The Earth: Is It Young or Is It Old?

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Qualifications

- Ph.D. in Nuclear Chemistry from the University of Rochester
- University Professor From 1990 - 1995
- NSF-Sponsored Scientist with More Than $200,000 In Research Grants
- More than 30 articles in the peer-reviewed journals of Nuclear Chemistry
- Currently writes junior high and high school science curriculum for homeschoolers.

How Do You Measure The Age of Something?

- You need a process that happens at a **constant rate.**
- You need to know that **rate.**
- You need to know the **initial conditions**.
- You need an **isolated** system.

There are at least **68** such processes in Creation which have been identified. They give ages for the earth that range from 100 years old - 4.6 billion years old

See: *What is Creation Science?* by Morris and Parker

The Amount of Sodium in the Ocean

Na^+ enters via:

- Rivers
- Surface runoff
- Groundwater discharge
- Ocean sediment release

Na^+ leaves via:

- Ocean Spray
- Clay absorption
- Sediment trapping
- Zeolite absorption

Sodium is entering the oceans faster than it is leaving.

Initial condition assumption for the level of sodium

Initial level at zero: 62 million years old

See: http://tccsa.tc/articles/ocean_sodium.html

The Earth's Helium Inventory

Helium is a light gas. It is produced on the earth mainly by the radioactive decay of certain atoms in the earth's crust. Because it is both light and unreactive, it tends to escape the rocks and enter earth's atmosphere. Once it reaches the atmosphere, it can escape into space *if* it has enough energy to escape earth's gravity.

- The rate of production of helium is based on the rate of radioactive decay, the amount of radioactive isotopes, and the rate at which helium escapes from rock. These are all easily measurable and well-understood.
- The rate of escape is based on the amount of helium in the atmosphere and the energy distribution of the helium atoms in the atmosphere. These are all easily measurable and well-understood
- The result is that helium is entering the atmosphere faster than it is leaving. If the atmosphere had **no helium** to begin with, the earth could be no more than **2 millions years old**.
- This figure is an upper limit. We *know* that radioactive decay was faster in the past, because there were more radioactive isotopes. Also, the earth used to be more geologically active, which releases even more helium into the atmosphere.

See: http://www.answersingenesis.org/creation/v20/i3/old_earth.asp

http://www.answersingenesis.org/tj/v8/i2/helium.asp

Dendrochronology

Oldest Living Tree: "Methuselah," a bristlecone pine **4,771 years old**

There is no theoretical limit on the age of bristlecone pines. Nevertheless, the oldest one has under 5,000 rings. This is actually an upper limit, as trees are known to form double rings occasionally.

See: http://www.answersingenesis.org/home/area/faq/docs/tree_ring.asp

Earth's Magnetic Field

Facts:

⇒ Since 1890, it has been decaying.
⇒ During times in the past, it has reversed.
⇒ Some planets have one, some don't.

Why does the earth have a magnetic field?

Physicists think that here are large electrical currents flowing through the core of the earth. There is a lot of evidence to support that these currents are the source of earth's magnetic field.

The Rapid-Decay Theory

God created the earth out of pure water (2Peter 3:5 - "...and the earth was formed out of water and by water.") with all of the molecule's spins aligned. This created an enormous magnetic field. Those atoms would quickly de-align with time, but their initial magnetic field would set up a current in the earth's core. The current would then decay rapidly (on the order of thousands of years) due to friction.

The current can be reversed under the influence of great tectonic activity.

Assuming other planets were formed this way, you can use the model to calculate other planets' fields.

The Dynamo Theory

During the formation of the earth, the earth's rotation caused separations of certain chemicals in the molten outer core. These chemicals were charged, and their mutual attraction began to force them back together. Because of certain conditions of temperature, complex currents were set up in the liquid of the outer core, producing random electrical currents, which result in a magnetic field.

This is similar to a **dynamo**, which can be shown to convert thermal energy or kinetic energy into magnetic or electrical energy.

Since the dynamo is a result of random currents, the magnetic field it generates will be somewhat erratic, and it will decay, increase, and sometimes reverse, depending on the specific conditions at the time.

The dynamo should last as long as the earth keeps spinning. Assuming that other planets have similar dynamos allows you to predict the fields of other planets.

Problems With The Dynamo Theory

- Cannot correctly predict whether or not a planet will have a magnetic field:
  Mars has no planetary field, dynamo theory predicts one.
  Mercury has one, dynamo theory predicts none.
- Using earth as a calibration, it is wrong on the strength of the other planets' fields.
- Rock samples from the moon and Mars both indicate that they each had magnetic fields at one time. Now neither do. The dynamo theory predicts that a planet or moon that has a magnetic field will always have one.

Success Of The Rapid-Decay Theory

- Correctly predicts the presence or absence of a magnetic field for each planet.
- Using earth as a calibration, it is correct on the strength of the other planets' fields
  In 1984, the theory was used to predict the magnetic fields of Neptune and Uranus. Neither had been measured. In the 1990's, Voyager measured those fields. The dynamo theory was 10,000 times off, this theory was right on the money.
- Correctly predicts the fact that Mars and the moon both had a magnetic field at one time. The Mars prediction was made BEFORE this was determined.

See: http://www.creationresearch.org/crsq/articles/21/21_3/21_3.html

Radioactive Decay

The rate of radioactive decay is easily measured. It is generally expressed in terms of half life. Some radioisotopes have short half lives, others have long half lives.

The only radioisotopes with short half lives are those that have a means of being renewed.

