



THE BIBLE AND SCIENCE

The Rocks Cry Out: Geology

AND GOD SAID, "LET THERE BE LIGHT," AND THERE WAS LIGHT. 4 GOD SAW THAT THE LIGHT WAS GOOD, AND HE SEPARATED THE LIGHT FROM THE DARKNESS. 5 GOD CALLED THE LIGHT "DAY," AND THE DARKNESS HE CALLED "NIGHT." AND THERE WAS EVENING, AND THERE WAS MORNING—THE FIRST DAY.

The Rocks Cry Out: Geology

Geology's Rocky Start

Geology is the scientific study of the Earth, its materials, processes, and history. It encompasses a wide range of disciplines, including the study of rocks, minerals, landforms, and the planet's structure. Geologists investigate how the Earth has changed over time, the forces that shape it, and the resources it provides.

Like other areas of science, Geology is comprised of many diverse but related disciplines. These disciplines span the spectrum from what we have referred to in this class as operational science to historical science.¹ Some of the key disciplines are:

- Physical Geology: Focuses on the physical features of the Earth, such as mountains, valleys, and rivers, and the processes that create them.
- Historical Geology: Studies the Earth's history, including the evolution of life and the changing environment over time.
- Mineralogy: The study of minerals, their composition, and properties.
- Petrology: The study of rocks, their formation, and composition.
- Stratigraphy: The study of layered rocks and their relationships to each other.
- Sedimentology: The study of sediments and sedimentary rocks.
- Paleontology: The study of fossils and past life forms.
- Geochemistry: The study of the chemical composition of the Earth.
- Geophysics: The study of the Earth's physical properties and processes.

While the study of the Earth and its materials in some form may be traced back to the Greeks in the 3rd and 4th centuries B.C. with a few additional developments punctuating the next thousand years or so, the term geology wasn't really used until 1603. Some hundred years later, James Hutton (1726–1797) is recognized as the first modern geologist. Hutton was a Scottish farmer and naturalist. If you look up Hutton's biography in curriculum recommended by the American Museum of Natural History, you'll read that,

In the late eighteenth century, when Hutton was carefully examining the rocks, it was generally believed that Earth had come into creation only around six thousand years earlier (on October 22, 4004 B.C., to be precise, according to the seventeenth century scholarly analysis of the Bible by Archbishop James Ussher of Ireland), and that fossils were the remains of animals that had perished during the Biblical flood.²

¹ <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/geology>

² <https://www.amnh.org/learn-teach/curriculum-collections/earth-inside-and-out/james-hutton>

But being a naturalist, Hutton was interested in explanations of what we currently observe in our study of the Earth that were supportive of his naturalist philosophy and didn't require the widely held model of biblical catastrophism. He proposed two key concepts upon which a new model could be established: the effects of subterranean heat (volcanism) and what he called the "Theory of Uniformitarianism".³ The Theory of Uniformitarianism is "the belief that geological forces at work in the present day—barely noticeable to the human eye, yet immense in their impact—are the same as those that operated in the past."⁴

At this time, geology was not widely embraced as a science on par with other fields of science. It was perceived as more like story-telling about the past rather than a hard science based on objective research done in the laboratory.

Hutton's ideas about uniformitarianism and Earth's age were not well received by the scientific community of his time. His ideas were falling into obscurity when Charles Lyell, a British lawyer and geologist (1797-1875), wrote the *Principles of Geology* in the early 1830s and later, *Elements of Geology*. Lyell's books promoted Hutton's principle of uniformitarianism, his studies of rocks and the processes that formed them, and the idea that Earth was possibly over 300 million years old. Lyell and his three-volume *Principles of Geology* had a lasting influence on the geologic community and public at large, who eventually accepted uniformitarianism and millionfold age for the Earth. The principle of uniformitarianism became so widely accepted, that geologists regarded catastrophic change as heresy. This made it harder for ideas like the sudden demise of the dinosaurs by asteroid impact to gain traction.⁵

Before we continue considering the impact of the eventual acceptance of Hutton's idea's, note once again the pattern that we've observed several times already in this series. New ideas, well founded or not, often face opposition in science. Another geologic example can be found more recently, in the last century.

