

What is an ice age? An ice age is a time period when the temperature of the Earth's surface and atmosphere is greatly reduced so that there is a presence or expansion of continental ice sheets, polar ice sheets and alpine glaciers in the southern and northern hemispheres. Within this time period, individual pulses of cold climate are considered "glacial periods" and warm intermittent periods are called "interglacial periods". Using the definition of glacial and interglacial periods, geologists classify the present condition of the world as an ice age that began 2.6 million years ago because the Greenland and Antarctic ice sheets still exist.

What is the basis of an ice age? There are three main types of evidence to consider. These include geological, chemical and paleontological. Geological evidence includes rocks, glacial moraines, drumlins, valley cutting, and the deposits of sediments. The chemical evidence looks at the variations in the ratios of isotopes in fossils found in sediments, sedimentary rocks and ocean sediment cores. Paleontological evidence looks at the changes in the geographical distribution of fossils. During cold time periods, organisms spread into lower latitudes and organisms that preferred warmer climates became extinct. These types of evidence have shown there were glacial periods over the past few million years.

What is the history of ice ages? There have been five major ice ages that chronicle the Earth's past: Huronian (over 2 million years ago), Cryogenian (about 850-630 million years ago), Andean-Saharan (about 460-420 million years ago), Karoo (360- 260 million years ago), and the Quaternary Ice ages (the current ice age starting about 2.58 million years ago).

What happens during glacial time periods? The climate is cooler and dryer over most of the Earth. Large land and sea ice masses extend outward from the poles. Mountain glaciers extend to lower elevations due to a lower snow line. Sea levels drop because large volumes of water above sea level are removed from the ice caps. Ocean circulation patterns are also disrupted.

What theories are there to explain the ice ages? There are many theories behind the ice ages.

- One theory is that the increase of ice and snow causes the earth to reflect more of the sun's energy and absorb less energy. When air temperatures decrease, ice and snow fields grow.

- Another theory hypothesizes that an ice-free Arctic Ocean leads to increased snowfall at high latitudes.
- Yet, another theory surrounds the concentrations of carbon dioxide and methane.
- An additional theory deals with the changes in the Earth's orbit around the sun and possibly the Sun's orbit around the galaxy.
- Some scientists have noted that the motion of the tectonic plates has resulted in changes in the relative location and amount of continental and oceanic crust on the Earth's surface, which in turn affects wind and ocean currents which may also be a cause of the ice age.
- There is a theory about the impact of relatively large meteorites and another theory that volcanism, eruptions of super volcanoes, was a cause.
 - It is noted that several of these factors may influence each other. One example is when the atmospheric composition of the earth changes, then climate is altered. This can change the atmospheric composition which repeats the cycle.

Will the Earth continue to experience glacial periods? There are two known configurations of the continents (in existence today) that either block or reduce the warm water from the equator to the poles. For example, the continent of Antarctica sits on top of a pole and the polar Arctic Ocean is almost land-locked. These physical conditions lead geologists to believe that the Earth will continue to experience glacial periods in the near future.

What are some of the effects of the most recent glacial period? The effects of the last glacial period are seen today. The moving ice impacted the landscape of Canada, Greenland, northern Eurasia and Antarctica. Typical features of erratic boulders, till, drumlins, eskers, fjords, kettle lakes, moraines, cirques, horns, etc. were left behind. The heavy weight of the ice deformed the Earth's crust and mantle. Global sea levels dropped over 330 feet (100 meters) to expose continental shelves in some areas. This caused land bridges to be formed between land masses and allowed animals to migrate. This type of changing land has been thought to have caused the Baltic and Scandinavian regions, as well as much of the North American coastlines.

1. Write the words.

volcanism _____

configurations _____

isotopes _____

tectonic plates _____

methane _____

2. Use each word in a sentence. Underline the word used.

pulses _____

intermittent _____

chronicle _____

land-locked _____

erratic _____

3. Which type of evidence for ice ages is described as “changes in the geographical distribution of fossils”? Circle the correct answer.

a. geological

b. chemical

c. paleontological

d. all of the above

