposited in sea water.

Metamorphic rock—Rock that has been changed through intense heat, high pressures, or contact with chemically active fluids from magma.

Mineral spirits—Alcohol-based petrochemical commonly used as a solvent.

Mollisols—Soil order identified by a surface (A) layer with 1% or more organic matter content 10 or more inches thick formed beneath a prairie. Soils usually have a neutral to basic pH (greater than or equal to 7).

Motte—A cluster of trees in a prairie.

Natural gas—Hydrocarbons that exist as a gas at surface temperature and pressure.

Nonmarine—Refers to sediments deposited on land or in lakes, streams,

swamps, or deltas.

Organic compounds—Material derived from living, or once living, organisms. In discussions about oil and gas, the term usually refers to such material buried in sedimentary rocks.

Period—One of the fundamental units of geologic time into which earth history is divided. A period is a subdivision of an era.

Permeable—Capable of transmitting a fluid.

Petroleum—Hydrocarbons that exist as a liquid at surface temperature and pressure.

Precipitation—Any form of water particles, such as rain, snow, hail, and/or sleet, that falls from the atmosphere and reaches the ground.

Rhyolite—Light-colored, fine-grained igneous rock (magma) formed from lava that flowed onto the surface of the earth. Oklahoma rhyolites are pink, red, or brown.

Salt—A sedimentary rock consisting of the mineral halite, NaCl, formed by chemical precipitation from evaporating sea water.

Sandstone—A sedimentary rock consisting of sand grains (mostly quartz) cemented together.

Sedimentary rock—Rock formed by the compaction and cementing of sediments deposited in water or from air. Sediments may consist of rock or mineral fragments of various sizes (mud, sand, gravel), the remains of animals or plants, the products of chemical action or evaporation, or mixtures of these materials. Sedimentary rocks typically have a layered structure known as bedding or stratification.

Shale—A sedimentary rock formed from mud and clays.

Shrink-swell potential—The shrinking of soil when dry and swelling when wet.

Soil—A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on the earthy parent material, as conditioned by relief over periods of time.

Soil horizon—A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes.

Soil order—The highest (most general) level in the current soil-classification system. Orders identify groups of soils with similar major properties.

Soil profile—A vertical section of the soil extending through all its horizons and into the parent material.

Soil series—A group of soils that have profiles that are almost alike, except for differences in the texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Temperature—The degree of hotness or coldness as measured on some definite temperature scale.

Terrace deposit—An old alluvial deposit near, but above, the present-day flood plain of a river.

Tornado—A violently rotating column of air protruding from a cumulonimbus cloud and in contact with the ground; a condensation funnel does not need to reach to the ground for a tornado to be present.

Tripoli—A lightweight form of silica rock used for its abrasive and absorbent properties.

Ultisols—Soil order identified by increasing clay content with increasing soil depth. Subsoil is acidic and contains enough iron (Fe) oxides to impart a red color. Soil is formed beneath a forest.

Unconformity—A substantial break or gap in the geologic record, usually formed by nondeposition or by uplift and erosion of previously deposited rocks and sediments.

Vertisols—Soil order identified by a very high content of shrink-swell clays. These clayey soils, which expand and contract under varying water content, pose many problems for such land use as tillage and roadway and building construction.

Volcanic ash—Accumulations of glasslike dust ejected from volcanoes. The principal sources of Oklahoma volcanic ash were once-active volcanoes in New Mexico, California, and Wyoming.

