

Chapter 4

What about carbon dating?

- How does the carbon ‘clock’ work?
- Is it reliable?
- What does carbon dating really show?
- What about other radiometric dating methods?
- Is there evidence that Earth is young?

PEOPLE who ask about carbon-14 (^{14}C) dating usually want to know about the radiometric dating¹ methods that are claimed to give millions and billions of years—carbon dating can only give thousands of years. People wonder how millions of years could be squeezed into the biblical account of history.

Clearly, such huge time periods cannot be fitted into the Bible without compromising what the Bible says about the goodness of God and the origin of sin, death, and suffering—the reason Jesus came into the world (see Chapter 2).

Christians, by definition, take the statements of Jesus Christ seriously. He said, “*But from the beginning of the creation God made them male and female*” (Mark 10:6). This only makes sense with a time line beginning with the Creation Week thousands of years ago. It makes no sense at all if man appeared at the end of billions of years.

We will deal with carbon dating first and then with the other dating methods.

1. Also known as isotope or radioisotope dating.

How the carbon 'clock' works

Carbon has unique properties that are essential for life on Earth. Familiar to us as the black substance in charred wood, as diamonds, and as the graphite in 'lead' pencils, carbon comes in several forms, or isotopes. One rare form has atoms that are 14 times as heavy as hydrogen atoms: carbon-14, or ^{14}C , or radiocarbon.

Carbon-14 is made when cosmic rays knock neutrons out of atomic nuclei in the upper atmosphere. These displaced neutrons, now moving fast, hit ordinary nitrogen (^{14}N) at lower altitudes, converting it into ^{14}C . Unlike common carbon (^{12}C), ^{14}C is unstable and slowly decays, changing back into nitrogen and releasing energy. This instability makes it radioactive.

Ordinary carbon (^{12}C) is found in the carbon dioxide (CO_2) in the air, which is taken up by plants, which in turn are eaten by animals. So a bone, or a leaf of a tree, or even a piece of wooden furniture, contains carbon. When ^{14}C has been formed, like ordinary carbon (^{12}C), it combines with oxygen to give carbon dioxide ($^{14}\text{CO}_2$), and so it also gets cycled through the cells of plants and animals.

We can take a sample of air, count how many ^{12}C atoms there are for every ^{14}C atom, and calculate the $^{14}\text{C}/^{12}\text{C}$ ratio. Because ^{14}C is so well mixed up with ^{12}C , we expect to find that this ratio is the same if we sample a leaf from a tree or a part of your body.

In living things, although ^{14}C atoms are constantly changing back to ^{14}N , they are still exchanging carbon with their surroundings, so the mixture remains about the same as in the atmosphere. However, as soon as a plant or animal dies, the ^{14}C atoms which decay are no longer replaced, so the amount of ^{14}C in that once-living thing

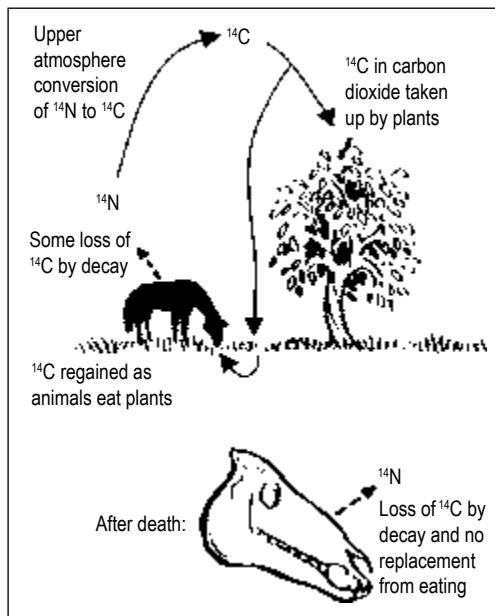


Figure 1. ^{14}C is gained by living things but lost after death.

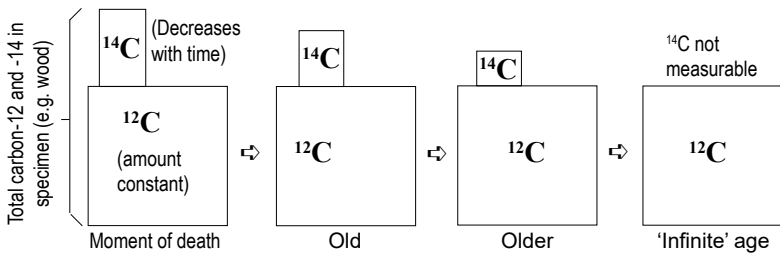


Figure 2. After death, the amount of ^{12}C remains constant, but the amount of ^{14}C decreases.

decreases as time goes on (figure 1). In other words, the $^{14}\text{C}/^{12}\text{C}$ ratio gets smaller. So, we have a ‘clock’ which starts ticking the moment something dies (figure 2).

Obviously, this works only for things which were once living. It cannot be used to date volcanic rocks, for example.

The rate of decay of ^{14}C is such that half of an amount will convert back to ^{14}N in $5,730 \pm 40$ years. This is the ‘half-life’. So, in two half-lives, or 11,460 years, only one-quarter will be left. Thus, if the amount of ^{14}C relative to ^{12}C in a sample is one-quarter of that in living organisms at present, then it has a theoretical age of 11,460 years. Anything over about 50,000 years old should theoretically have no detectable ^{14}C left. That is why radiocarbon dating cannot give millions of years. In fact, if a sample contains ^{14}C , it is good evidence that it is *not* millions of years old.