It was a century ago this spring [October 2012] that a little-known German meteorologist named Alfred Wegener proposed that the continents had once been massed together in a single supercontinent and then gradually drifted apart. He was, of course, right. Continental drift and the more recent science of plate tectonics are now the bedrock of modern geology, helping to answer vital questions like where to find precious oil and mineral deposits, and

³ Ibid.

⁴ Ibid.

⁵ <https://opengeology.org/textbook/1-understanding-science>

how to keep San Francisco upright. But in Wegener's day, geological thinking stood firmly on a solid earth where continents and oceans were permanent features.

We like to imagine that knowledge advances fact upon dispassionate fact to reveal precise and irrefutable truths. But there is hardly a better example of just how messy and emotional science can be than Wegener's discovery of the vast, turbulent forces moving within the earth's crust. As often happens when confronted with difficult new ideas, the establishment joined ranks and tore holes in his theories, mocked his evidence and maligned his character. It might have been the end of a lesser man, but as with the vicious battles over topics ranging from Darwinian evolution to climate change, the conflict ultimately worked to the benefit of scientific truth.⁶

Whether or not the truth has prevailed in all of the cases named in this citation (Darwinian evolution, climate change), it is clear that trying to get to the truth in science can be messy and is rarely dispassionate. This example was from the early 1900s. "By 1930 [Wegener's] theory had been rejected by most geologists, and it sank into obscurity for the next few decades, only to be resurrected as part of the theory of [plate tectonics](#) during the 1960s."⁷

That citation says, "*As often happens* [emphasis added] when confronted with difficult new ideas, the establishment joined ranks and tore holes in his theories, mocked his evidence and *maligned his character* [emphasis added]." A statement like that from Ken Ham of *Answers in Genesis* would itself likely be dismissed or mocked simply because of the source. But that acknowledgment is from the *Smithsonian Magazine*! For a current example of a noteworthy scientist documenting this tendency in the scientific community, see the video "My dream died, and now I'm here" by renowned theoretical physicist, author, and (more recently) YouTuber Sabine Hossenfelder.⁸

The point is not to depict scientists as being dishonest or malign their character, though that is often how creationist scientists are attacked and dismissed. The point is to underscore the fact that having a worldview and permitting that perspective to be your framework for interpreting observations and evidence, a charge frequently employed in an attempt to discredit creationists, is not unique to creationists. It is true of all scientists because all scientists are humans with worldviews. Science is not something that happens in a laboratory vacuum. Scientific theories are proposed and considered by, rejected or embraced by human beings who bring their

⁶ <https://www.smithsonianmag.com/science-nature/when-continental-drift-was-considered-pseudoscience-90353214>

⁷ <https://www.britannica.com/biography/Alfred-Wegener>

⁸ <https://www.youtube.com/watch?v=LKiBIGDfRU8>

philosophical assumptions and other more mundane human motivations⁹ to their scientific endeavor. As noted in the introduction to this series, science often proceeds “one funeral at a time”. While it is true that creationists have their *a priori* commitment to their worldview that motivates them to seek explanations of the evidence and their observations that are in concert with their preexisting network of beliefs, so does the naturalist. All scientists do.

The Presupposition of Deep Time

Ok, back to the impact of the eventual acceptance of Hutton’s idea’s... he proposed that subterranean heat (volcanism) and the “Theory of Uniformitarianism” could explain the current state of the Earth if there were long eons of time to allow for the gradual changes. We noted that Hutton’s ideas were not well received initially but that Charles Lyell’s three volume work, *Principles of Geology*, a half a century later prevented Hutton’s theories from falling into obscurity. Eventually, that model became the orthodox view and eventually became so widely accepted that any invocation of catastrophe was considered the scientific equivalent of heresy.