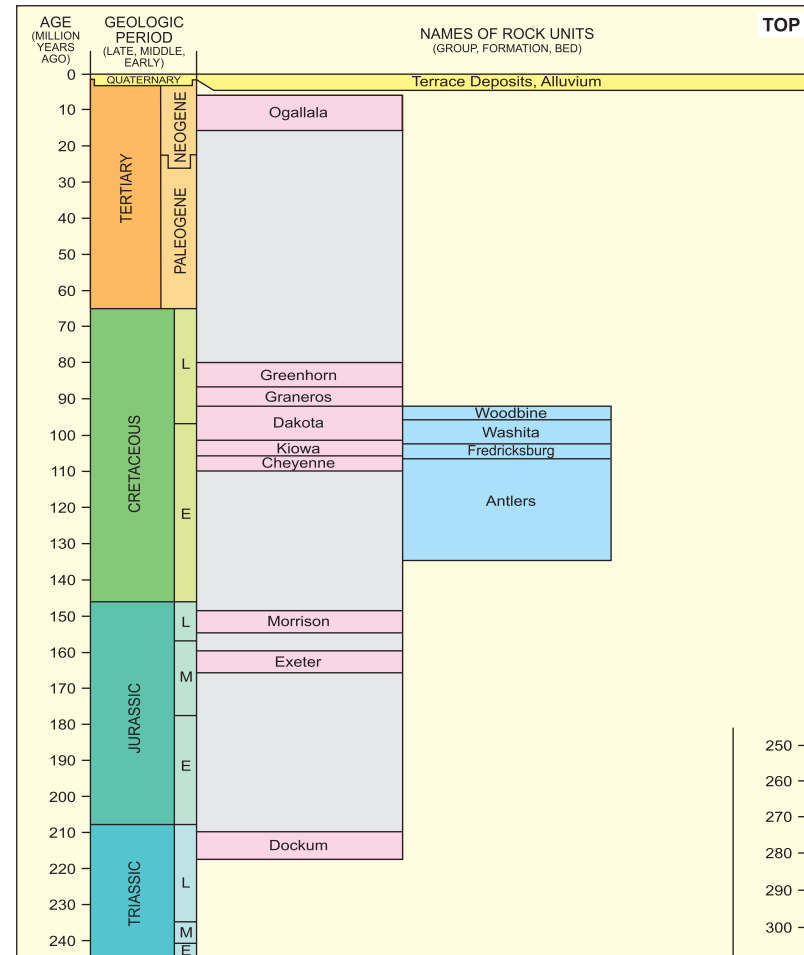


Figure 35. The generalized stratigraphic column shows selected rock units of Oklahoma. Ages of geologic-time periods are approximate. Rock units separated by commas show the youngest first; rock units with hyphens are indefinite or interchangeable. Shaded areas represent unconformities. Row or column height does not indicate thickness of rock units. The reader may refer to Figure 1 that illustrates the major geologic provinces of Oklahoma. Sources used to compile the stratigraphic column are Huffman (1958), Zeller (1968), Sutherland and Manger (1979), Bingham and Bergman (1980), Hills and Kottowski (1983), Lucas and others (1987), Mankin (1987), and Arbenz (1989).

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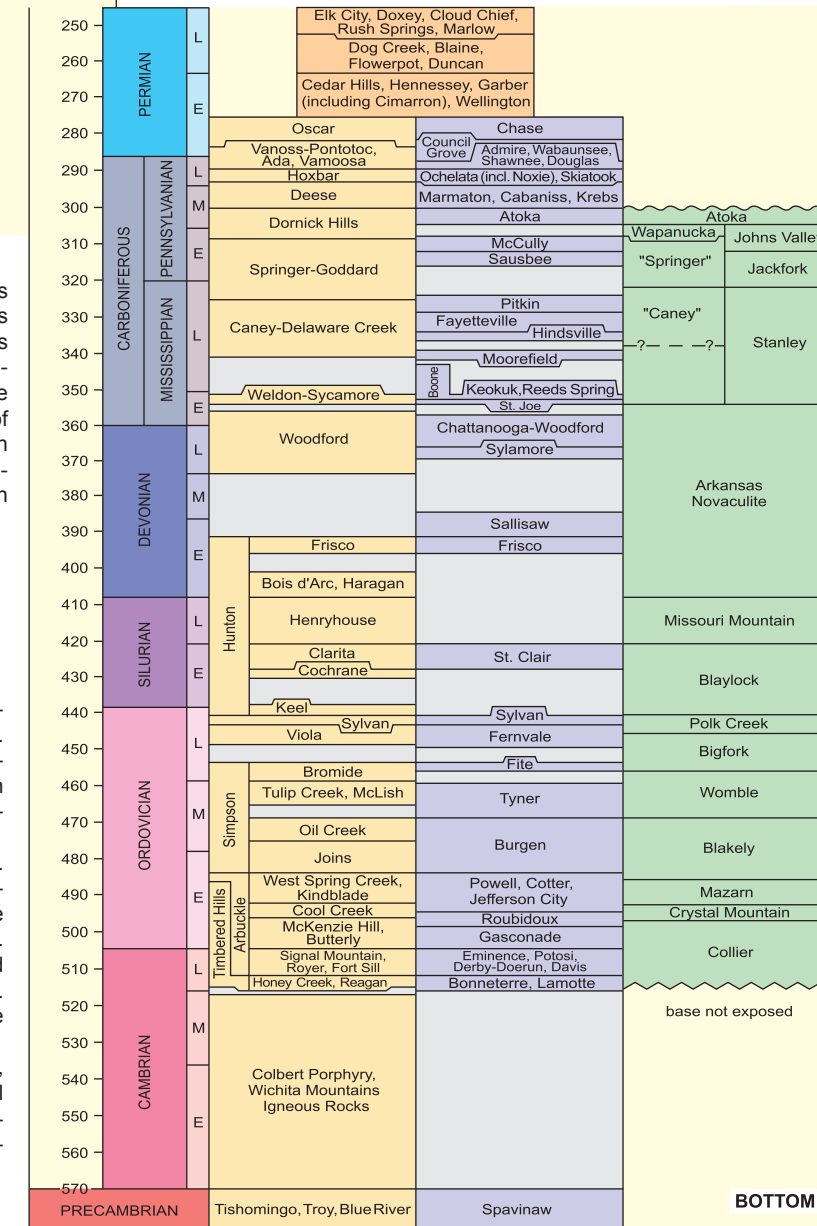
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GENERALIZED STRATIGRAPHIC COLUMN OF PRINCIPAL OUTCROP UNITS IN OKLAHOMA