However, things are not quite so simple. Firstly, plants discriminate against carbon dioxide containing ^{14}C . That is, they take up less than would be expected and so they test older than they really are. Furthermore, different types of plants discriminate differently. This also has to be corrected for.²

Secondly, the ratio of $^{14}\text{C}/^{12}\text{C}$ in the atmosphere has not been constant—for example it was higher before the industrial era when the massive burning of fossil fuels released a lot of carbon dioxide that was depleted in ^{14}C . This would make things which died at that time appear older in terms of carbon dating. Then there was a rise in $^{14}\text{CO}_2$ with the advent of atmospheric testing of atomic bombs in the 1950s.³ This would make things carbon dated from that time appear younger than their true age.

2. Today, a stable carbon isotope, ^{13}C , is measured as an indication of the level of discrimination against ^{14}C . It is also a check that the ^{14}C came from a once-living organism.

3. Radiation from atomic testing, like cosmic rays, causes the conversion of ^{14}N to ^{14}C .

Measurement of ^{14}C in historically dated objects (e.g. seeds in the graves of historically dated tombs) enables the level of ^{14}C in the atmosphere at that time to be estimated, and so partial calibration of the ‘clock’ is possible. Accordingly, carbon dating carefully applied to items from historical times can be useful. However, even with such historical calibration, archaeologists do not regard ^{14}C dates as absolute because of frequent anomalies. They rely more on dating methods that link into historical records.

Outside the range of recorded history, calibration of the ^{14}C ‘clock’ is not possible.⁴

Other factors affecting carbon dating

The number of cosmic rays penetrating Earth’s atmosphere affects the amount of ^{14}C produced and therefore the dating system. The number of cosmic rays reaching Earth varies with the sun’s activity, and with the Earth’s passage through magnetic clouds as the solar system travels around the Milky Way Galaxy.

The strength of Earth’s magnetic field affects the amount of cosmic rays entering the atmosphere. A stronger magnetic field deflects more cosmic rays away from Earth. Overall, the energy of Earth’s magnetic



The strength of Earth’s magnetic field affects carbon dating.

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4. Tree ring dating (dendrochronology) has been used in an attempt to extend the calibration of carbon-14 dating earlier than historical records allow, but this depends on temporal placement of fragments of wood (from long-dead trees) using carbon-14 dating, assuming a more-or-less straight-line extrapolation backwards. Then cross-matching of ring patterns is used to calibrate the carbon ‘clock’—a circular process which does not give an independent calibration of the carbon dating system.

field has been decreasing,⁵ so more ^{14}C is being produced now than in the past. This will make old things look older than they really are.

Also, the Genesis Flood would have greatly upset the carbon balance. The Flood buried a huge amount of carbon, which became coal, oil, etc., lowering the total ^{12}C in the biosphere (including the atmosphere—plants regrowing after the Flood absorb CO_2 which is not replaced by the decay of the buried vegetation).⁶ Total ^{14}C is also proportionately lowered at this time, but whereas no terrestrial process generates any more ^{12}C , ^{14}C is continually being produced, and at a rate which does not depend on carbon levels (it comes from nitrogen). Therefore the ^{14}C level *relative to ^{12}C* increases after the Flood. So the $^{14}\text{C}/^{12}\text{C}$ ratio in plants/animals/the atmosphere before the Flood had to be lower than what it is now.

Unless this effect (which is additional to the magnetic field issue just discussed) were corrected for, carbon dating of fossils formed in the Flood would give ages much older than the true ages.

Creationist researchers have suggested that dates of 35,000–45,000 years should be recalibrated to the biblical date for the Flood.⁷ Such a recalibration makes sense of anomalous data from carbon dating—for example, very discordant ‘dates’ for different parts of a frozen musk ox carcass from Alaska and an inordinately slow rate of accumulation of ground sloth dung pellets in the older layers of a cave where the layers were carbon dated.⁷

Also, volcanoes emit much CO_2 depleted in ^{14}C . Since the Flood was accompanied by much volcanism (see Chapters 10, 11, 12, and 17), fossils formed in the early post-Flood period would give radiocarbon ages older than they really are.

In summary, the carbon-14 method, when corrected for the effects of the Flood, can give useful results, but needs to be applied carefully. It does not give dates of millions of years and when corrected properly fits well with the biblical Flood (figure 3).

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5. McDonald, K.L. and Gunst, R.H., An analysis of the earth’s magnetic field from 1835 to 1965, *ESSA Technical Report IER 46-IES*, US Government Printing Office, p. 14, 1965.
 6. Taylor, B.J., Carbon dioxide in the antediluvian atmosphere, *Creation Research Society Quarterly* **30**(4):193–197, 1994.
 7. Brown, R.H., Correlation of C-14 age with real time, *Creation Research Society Quarterly* **29**(1):45–47, 1992. Musk ox muscle was dated at 24,000 years, but hair was dated at 17,000 years. Corrected dates bring the difference in age approximately within the lifespan of a musk ox. With sloth cave dung, standard carbon dates of the lower layers suggested less than 2 pellets per year were produced by the sloths. Correcting the dates increased the number to a more realistic 1.4 per day.