The impact of this sea change in geology on other fields of science such as biology cannot be overestimated. As noted in the geology textbook, *An Introduction to Geology*:

A contemporary of Lyell, Charles Darwin (1809-1882) took *Principles of Geology* on his five-year trip on the HMS Beagle. Darwin used uniformitarianism and deep geologic time to develop his initial ideas about evolution. Lyell was one of the first to publish a reference to Darwin’s idea of evolution.¹⁰

The American Museum of Natural History curriculum cited earlier concurs that impact of this this theory (which began as a philosophical assumption) cannot be underestimated:

This means that the rates at which processes such as erosion or sedimentation occur today are similar to past rates, making it possible to estimate the times it took to deposit a sandstone, for example, of a given thickness. It became evident from such analysis that enormous lengths of time were required to account for the thicknesses of exposed rock layers. Uniformitarianism is one of the fundamental principles of earth science. Hutton’s theories amounted to a frontal attack on a popular contemporary school of thought called catastrophism: the belief that only natural catastrophes, such as the Great Flood, could

⁹ See video “I was asked to keep this confidential” by Sabine Hassenfelder in which she shares correspondence from a colleague urging her to cease her public airing of problems in the scientific academy because it is hurting the funding and livelihood of scientists who have families to support.

¹⁰ <https://opengeology.org/textbook/1-understanding-science>

account for the form and nature of a 6,000-year-old Earth. The great age of Earth was the first revolutionary concept to emerge from the new science of geology.¹¹

This shift in Geology in concert with the early developments in cosmology that we have already considered played a critical role in shaping the thinking of naturalists in the early 19th century.

Modern Dating Methods

At the dawn of the 20th century, geological science is said to have taken another giant leap forward due to the development of methods for obtaining precise absolute dates for geological formations using radioactive isotopes. Prior to this, geologists relied solely on fossils and stratigraphic correlation to determine the relative ages of rock sections. However, the advent of isotopic dating enabled the assignment of “absolute ages” to rock units. These absolute dates could then be applied to fossil sequences containing datable material, effectively converting the previously relative ages into absolute ones.¹²

This development is claimed to and popularly understood to remove subjectivity from the dating methods used in geology. However, creationists have made some convincing arguments to the contrary. While there are still patterns to be explained (e.g. creationists tend to agree that deeper rocks are older, just not by millions of years), geologist John Woodmorappe has produced a very technical and devastating critique of radiometric dating.¹³ Chapter 4 of the *The Creation Answers Book*¹⁴ details his findings and other relevant research in this area. What follows are the key concepts from that chapter.

Unprovable Assumptions

There are a variety of radiometric dating methods used today to give ages of millions or billions of years for rocks. These techniques use the relative concentrations of parent and daughter elements 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, *rocks formed by heat*, and are normally seen as giving the time since solidification. The isotope ratios

¹¹ <https://www.amnh.org/learn-teach/curriculum-collections/earth-inside-and-out/james-hutton>

¹² <https://en.wikipedia.org/wiki/Geology>

¹³ Woodmorappe, J., *The Mythology of Modern Dating Methods*, Institute for Creation Research, US, 1999

¹⁴ Don Batten, David Catchpoole, Jonathan Sarfati and Carl Wieland, *The Creation Answers Book*, Eleventh Edition (Creation Ministries International, 2025) 67-86

can be measured very accurately, but isotope concentrations are not dates. To derive ages from such measurements, unprovable assumptions have to be made. Three such assumptions are:

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.

Geologists use a number of techniques to try to ensure that the assumptions they use are correct but the fact remains that they are still unprovable assumptions.

Bad Dates

As you might guess, a process which requires the kind of assumptions mentioned above is sometimes yields “bad dates”. When researchers get results indicating a discordant date outside of the expected range, it is common for them to develop explanations for causes of the out of range date results. The need for this kind of posterior reasoning should be a clue that there are problems with radiometric dating as it is currently understood. The *Creation Answers Book* provides an example of how this posterior reasoning played out in the dating of *Australopithecus ramidus* fossils.¹⁵

Most samples of basalt closest to the fossil-bearing strata gave dates of about 23 Ma 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.¹⁶

The chapter provides another example¹⁷ in which a primate skull began with a date of about 212 to 230 Ma, but the date was discarded because the fossil record indicates that humans weren’t around that long ago. Through a series of attempts at dating other volcanic rocks in the area, a

¹⁵ WoldeGabriel, G. et al., Ecological and temporal placement of early Pliocene hominids at Aramis, Ethiopia, *Nature* 371(6495):330–333, 1994.

¹⁶ Don Batten, David Catchpoole, Jonathan Sarfati and Carl Wieland, *The Creation Answers Book*, Eleventh Edition (Creation Ministries International, 2025) 74

¹⁷ Ibid. 75

date in the range of 2.9 Ma was achieved and eventually that was worked down to 1.9 Ma based on a study of pig fossils¹⁸ and further studies of rocks from the area.