- EXPLANATION**
(Color Shows Province Where Rocks Crop Out)
- Panhandle and northwestern Oklahoma
 - Gulf Coastal Plain
 - Anadarko Basin, Anadarko Shelf, southwestern Oklahoma
 - Wichita Uplift, Ardmore Basin, Arbuckle Uplift, southern Cherokee Platform
 - Ozark Uplift, northern Cherokee Platform, Arkoma Basin
 - Ouachita Uplift





Glass Mountains



Sprinkler irrigation



Limestone in Arbuckle



Tombstone topography



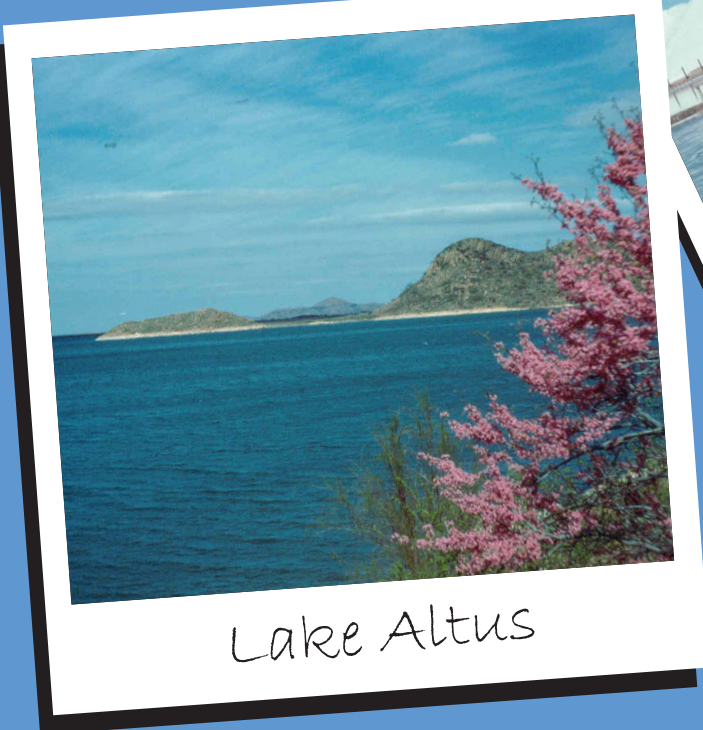
Granite in Wichita



Solar-salt pans



Glass sands



Lake Altus



Turner Falls



Hennessey Shale