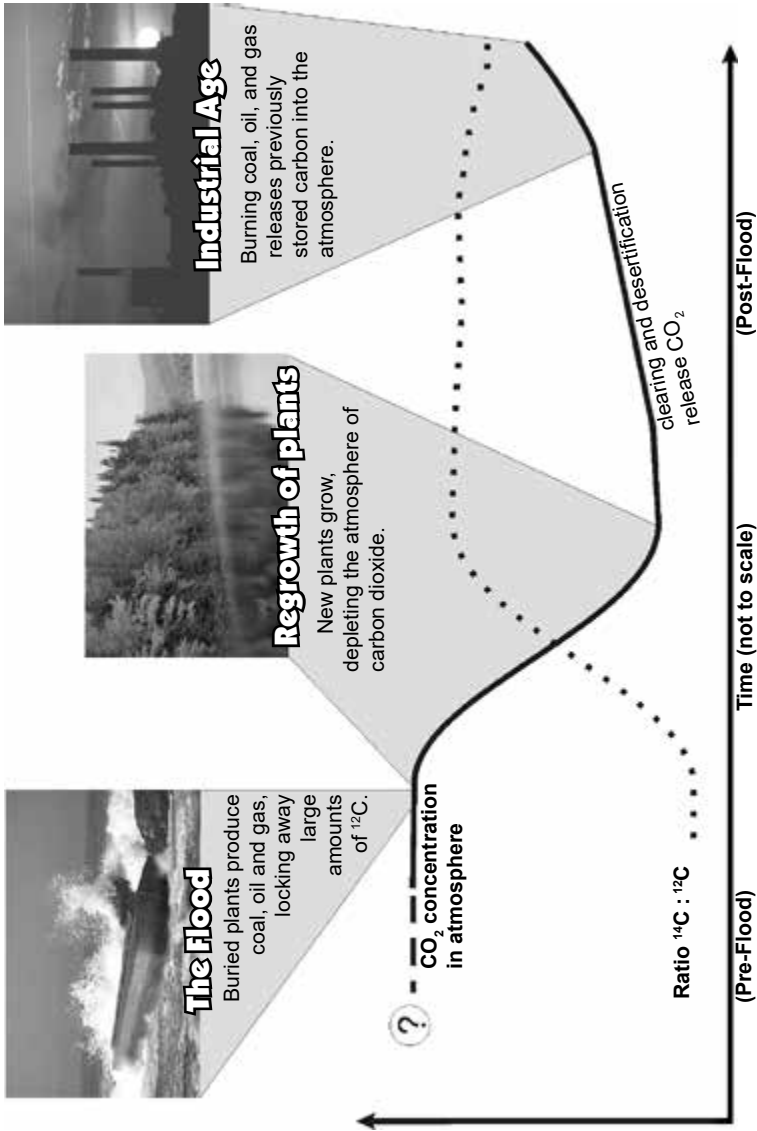
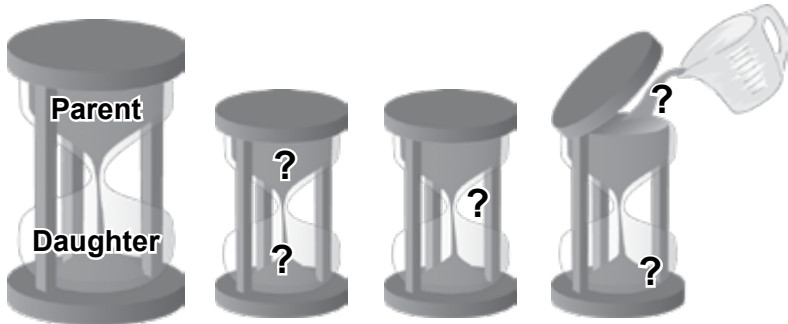


Figure 3. Likely effect of the Flood and man's activities on carbon isotopes, which affect carbon dating



The hourglasses represent radiometric dating. It is assumed that we know the amount of parent and daughter elements in the original sample, the rate of decay is constant, and no parent or daughter material has been added or removed.

Other radiometric dating methods

There are various other radiometric dating methods used today to give ages of millions or billions of years for rocks. These techniques, unlike carbon dating, mostly use the relative concentrations of parent and daughter products in radioactive decay chains. For example, potassium-40 decays to argon-40, uranium-238 decays to lead-206 via other elements like radium, uranium-235 decays to lead-207, rubidium-87 decays to strontium-87, etc. These techniques are applied to igneous rocks, and are normally seen as giving the time since solidification.

The isotope concentrations can be measured very accurately, but isotope concentrations are not dates. To derive ages from such measurements, unprovable assumptions have to be made (see hourglass diagram above) such as:

1. The starting conditions are known (for example, that there was no daughter isotope present at the start, or that we know how much was there).
2. Decay rates have always been constant.
3. Systems were closed or isolated so that no parent or daughter isotopes were lost or added.

Isotope concentrations, or ratios, can be measured very accurately, but isotope concentrations, or ratios, are not dates.

There are patterns in the isotope data

There is plenty of evidence that the radioisotope dating systems are not the infallible techniques many think, and that they are not measuring millions of years. However, there are still patterns to be explained. For example, deeper rocks often tend to give older ‘ages’. Creationists agree that the deeper rocks are generally older, but not by millions of years. Geologist John Woodmorappe, in his devastating critique of radioactive dating,⁸ points out that there are other large-scale trends in the rocks that have nothing to do with radioactive decay.

‘Bad’ dates?

When a ‘date’ differs from that expected, researchers readily invent excuses for rejecting the result. The common application of such posterior reasoning shows that radiometric dating has serious problems. Woodmorappe cites hundreds of examples of excuses used to explain ‘bad’ dates.⁸

For example, researchers applied posterior reasoning to the dating of *Australopithecus ramidus* fossils.⁹ Most samples of basalt closest to the fossil-bearing strata gave dates of about 23 Ma (*Mega annum*, million years) by the argon-argon method. The authors decided that was ‘too old’, according to their beliefs about the place of the fossils in the evolutionary grand scheme of things. So they looked at some basalt further removed from the fossils and selected 17 of 26 samples to get an acceptable maximum age of 4.4 Ma. The other nine samples again gave much older dates but the authors decided they must be contaminated, and discarded them. That is how radiometric dating works. It is very much driven by the existing long-age worldview that pervades academia today.