This example doesn't necessarily indicate that the researchers are dishonest but it highlights once again that the researcher's paradigm constrains their understanding and interpretation of the evidence. "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."¹⁹

What Date Would You Like?

The subjectivity of these dating methods is not just an inference made by creationist apologists like myself. It is readily acknowledged by the experts in a few ways. First, the submission forms issued by radiometric dating labs often include a question in the section asking for details about the sample to be tested that asks how for the expected age range from the submitter.²⁰ This question is used to "calibrate" the tests and rule out the "bad" ages and identify the "good" ones from among the results. Imagine visiting the lab at your local hospital to get bloodwork for a lipid profile your doctor prescribed. What would you think if they asked you to fill out a form before the blood draw that asked you to tell them what *you* thought your cholesterol numbers were so that they could rule out the "bad" numbers and keep the "good" ones? You would probably consider finding a different lab.

Second, the more rigorous version of radiometric dating which uses isochrons is so prone to yielding "bad" dates 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."²¹ If the methods used for dating rocks were objective and reliable, it should not be necessary to "calibrate" the results with the *a priori* assumptions of the inquirer and select from among the categories of exceptions to explain away undesirable results.

¹⁸ Lubenow, M., The pigs took it all, *Creation* 17(3):36–38, 1995; creation.com/pigstook.

¹⁹ Don Batten, David Catchpoole, Jonathan Sarfati and Carl Wieland, *The Creation Answers Book*, Eleventh Edition (Creation Ministries International, 2025) 75

²⁰ See sample included at the end of these notes.

²¹ Don Batten, David Catchpoole, Jonathan Sarfati and Carl Wieland, *The Creation Answers Book*, Eleventh Edition (Creation Ministries International, 2025) 83

Testing Samples of Known Age

Another indicator that the reliability of these standard dating methods should be questioned is their tendency to produce incorrect ages on samples of known origin and age. The following example is included from the *Creation Answers* book along with all its original footnotes.

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.²²

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.²³ 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.²⁴ If excess argon can cause exaggerated dates for rocks of known age, then why should we trust the method for rocks of unknown age?²⁵

The RATE project (Radioisotopes and the Age of the Earth) was a collaborative research initiative involving scientists from organizations like the *Institute for Creation Research* (ICR), the *Creation Research Society* (CRS) and *Creation Ministries International* (CMI).²⁶ Its primary goal was to investigate the methodologies and results of radiometric dating methods from a young-earth creationist perspective. Scientists from the RATE project, including Dr. Steven Austin of CMI, tested rock samples from a Mount St. Helens lava dome that formed after its 1980 eruption. This provided them with a rock of known age (around 10 years old at the time of testing) to see if conventional radiometric dating methods would produce accurate results.

²² 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.

²³ 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.

²⁴ Snelling, p. 520, 1998.

²⁵ Don Batten, David Catchpoole, Jonathan Sarfati and Carl Wieland, *The Creation Answers Book*, Eleventh Edition (Creation Ministries International, 2025) 76

²⁶ <https://creation.com/rate-group-reveals-exciting-breakthroughs>

The RATE project reported that using the potassium-argon (K-Ar) dating method on these samples yielded dates ranging from 350,000 to 2.8 million years. This discrepancy between the known age of the rock and the radiometric dating results led RATE researchers to conclude that these methods are unreliable and that conventional assumptions used in radiometric dating are likely incorrect.

Critics of the project point to a number of factors they claim invalidate the tests Dr. Austin had done on the sample, including their claim that he used the wrong kind of test for the sample in question. However, even a skeptical reviewer of the project must acknowledge that Dr. Austin's point stands. The reason given for the test being the wrong kind for his sample is that it is known to yield erroneously old dates on any sample younger than 10,000 years old.²⁷

Different Methods, Different Results

Among the objections to the RATE project's findings was the claim that using different kinds of tests and multiple sample serves as a check and balance to ensure accuracy of radiometric dating. The problem with that objection is that the different techniques often yield very different results. Dr. Austin from the RATE project has also done research at the Grand Canyon that demonstrates this problem. The table below displays "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)".²⁸

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

Various reasons for the "bad" dates can be constructed, but these are simply posterior explanations. Techniques that yield results that can be dismissed simply because they don't align with our preexisting beliefs are not objective.

