

### 13. What is magnetic declination?

From any point on the Earth's surface, it's the angle between a line pointing to the geographic North Pole and another line pointing to the magnetic pole.

The geographic North and South poles mark the Earth's axis of rotation and do not coincide with the magnetic north and south poles. At the present time, magnetic north is located at about 71° N latitude, 96° W longitude, just southeast of Prince of Wales Island, Nunavut, Canada. This is about 1,300 miles from geographic north.

A compass needle in the Northern Hemisphere points to magnetic north, whereas most maps are oriented with geographic north at the top. The angle between magnetic north and geographic north is the magnetic declination; the angle (in degrees) is shown by two diverging arrows near the bottom of a topographic map.

In northern Maine, magnetic north is about 23° west of geographic north; in Washington State, magnetic north is about 23° east of geographic north. A line of zero declination extends through eastern Georgia, eastern Tennessee, Kentucky, eastern Indiana, and Lake Michigan. Along this line, geographic north and magnetic north lie in the same direction.

Magnetic north is east of geographic north everywhere in Oklahoma. In the western Panhandle the declination is about 12° east, and in most of eastern Oklahoma it is about 8° east. However, the Earth's magnetic field is neither uniform nor constant; as a result, the magnetic declination in some parts of eastern Oklahoma is as little as 6.5° east.

## General Questions



### 14. What do you have about water?

The OGS publishes many maps and technical reports concerning the quality, quantity, and location of ground water, and we stock other publications by the USGS.

Our most popular publications about water are sets of maps in the OGS Hydrologic Atlas series. Each set covers about one-ninth of the State at a scale of 1:250,000 (except the Panhandle, described below). A set consists of four maps showing (1) the geology, (2) the principal aquifers and water-well information, (3) the chemical quality of ground water, and (4) surface-water information.

Each hydrologic atlas of the counties in the Panhandle, published by the USGS and available from OGS Publication Sales (Appendix 1), consists of three maps each at a scale of 1:125,000. They show the geology, depth to ground water, chemical quality of the water, areas favorable for irrigation, thickness of unconsolidated deposits, and thickness of saturated zones.

We also have a set of two maps showing Oklahoma's ground-water resources, published in cooperation with the Oklahoma Department of Health. One map shows unconsolidated alluvium and terrace deposits; the other shows bedrock aquifers and recharge areas. Several technical reports by the OGS focus on the geohydrology of specific aquifers, quality of water in abandoned mines, and ground-water resources of specific counties.

Other important sources of information on water in Oklahoma are the Water Resources Division of the USGS (Appendix 2), the Oklahoma Water Resources Board (Appendix 1), and the Oklahoma Department of Environmental Quality (Appendix 1).