A similar story surrounds the dating of the primate skull known as KNM-ER 1470.¹⁰ This started with an initial 212 to 230 Ma, which, **according to the fossils**, was considered way off the mark (humans ‘weren’t around then’). Various other attempts were made to date the volcanic rocks in the area. Over the years an age of 2.9 Ma was settled upon because of the agreement between several different published studies (although the studies involved selection of ‘good’ from ‘bad’ results, just like *Australopithecus ramidus*).

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8. Woodmorappe, J., *The Mythology of Modern Dating Methods*, Institute for Creation Research, US, 1999; creation.com/mmdm.
 9. WoldeGabriel, G. *et al.*, Ecological and temporal placement of early Pliocene hominids at Aramis, Ethiopia, *Nature* **371**(6495):330–333, 1994.
 10. Lubenow, M., The pigs took it all, *Creation* **17**(3):36–38, 1995; creation.com/pigstook.

However, preconceived notions about human evolution could not cope with a skull like 1470 being ‘that old’. A study of pig fossils in Africa readily convinced most anthropologists that the 1470 skull was much younger. After this was widely accepted, further studies of the rocks brought the radiometric age down to about 1.9 Ma—again several studies ‘confirmed’ *this* date. Such is the dating game.

Are we suggesting that evolutionists are conspiring to massage the data to get the answers they want? No, not generally. It is simply that all observations must fit the prevailing paradigm. The paradigm, or belief system, of molecules-to-man evolution over eons of time is so strongly entrenched it is not questioned—it is a ‘fact’. So every observation *must* fit this paradigm.¹¹ Unconsciously, the researchers, who are supposedly ‘objective scientists’ in the eyes of the public, select the observations to fit the basic belief system.

We must remember that the past is not open to the normal processes of experimental science; that is, repeatable experiments in the present. A scientist cannot do experiments on events that happened in the past. Scientists do not measure the age of rocks, they measure isotope concentrations, and these can be measured extremely accurately. However, the ‘age’ is calculated using assumptions about the past that cannot be proven.

We should remember God’s admonition to Job, “*Where were you when I laid the foundations of the earth?*” (Job 38:4).

Those involved with unrecorded history gather information in the present and construct stories about the past. The level of proof demanded for such stories seems to be much less than for studies in the empirical sciences, such as physics, chemistry, molecular biology, physiology, etc.

Williams, an expert in the environmental fate of radioactive elements, identified 17 flaws in the isotope dating reported in just three widely respected seminal papers that supposedly established the age of the Earth at 4.6 billion years.¹² John Woodmorappe has produced an incisive critique of these dating methods. He exposes hundreds of myths that have grown up around the techniques. He shows that the few ‘good’ dates left after the ‘bad’ dates are filtered out could easily be explained as fortunate coincidences.

11. Reed, J.K., *Rocks Aren’t Clocks: A critique of the geologic time scale*, Creation Book Publishers, US, 2013; creation.com/rac.

12. Williams, A.R., Long-age isotope dating short on credibility, *Journal of Creation* 6(1):2–5, 1992; creation.com/isotope-dating.

What date would you like?

The forms issued by radioisotope laboratories for submission with samples to be dated commonly ask how old the sample is expected to be. Why? If the techniques were absolutely objective and reliable, such information should not be necessary. Presumably the laboratories know that anomalous dates are common, so they need some check on whether they have obtained a ‘good’ date.

Testing radiometric dating methods

If the long-age dating techniques were really objective means of finding the ages of rocks, they should work in situations where we know the age. Furthermore, different techniques should consistently agree with one another.

Methods should work reliably on things of known age

There are many examples where the dating methods give ‘dates’ that are wrong for rocks of known age. One example is K-Ar ‘dating’ of five historical andesite lava flows from Mt Ngauruhoe in New Zealand. Although one lava flow occurred in 1949, three in 1954, and one in 1975, the ‘dates’ ranged from less than 0.27 to 3.5 Ma.¹³

Again, using hindsight, it is argued that ‘excess’ argon from the magma (molten rock) was retained in the rock when it solidified. The secular scientific literature lists many examples of excess argon causing dates of millions of years in rocks of known historical age.¹⁴ This excess appears to have come from the upper mantle, below Earth’s crust. This is consistent with a young world—the argon has had too little time to escape.¹⁵ If excess argon can cause exaggerated dates for rocks of **known** age, then why should we trust the method for rocks of **unknown** age?

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13. Snelling, A.A., The cause of anomalous potassium-argon ‘ages’ for recent andesite flows at Mt. Ngauruhoe, New Zealand, and the implications for potassium-argon ‘dating’, *Proc. 4th ICC*, pp. 503–525, 1998.
 14. Williams, 1992, lists many instances. For example, six cases were reported by Krummenacher, D., Isotopic composition of argon in modern surface volcanic rocks, *Earth and Planetary Science Letters* **8**(2):109–117, 1970; five were reported by Dalrymple, G.B., ⁴⁰Ar/³⁶Ar analyses of historic lava flows, *Earth and Planetary Science Letters* **6**(1):47–55, 1969. A large excess was reported in Fisher, D.E., Excess rare gases in a subaerial basalt from Nigeria, *Nature Physical Science* **232**(29):60–61, 1971.
 15. Snelling, p. 520, 1998.



Lava flows of known age often give wrong radioisotope dates.

Other techniques, such as the use of isochrons,¹⁶ make different assumptions about starting conditions, but there is a growing recognition that such ‘fool-proof’ techniques can also give ‘bad’ dates. So data are again selected according to what the researcher already believes about the age of the rock.