Chapter 4 of the *Creations Answers Book* provides a few more examples like the one in the citation below (included with all of its original footnote references):

²⁷ <https://skeptoid.com/episodes/4146>

²⁸ Don Batten, David Catchpoole, Jonathan Sarfati and Carl Wieland, *The Creation Answers Book*, Eleventh Edition (Creation Ministries International, 2025) 78

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.²⁹ This contrasts with an age of 1,550–1,650 Ma based on other isotope ratios,³⁰ and ages of 275, 61, 0, 0, and 0 Ma from thorium/lead ($^{232}\text{Th}/^{208}\text{Pb}$) ratios in five uraninite grains.³¹ 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.³² The ‘zero’ ages in this case are consistent with the Bible.³³

Conducting multiple kinds of tests on multiple samples seems like a good idea to help insure accuracy in radiometric dating. However, if researchers likewise pick and choose from among the results based on a preexisting model, it seems this check and balance measure is plagued by the same problem as the tests it is intended to safeguard.

Presence of ^{14}C

Yet another challenge for anyone who relies on standard dating methods to arrive at an ancient age for the Earth is the abundant presence of carbon 14 (^{14}C) found in fossils and fossil fuels. Anything older than 100,000 years old should have so little ^{14}C left in it that it would be unmeasurable. Yet, “no source of coal has been found that lacks ^{14}C , yet this fossil fuel supposedly ranges up to hundreds of millions of years old.”^{34,35,36}

The discrepancy represented by this well known fact is startling and puzzling to those who believe the Earth to be 4.3 billion years old. Fossils in rocks dated to be in ranges from 1–500 Ma by radioisotope dating methods regularly are found to have an average radiocarbon age of about 50,000 years (this age is also likely inflated due to known problems with carbon dating).

²⁹ Snelling, A.A., The failure of U-Th-Pb ‘dating’ at Koongarra, Australia, *JoC* 9(1):71–92, 1995; creation.com/koongarra.

³⁰ 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.

³¹ Snelling, 1995.

³² Ibid.

³³ Don Batten, David Catchpoole, Jonathan Sarfati and Carl Wieland, *The Creation Answers Book*, Eleventh Edition (Creation Ministries International, 2025) 78

³⁴ Don Batten, David Catchpoole, Jonathan Sarfati and Carl Wieland, *The Creation Answers Book*, Eleventh Edition (Creation Ministries International, 2025) 79

³⁵ Gien, P., Carbon-14 content of fossil carbon, *Origins* 51:6–30, 2001; grisd.org/origins-51006.

³⁶ Baumgardner, J.R., Snelling, A.S., Humphreys, D.R., and Austin, S.A., Measurable ^{14}C in fossilized organic materials: confirming the young earth creation-flood model, *Proc. 5th ICC*, pp. 127–142, 2003.

While puzzling to many, the abundant presence of ^{14}C fits very nicely with a young Earth model that views fossil-bearing rock layers as having been deposited during the year-long global flood described in Genesis.

Helium and Heat

As we discussed the history of geology and the philosophical leanings of various proponents in that saga, it's clear that there are essentially two approaches, though neither could be considered monolithic. This is as it should be as scientists search for answers given ongoing discoveries of evidence that they attempt to understand in the context of their existing models. One approach posits nature as an unguided process of physics and chemistry producing all that we see gradually by known currently observed processes over vast eons of time. The other approach posits all of creation as sourced in the personal God who has revealed himself in Scripture as the unchanging Creator who upholds all that he has made and charged humans to rule over as His image-bearers.

Though the former approach has come to recognize the possibility of cataclysmic events leaving their mark on the planet (i.e. asteroids causing extinction level events), its clear default assumption is slow and steady, allowing plenty of time for life to evolve out of the “primordial soup” via undirected natural processes.

The latter approach considers the description of a global flood initiated by the Creator as judgement upon his creation as a key piece of information in questions about how our planet came to be in the state in which we find it today. This hypothesis of catastrophism is not without its challenges. There is much we do not understand and many answers still to be pursued in relation to such a model. But the tectonic, volcanic, and other forces that would attend such a global catastrophe hold a wealth of explanatory power when taken into consideration.