Carbon-14 has a half life of 5,730 years. If it were not renewed, all carbon-14 would decay away in under 100,000 years. Carbon-14 is produced when cosmic rays knock neutrons out of atoms in the upper atmosphere. These neutrons react with nitrogen atoms, making carbon-14.

There are at least 11 radioactive isotopes (like lead-205) that have half lives between 1 million years and 80 million years, but they cannot be found anywhere in the solar system unless they are made in the lab.

This is evidence that the earth is at least several hundred million years old.

This reasoning makes a BIG assumption.
It assumes that radioactive decay rates are **CONSTANT**.
There are several lines of evidence that indicate this is **NOT** the case:

- Reifenschweiler showed that the decay rate of tritium (a radioactive isotope of hydrogen) varies by as much as 40% with changing temperature when exposed to titanium. (Reifenschweiler, O., Phys. Lett. A, 1994, **184**: p. 149)
- Bosh and others showed that in a fully-ionized state, the beta decay rates of heavy isotopes can be accelerated by a factor of a **billion**. (Bosh, F., *et al*., Phys. Rev. Lett, 1996, **77**: 5190-5193)
- Analysis of helium trapped in deep zircons indicate a "burst" of radioactive decay at some point in earth's past. (See below)

Helium Trapped in Zircons

- One mode of radioactive decay is **alpha decay**. When this happens, a nucleus ejects an alpha particle, which is a helium nucleus.
- This helium nucleus begins to speed away from the emitting nucleus, but it can get trapped in surrounding material.
- While examining zircons from a borehole in Fenton Hills, New Mexico, scientists noticed large amounts of helium in the zircons. This was surprising, as helium should diffuse out of zircon fairly quickly.
- If the radioactive decay that produced the helium was as slow as expected from the half lives of the isotopes present, there should not be much buildup

The researchers looked through the literature and were surprised to find that although it was generally assumed that helium diffuses quickly through zircon, the actual rate had **never been measured**.

The researchers set up two scenarios:

- ✓ Assuming the rocks were as old as standard geology claims (greater than 1.5 billion years old) and that the radioactive decay rates are constant, they predicted how quickly helium must diffuse out of zircon to get the buildup that was observed.

- ✓ Assuming the rocks were only 6,000 years old and that there was an early "burst" of radioactive decay that produced more than "500 million years" worth of alpha decay in a few days, they predicted how quickly helium must diffuse out of zircon to get the buildup that was observed.

Not surprisingly, the predictions were off by a factor of 100,000!

Two years later, the diffusion rates were measured

The data lined up **perfectly** with the prediction that the rocks were thousands of years old and that there had been a "burst" of radioactive decay in the past.

See: http://www.icr.org/research/icc03/pdf/Helium_ICC_7-22-03.pdf

<u>Carbon-14 Dating</u>

- Carbon-14 atoms decay to Nitrogen-14 atoms with a half-life of 5,730 years.
- All living organisms (including plants) exchange carbon-14 with the atmosphere.
- Upon death, this exchange ceases. As a result, the carbon-14 concentration begins to decrease
- If you know how much carbon-14 was in a living creature when it died, you can use the decay rate and the amount left to determine how long ago the organism died.

Assumptions of Carbon-14 Dating:

- The decay rate of Carbon-14 is constant. It is not clear this is a good assumption.
- Carbon-14 cannot enter or leave a fossil. This has been demonstrated to be false in some cases.
- The Amount of Carbon-14 in the Atmosphere Must Have Always Been What it is now. This has been demonstrated to be false.

An Even Bigger Problem With Carbon-14 Dating

Lots of items that are supposedly **MUCH OLDER** date as relatively "young" with the carbon-14 method

- 10 coal samples from all over the U.S. that are supposedly 45-330 MILLION years dated 50,000 ± 5,000 years old with the carbon-14 dating method.
- 5 diamond samples from 5 different mines in Botswana and South Africa are all supposed to be several hundred million years old. They dated as roughly 57,000 ± 10,000 years old.
- Baumgardner and others list NINETY other cases in the literature where materials that are supposed to be millions of years old date as tens of thousands of years old with the carbon-14 system.

See: http://www.icr.org/research/icc03/pdf/RATE_ICC_Baumgardner.pdf
http://www.icr.org/research/icc03/pdf/RATE_ICC_Baumgardner.pdf

Potassium-Argon Dating

Uses the radioactive decay of potassium-40 into argon-40

This technique is used to date volcanic rock. The assumption is that all argon-40 boils out of the lava while it is hot. Thus, when the lava cools, it starts with no argon-40.

- Rocks from a 200-year old Hawaiian lava flow dated as 1.6 ± 0.16 million years old.
- Rocks from a 500-year old lava flow dated as 12.6 ± 4.5 million years old.
- Rocks from the Kilauea basalt in Hawaii that history tells us are 200 years old dated as 42.9 ± 4.2 million years old.
- Snelling lists **23 examples** of volcanic rocks whose ages are known being dated as far too old using the potassium-argon dating method.

See: http://www.icr.org/pubs/imp/imp-307.htm

Conclusions

- Salt in the ocean leads to a maximum age of 62 million years
- Helium in the atmosphere leads to a maximum age of 2 million years
- Dendrochronology indicates that the most likely age is several thousand years
- The ONLY successful model of planetary magnetic fields indicates a maximum age of 9,000 years
- The lack of short-lived radioisotopes indicates a minimum age of several hundred million years, but this depends on an assumption that does not seem reliable.
- Radiometric dating is not reliable, except for the specific case of carbon-14 dating over the past 3,000 years, assuming the radioactive decay rate is constant over than time period.