Geologist Dr Steve Austin sampled basalt from the base of the Grand Canyon strata and from lava that spilled over the edge of the canyon.¹⁷ By evolutionary reckoning, the latter should be a billion years younger than the basalt from the bottom. Standard laboratories analyzed the isotopes. The rubidium-strontium isochron technique suggested that the recent lava flow was 270 Ma *older* than the basalts beneath the Grand Canyon—an impossibility.

Different dating techniques should consistently agree

If the dating methods are an objective and reliable means of determining ages, they should agree. If a chemist were measuring the sugar content of blood, all valid methods for the determination would give the same answer (within the limits of experimental error). However, with radiometric dating, the different techniques often give quite different results.

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16. The isochron technique involves collecting a number of rock samples from different parts of the rock unit being dated. The concentration of a parent radioactive isotope, such as rubidium-87, is graphed against the concentration of a daughter isotope, such as strontium-87, for all the samples. A straight line is drawn through these points, representing the ratio of the parent:daughter, from which a ‘date’ is calculated. If the line is of good fit and the ‘age’ is acceptable it is considered a ‘good’ date. The method involves dividing both the parent and daughter concentrations by the concentration of a similar stable isotope—in this case, strontium-86.
 17. Austin, S.A. (Ed.), *Grand Canyon: Monument to Catastrophe*, Institute for Creation Research, US, pp. 120–131, 1994; creation.com/monument.

In the study of Grand Canyon rocks by Austin, different techniques gave different results (see Table below). Again all sorts of reasons can be suggested for the ‘bad’ dates, but this is again posterior reasoning. Techniques that give results that can be dismissed just because they don’t agree with what we already believe cannot be considered objective.

In Australia, some wood found in Tertiary basalt was clearly buried in the lava flow that formed the basalt, because the wood was charred from contact with the hot lava. The wood was ‘dated’ by radiocarbon (^{14}C) analysis at about 45,000 years old, but the basalt was ‘dated’ by the potassium-argon method at 45 million years old!¹⁸

Method	'Age'
Six potassium-argon model ages	10,000 years to 117 Ma
Five rubidium-strontium ages	1,270–1,390 Ma
Rubidium-strontium isochron	1,340 Ma
Lead-lead isochron	2,600 Ma

Radiometric ‘ages’, using different methods, for basaltic rocks most geologists accept as only thousands of years old, from the Uinkaret Plateau of the Grand Canyon (Ma = millions of years)¹⁹

Isotope ratios of uraninite crystals from the Koongarra uranium body in the Northern Territory of Australia gave lead-lead isochron ages of 841 ± 140 Ma.²⁰ This contrasts with an age of 1,550–1,650 Ma based on other isotope ratios,²¹ and ages of 275, 61, 0, 0, and 0 Ma from thorium/lead ($^{232}\text{Th}/^{208}\text{Pb}$) ratios in five uraninite grains.²² The latter figures are significant because thorium-derived dates should be the more reliable, since thorium is less mobile than the uranium minerals that are the parents of the lead isotopes in the lead-lead system.²³ The ‘zero’ ages in this case are consistent with the Bible.

More evidence something is wrong

^{14}C in fossils supposedly millions of years old

Fossils older than 100,000 years should have too little ^{14}C to measure, but dating labs consistently find ^{14}C , well above background levels, in fossils

18. Snelling, A.A., Radiometric ‘dating’ in conflict! *Creation* 20(1):24–27, 1997; creation.com/basalt-wood.

19. Austin, 1994.

20. Snelling, A.A., The failure of U-Th-Pb ‘dating’ at Koongarra, Australia, *Journal of Creation* 9(1):71–92, 1995; creation.com/koongarra.

21. Maas, R., Nd-Sr isotope constraints on the age and origin of unconformity-type uranium deposits in the Alligator Rivers uranium field, Northern Territory, Australia, *Economic Geology* 84(1):64–90, 1989.

22. Snelling, 1995.

23. Snelling, 1995.

supposedly many *millions* of years old.^{24,25} For example, no source of coal has been found that lacks ¹⁴C, yet this fossil fuel supposedly ranges up to hundreds of millions of years old. Fossils in rocks dated at 1–500 Ma by long-age radioisotope dating methods gave an average radiocarbon ‘age’ of about 50,000 years, much less than the limits of modern carbon dating²⁶ (see earlier in this Chapter for why even these ages are inflated). Furthermore, there was no pattern of younger to older in the carbon dates that correlated with the evolutionary/uniformitarian ‘ages’.²⁷

This evidence is consistent with the fossil-bearing rock layers being formed in the year-long global catastrophe of the biblical Flood, as flood geologists since Nicholas Steno (1631–1687) have recognized.

Even Precambrian (‘older than 545 Ma’) graphite, which is not of organic origin, contains ¹⁴C above background levels.²⁸ This is consistent with Earth itself being only thousands of years old, as a straightforward reading of the Bible would suggest.

It is an unsolved mystery to evolutionists as to why coal has ¹⁴C in it,²⁹ or wood supposedly many millions of years old still has ¹⁴C present, but it makes perfect sense in a creationist worldview.

Many physical evidences contradict the ‘billions of years’.

