

What is the evidence for The age of the Earth?



The evidence for the age of the Earth is necessarily indirect because nobody alive today was there to see it. Current understanding is based on a set of facts that are hard to explain otherwise. There are independent lines of evidence that point to similar conclusions. One of them is presented here.

Radioactive atoms split apart

The nuclear cores of some types of atoms randomly split apart, changing into different types of atoms. This is well understood and is the basis for nuclear power, nuclear bombs, radiation therapy, PET scans, and smoke detectors.

The rate of splitting is known, so it acts like a stopwatch

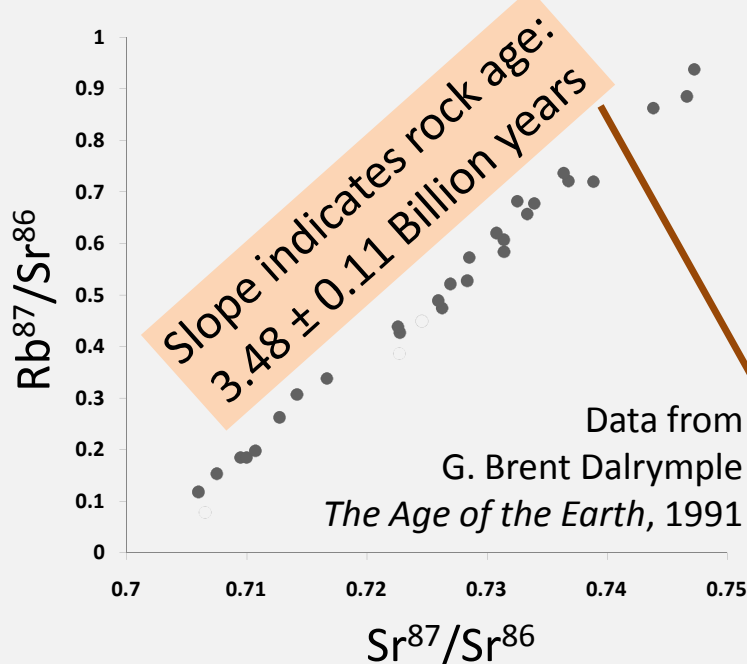
A group of atoms has a steady splitting rate that does not depend much on chemistry, vibration, temperature, or other external factors. The largest variation is from chemical bonding for very light elements, which is <1%.

When a rock forms, its stopwatch is reset

A typical rock includes several different minerals, each with a different mixture of atoms. Some minerals start out with the same ratio of two types of Strontium (Sr) atoms but different ratios of Strontium to Rubidium (Rb) – the clock hand starts straight up.

Radioactive splitting changes one element into another, running the watch forward

As atoms split, the chemical ratios change, producing a consistent slope that tells how long it has been since the rock was formed.



An example for one particular rock (from Morton, Michigan) is shown here. As Rubidium atoms in the rock split into Strontium atoms, the slope of points from various minerals all line up to show the rock's age.

The Earth should be at least as old as old as the rocks that formed in it