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## The Permian Period

The Permian period lasted from 299 to 251 million years ago\* and was the last period of the [Paleozoic Era](#). The distinction between the Paleozoic and the Mesozoic is made at the end of the Permian in recognition of the largest mass extinction recorded in the history of life on Earth. It affected many groups of organisms in many different environments, but it affected marine communities the most by far, causing the extinction of most of the marine invertebrates of the time. Some groups survived the Permian mass extinction in greatly diminished numbers, but they never again reached the ecological dominance they once had, clearing the way for another group of sea life. On land, a relatively smaller extinction of diapsids and synapsids cleared the way for other forms to dominate, and led to what has been called the "[Age of Dinosaurs](#)." Also, the great forests of fern-like plants shifted to gymnosperms, plants with their offspring enclosed within seeds. Modern conifers, the most familiar gymnosperms of today, first appear in the fossil record of the Permian. The Permian was a time of great changes and life on Earth was never the same again.

The global geography of the Permian included massive areas of land and water. By the beginning of the Permian, the motion of the Earth's crustal plates had brought much of the total land together, fused in a supercontinent known as Pangea. Many of the continents of today in somewhat intact form met in Pangea (only Asia was broken up at the time), which stretched from the northern to the southern pole. Most of the rest of the surface area of the Earth was occupied by a corresponding single ocean, known as Panthalassa, with a smaller sea to the east of Pangea known as Tethys.

Models indicate that the interior regions of this vast continent were probably dry, with great seasonal fluctuations due to the lack of a moderating effect provided by nearby bodies of water. Only portions of this interior region received rainfall throughout the year. There is little known about the Panthalassic Ocean itself. There are indications that the climate of the Earth shifted during the Permian, with decreasing glaciation as the interiors of continents became drier.

## Stratigraphy

Until the later 1990s, there was little consensus on the order of strata in the late Permian. Since the upper strata of various Permian locations tend to be relatively fossil deficient, correlation using index fossils has been difficult. Correlation was attempted using fossils that were in some cases native only to the local regions where they were found and older work

was based on assumptions that have changed in more recent years.

Older classifications relied on the Ural Mountains stratigraphy. In 1994, Jin et al. proposed a worldwide stratigraphy of the Permian Period made up of four series/epochs: the Uralian, the Chihshian, the Guadalupian, and the Lopingian. In the early 2000s, work by Jin and others resulted in the stratigraphy currently accepted by the [International Commission on Stratigraphy](#).

The current stratigraphy divides the Permian into three series or epochs: the Cisuralian (299 to 270.6 mya), Guadalupian (270.6 to 260.4 mya), and Lopingian (260.4 to 251 mya).

\* Find out [more about how these periods of time are defined](#).

Permian shales, sandstones, siltstones, limestones, sands, marls, and dolostones were deposited as a result of sea-level fluctuations. These fluctuation cycles can be seen in the rock layers. Relatively few sites lend themselves to direct radioactive dating, so the age of intermediate strata is often estimated.

Permian fossils that have been used as index fossils include brachiopods, ammonoids, fusulinids, conodonts, and other marine invertebrates, and some genera occur within such specific time frames that strata are named for them and permit stratigraphic identification through the presence or absence of specified fossils.

## Localities

- [Glass Mountains, Texas](#): Permian fossils from the Glass Mountains are of shallow, warm-water marine life.

## Resources and references

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- Ross, C.A., and J.R.P. Ross 1995. Permian sequence stratigraphy. Pp. 98-123 in P.A. Scholle, T.M. Peryt, and D.S. Ulmer-Scholle (eds.), *The Permian of Northern Pangea*, Vol. 1. Springer-Verlag, Berlin.
- Find out more about the [Brule Trackways, Nova Scotia](#), where hundreds of Permian age trackways have been found.
- Find out more about the Permian paleontology and geology of North America at the [Paleontology Portal](#).

- See the [Wikipedia](#) page on the Permian.

\* Dates from the International Commission on Stratigraphy's International Stratigraphic Chart, 2009.

Page content written and completed by Chavé Alexander, Henry Chang, Carl Tsai, and Peggy Wu as part of a Biology 1B project for Section 115 under Brian R. Speer, 5/11/1998; Sarah Rieboldt updated the pages to reflect the Geological Society of America (GSA) 1999 Geologic Timescale, 11/2002; Dave Smith recombined the content into a single page, adapted it to the new site format and made some content updates, 6/30/2011

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