Of the methods that have been used to estimate the age of Earth, 90% point to an age far less than the billions of years asserted by evolutionists. A few of them:

- Evidence for rapid formation of geological strata, as in the biblical Flood. Some of the evidences are: lack of erosion between rock layers supposedly separated in age by many millions of years; lack of disturbance of rock strata by biological activity (worms, roots, etc.); lack of soil layers; polystrate fossils (which traverse several rock layers vertically—these could not have stood vertically for eons of time while they slowly got buried); thick layers of ‘rock’ bent without fracturing, indicating that the rock was all soft when bent; and more. See Chapter 15 and books by geologists Morris³⁰ and Austin.³¹

24. Giem, P., Carbon-14 content of fossil carbon, *Origins* 51:6–30, 2001; grisda.org/origins-51006.

25. Baumgardner, J.R., Snelling, A.S., Humphreys, D.R. and Austin, S.A., Measurable ¹⁴C in fossilized organic materials: confirming the young earth creation-flood model, *Proc. 5th ICC*, pp. 127–142, 2003.

26. Baumgardner *et al.*, 2003

27. Baumgardner *et al.*, 2003

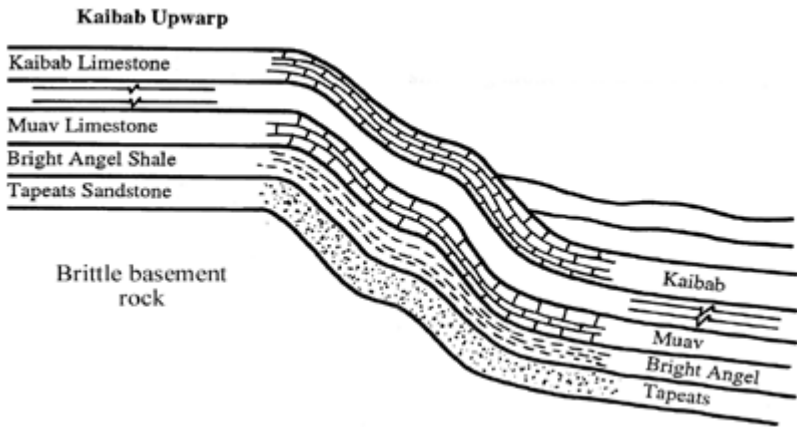
28. Baumgardner *et al.*, 2003

29. Lowe, D.C., Problems associated with the use of coal as a source of ¹⁴C-free background material, *Radiocarbon* 31(2):117–120, 1989.

30. Morris, J., *The Young Earth*, Master Books, US, 2007; creation.com/tye.

31. Austin, 1994.

- Red blood cells, proteins, DNA, and carbon-14 have been found in dinosaur bone. None of these should be present if the bones are over 65 million years old (according to evolutionary dating).³²
- Earth's magnetic field has been decaying so fast that it looks like it is less than 10,000 years old. Rapid reversals during the Flood year and fluctuations shortly after would have caused the field energy to drop even faster.^{33,34}



Cross-section of Grand Canyon geology showing the Kaibab Upwarp. Plastic folding of strata shows that the layers were still soft when bent, consistent with them all being laid down quickly—as in Noah's Flood (after Morris³⁵)—not over hundreds of millions of years.

- A supernova is an explosion of a massive star—the explosion briefly outshines the rest of the galaxy. Supernova remnants (SNRs) should keep expanding for hundreds of thousands of years, according to the physical equations. Yet there are no very old, widely expanded (Stage 3) SNRs, and few moderately old (Stage 1) ones in our galaxy, the Milky Way, or in its satellite galaxies, the Magellanic Clouds. This is just what we would expect for 'young' galaxies that have not existed long enough for wide expansion.^{36,37}

32. Catchpoole, D., Double-decade dinosaur disquiet, *Creation* **36**(1):12–14, 2014; creation.com/dino-disquiet.

33. Humphreys, D.R., Reversals of the earth's magnetic field during the Genesis Flood, *Proc. 1st ICC* **2**:113–126, 1986.

34. Sarfati, J., The earth's magnetic field: evidence that the earth is young, *Creation* **20**(2):15–17, 1998; creation.com/magfield.

35. Morris, 2007.

36. Davies, K., Distribution of supernova remnants in the galaxy, *Proc. 3rd ICC*, pp. 175–184, 1994.

37. Sarfati, J., Exploding stars point to a young universe, *Creation* **19**(3):46–48, 1997; creation.com/snr.

- Continents erode so rapidly that they should have worn away completely many times over in billions of years.³⁸ The problem is more acute in mountainous regions, and there are also huge plains that are supposedly very old with hardly any erosion. The average height reduction for all the continents of the world is about 6.0 mm (0.24 inches) per 100 years.³⁹ A height of 150 kilometres (93 miles) of continent would have eroded in 2.5 billion years (the uniformitarian age of the cores of the continents). If erosion had been going on for billions of years, no continents would remain on Earth. For example, North America should have been levelled in just 10 million years if erosion has happened at the average rate. Note that this is an upper age limit, not an actual age.
- Salt is entering the sea much faster than it is escaping. The sea is not nearly salty enough for this to have been happening for billions of years. Even granting generous assumptions to evolutionists, such as the sea having no salt to start with, the sea could not be more than 62 Ma old—far younger than the billions of years believed by evolutionists. Again, this indicates a maximum age, not the actual age.^{40,41}

Dr Russell Humphreys gives other processes inconsistent with billions of years in the booklet *Evidence for a Young World*.

However, creationists cannot prove the age of Earth using a particular scientific method, any more than evolutionists can. They realize that all science is tentative because we do not have all the data, especially when dealing with the past. This is true of both creationist and evolutionist scientific arguments—evolutionists have had to abandon many ‘proofs’ for evolution just as creationists have also had to modify their arguments. The atheistic evolutionist W.B. Provine admitted: “Most of what I learned of the field [evolutionary biology] in graduate (1964–68) school is either wrong or significantly changed.”⁴²

38. Walker, T., Eroding ages, *Creation* **22**(2):18–21, 2000; creation.com/erosion.

39. Roth, A., *Origins: Linking Science and Scripture*, Review and Herald Publishing, US, p. 271, 1998, cites Dott and Batten, *Evolution of the Earth*, McGraw-Hill, US, p. 155, 1988, and a number of others.

40. Austin S.A. and Humphreys, D.R., The sea’s missing salt: a dilemma for evolutionists, *Proc. 2nd ICC* **2**:17–33, 1990.

41. Sarfati, J., Salty seas: Evidence for a young earth, *Creation* **21**(1):16–17, 1998; creation.com/salty.

42. A review of *Teaching about Evolution and the Nature of Science* (National Academy of Science US, 1998) by Dr Will B. Provine; fp.bio.utk.edu/darwin/NAS_guidebook/provine_1.html, 1998; available via web.archive.org.

Creationists understand the limitations of dating methods better than evolutionists who claim that they can use processes observed in the present to ‘prove’ that Earth is billions of years old. In reality, all dating methods, including those that point to a young Earth, rely on unprovable assumptions.

Creationists ultimately date Earth historically using the chronology of the Bible. This is because they believe that this is an accurate eyewitness account of world history, which bears the evidence within it that it is the Word of God, and is therefore totally reliable and error-free (see Chapter 1 for some of the evidences).

Orphan radiohalos

Decaying radioactive particles in solid rock cause spherical zones of damage in the surrounding crystal structure. A speck of radioactive element such as uranium-238, for example, will leave a sphere of discoloration of characteristically different radius for each element it produces in its decay chain to lead-206.⁴³ Viewed in cross-section with a microscope, these spheres appear as rings called radiohalos. Dr Gentry has researched radiohalos for many years, and published his results in leading scientific journals.⁴⁴

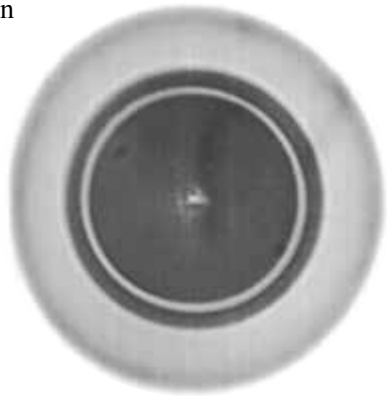


Photo by Robert Gentry

A concentric series of radiohalos

Some of the intermediate decay products—such as the polonium isotopes—have very short half-lives (they decay quickly). For example, ²¹⁴Po has a half-life of just 164 microseconds. Curiously, rings created by polonium decay are often found without the parent uranium halos. Now, the polonium has to get into the rock before the rock solidifies, but it cannot derive from a uranium speck in the solid rock, otherwise there would be a uranium halo. This suggests the rock formed *very* quickly.⁴⁵ There possibly also had to be a period of rapid decay of uranium to

43. Only those that undergo alpha decay (releasing a helium nucleus) produce a halo.

44. Gentry, R.V., *Creation's Tiny Mystery*, Earth Science Associates, US, 1986 (see references therein).

45. Snelling, A.A. and Armitage, M.H., Radiohalos—a tale of three granitic plutons, *Proc. 5th ICC*, pp. 243–267, 2003.

produce the amount of polonium that is seen. Orphan halos speak of conditions in the past that do not fit with the uniformitarian view of Earth history, which is the basis of the radiometric dating systems.

Do radiometric ‘dates’ have any meaning?

Geologist John Woodmorappe, after analyzing 500 papers published on radioisotope dating, concluded that isotope dating was rife with circular reasoning, and story telling to fit the preconceived ideas of the researchers.⁴⁶

The isochron dating technique was once thought to be infallible because it supposedly covered the assumptions about starting conditions and closed systems.⁴⁷ Geologist Dr Andrew Snelling reported on ‘dating’ of the Koongarra uranium deposits in the Northern Territory of Australia, primarily using the lead-lead isochron method.⁴⁸ He found that even 113 highly weathered soil samples from the area, which are definitely not closed systems (leaching of parent and daughter isotopes would invalidate the ‘dates’), gave a very nice looking ‘isochron’ line with an ‘age’ of $1,445 \pm 20$ Ma. Other methods gave ‘ages’ ranging from even higher to all the way down to zero years.

Such ‘false isochrons’ are so common that a whole terminology has grown up to describe them, such as apparent isochron, mantle isochron, pseudoisochron, secondary isochron, inherited isochron, erupted isochron, mixing line and mixing isochron. Zheng wrote:

“... some of the basic assumptions of the conventional Rb-Sr [rubidium-strontium] isochron method have to be modified and an observed isochron does not certainly define valid age information for a geological system, even if a goodness of fit of the experimental results is obtained in plotting $^{87}\text{Sr}/^{86}\text{Sr}$ against $^{87}\text{Rb}/^{86}\text{Sr}$. This problem cannot be overlooked, especially in evaluating the numerical time scale. Similar questions can also arise in applying Sm-Nd [samarium-neodymium] and U-Pb [uranium-lead] isochron methods.”⁴⁹

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46. Woodmorappe, J., *The Mythology of Modern Dating Methods*, Institute for Creation Research, US, 1999; creation.com/mmdm.
47. Snelling, A.A., Isochron discordances and the role of inheritance and mixing of radioisotopes in the mantle and crust; in: Vardiman, L. et al. (Eds.), *Radioisotopes and the Age of the Earth Vol. II*, ICR, US and CRS, US, pp. 393–524, 2005.
48. Snelling, A.A., The failure of U-Th-Pb ‘dating’ at Koongarra, Australia, *Journal of Creation* 9(1):71–92, 1995; creation.com/koongarra.
49. Zheng, Y.F., Influences of the nature of initial Rb-Sr system on isochron validity, *Chemical Geology* 80(1):1–16, 1989; p. 14.

Even with ‘isochrons’, part of the isochron line is interpreted as not being due to age—how can one part of the line be attributed to age but the other part of the same line be ignored as irrelevant where it cannot be due to age? Furthermore, even non-radioactive elements will give nice straight lines when ratios of concentrations are plotted.⁵⁰ Clearly, such patterns are not due to age at all.

Another popular dating method is the uranium-lead concordia technique. This effectively combines the two uranium-lead decay series into one diagram. Results that lie on the curve have the same ‘age’ according to the two lead series and are called ‘concordant’. However, the results from zircons, for example, generally lie off the concordia curve—they are discordant (disagree). Numerous models, or stories, have been developed to explain such inconsistent data.⁵¹ However, such story-telling is not objective science that proves an old Earth.

Dr Snelling has suggested that fractionation (sorting) of elements in the molten state in Earth’s mantle could be a significant factor in explaining the ratios of isotope concentrations, which are interpreted as ages. This would also explain the prevalence of ‘false isochrons’. But how does a geologist tell a false isochron from a ‘good’ one? Results that agree with accepted ages are considered ‘good’. This is circular reasoning and very bad science.

As long ago as 1966, Nobel Prize nominee Melvin Cook, Professor of Metallurgy at the University of Utah, pointed out evidence that lead isotope ratios, for example, may involve alteration by important factors other than radioactive decay.⁵² Cook noted that in ores from the Katanga mine there was an abundance of lead-208, a stable isotope, but no thorium-232 as a source of lead-208. Thorium has a long half-life (decays very slowly) and is not easily leached out of the rock, so if the lead-208 came from thorium decay, some thorium should still be there. Cook suggested that perhaps the lead-208 came about by neutron capture conversion of lead-206 to lead-207 to lead-208. However, a period of rapid radioactive decay could also explain the data (see below). In either case the data are consistent with an age of thousands of years, not millions of years.

50. Walker, T., The Somerset Dam igneous complex, south-east Queensland, Honours thesis [1st class Honours or *Summa cum laude* awarded], Department of Earth Sciences, University of Queensland, 1998.

51. Gebauer, D. and Grunfelder, M., U-Th-Pb dating of minerals; in: Jager, E. and Hunziker, J.C. (Eds.), *Lectures in Isotope Geology*; Springer Verlag, US, pp. 105–131, 1979.

52. Cook, M.A., *Prehistory and Earth Models*, Max Parrish, UK, 1966.

Helium and heat: evidence for non-constant decay rates

Physicist Dr Robert Gentry has pointed out that the amount of helium (helium derives from the decay of radioactive elements, such as uranium) in zircons from deep (hot) bores is not consistent with an evolutionary age of 1,500 Ma for the granite rocks in which they are found.⁵³ The amount of lead corresponds with current rates of decay of uranium acting over the assumed timescale, but almost all the helium formed should have diffused out of the crystals in that time.

The diffusion rates of helium have now been measured and they are very high (100,000 times greater than evolutionary geologists had assumed), so the helium should not be there if the radioactive decay had been going on at present rates for the eons of time claimed by uniformitarians.⁵⁴ Indeed, modelling of the diffusion indicates that the ‘1.5 billion years’ worth of radioactive decay occurred, but the rate of helium leakage dates these ‘billion-year-old’ zircons at $5,700 \pm 2,000$ years.⁵⁵

Research on the concentration and diffusion rates of argon, another product of radioactive decay, agree with the helium data, giving independent confirmation.⁵⁶

The only sensible explanation for this is that there has been a period of accelerated radioactive decay several thousand years ago. Whatever caused such elevated rates of decay may also have been responsible for the lead isotope anomalies documented by Cook (above).

A period of accelerated decay would also solve the puzzle of the amount of heat emanating from Earth—an amount consistent with the amount of radioactive decay that has occurred, but not with a billions of years timescale.⁵⁷

So, evidence is mounting to suggest a period of rapid radioactive decay in the past, just thousands of years ago.

Interestingly, the accelerated decay seems to have affected the longest

53. Gentry, 1986.

54. Humphreys, D.R., Austin, S.A., Baumgardner, J.R. and Snelling, A.A., Helium diffusion rates support accelerated nuclear decay, *Proc. 5th ICC*, pp. 175–195, 2003.

55. Humphreys *et al.*, 2003, and Humphreys, D.R., Helium evidence for a young world continues to confound critics, creation.com/helium-critics, 29 November 2008.

56. Humphreys, D.R., Argon diffusion data support RATE’s 6,000-year helium age of the earth, *Journal of Creation* **25**(2):74–77, 2011; creation.com/argon-diffusion-age.

57. Baumgardner, J., Distribution of radioactive isotopes in the earth, ch. 3; in: Vardiman, L., Snelling, A.A. and Chaffin, E.F. (Eds.), 2000, *Radioisotopes and the Age of the Earth*, Institute for Creation Research, US.

half-life isotopes most, and particularly those involving alpha-decay.⁵⁸

Conclusions

There are many lines of evidence that the radiometric dates are not the objective evidence for an old Earth that many claim, and that the world is really only thousands of years old. Although we don't have all the answers, we have lots of answers, and we do have the sure testimony of the Word of God to the true history of the world.

58. Vardiman, L., Austin, S.A., Baumgardner, J.R., Chaffin, E.F., DeYoung, D.B., Humphreys, D.R. and Snelling, A.A., Radioisotopes and the age of the earth, *Proc. 5th ICC*, pp. 337–348, 2003.