For example, the heat that would have been generated from such an event could explain many of the dating controversies we've discussed as well as the presence of yet another unexpected discrepancy, the presence of inexplicable amounts of helium that should not be present in rock that are 1.5 billion years old.

Radiometric dating methods attempt to assess how old a rock sample is based on the amount of radioactive decay that has occurred in an element such as uranium contained within the sample. The process of decay in an element like uranium produces helium which then diffuses out of the sample. Dr. Robert Gentry (Physicist) has shown that the amount of helium in zircons from deep (hot) bores is not consistent with the age of 1,500 Ma for the granite in which they are found.³⁷

³⁷ Gentry, R.V., *Creation's Tiny Mystery*, Earth Science Associates, US, 1986.

We now have an idea of the diffusion rates of helium and they are about 100,000 times higher than uniformitarian geologists had assumed. The amount of the daughter element, lead, is what would be expected if the decay were happening at current rates over the enormous time scale that has been assumed by uniformitarian geologists³⁸; however, on that same scale, all the helium should have diffused out of the crystals.

What it appears we have found in modeling the diffusion rates is that the ‘1.5 billion years’ worth of radioactive decay did occur, but the rate of helium leakage dates these ‘billion-year-old’ zircons at $5,700 \pm 2,000$ years.³⁹ Either the decay rate has varied in the past or the diffusion rate of helium has varied in the past. In either case, the standard Uniformitarianism assumption cannot be maintained.

One might argue that there may be some sort of anomaly yet to be discovered that would explain this apparent discrepancy. That’s possible but that explanation would also need to address the independent confirmation by tests on argon, another product of radioactive decay, that agree with the helium data.⁴⁰ There may be a yet unknown explanation for these discrepancies, or the explanation may simply be that there was an accelerated period of radioactive decay in the past.

In addition to explaining that data, a period of accelerated decay would also explain the fact that there is still so much heat emanating from Earth. That amount of radioactive decay occurring recently, several thousand years ago, at an accelerated rate would be consistent with the “heat problem” often noted about the catastrophist view but not with the current consensus of billions of years timescale.⁴¹

Are the methods currently used to estimate the age of the Earth objective and analogous to other tests and observations done in laboratories today? Given what we have considered, it seems very reasonable to see a distinction between operations science and this category that we have distinguished as historical science. While geologic dating methods do employ operational science in their testing, the conclusions drawn from test results are clearly not objective in the same sense as a lipid panels produced in a blood lab.

³⁸ 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.

³⁹ 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.

⁴⁰ Humphreys, D.R., Argon diffusion data support RATE’s 6,000-year helium age of the earth, *JoC* 25(2):74–77, 2011; creation.com/argon-diffusion-age.

⁴¹ 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.

Positive Evidence for a Recent Creation

So far, this portion of The Bible and Science series on Geology has focussed on the history of the field and noteworthy problems with the standard dating methods in use by geologists. In a sense it has focused on problems with the Uniformitarianism view rather than provide positive evidence for the creationist catastrophism view. This has been by design and, in part, because Dr. Robert Carter spent a large portion of his two sessions with us early on in the series discussing positive proofs for creationism from geology and related fields like paleontology. But it was also because the foundational assumptions about what we can know from dating methods and how old we believe the Earth is really is pivotal in everything else that may be considered on this topic. It is *not* in any way due to a lack of positive evidence for a recent creation and a catastrophic global flood as described in Genesis and by Jesus in the New Testament.

There is ample evidence of the biblical model of recent creation and catastrophic judgement by global flood in the recent past for anyone willing to consider this alternative model. On its website, *Creation Ministries International* lists 101 evidences for a young earth model from across every major branch of science with each brief description linking out to articles explaining in detail how that evidence supports a young earth model.⁴²

In light of Dr. Carter's lectures and given the short time left in this series, we will only survey a few key categories of evidence from the field of geology.

- Fossil Groupings (sea, smarter/mobile, etc.)
- Fossil anomalies
- Aquatic fossils on mountains
- Dinosaur tracks
- Polystrate Fossils
- Absent Fossils
- Geologic Column
- Massive land features
 - Grand Canyon
 - Oceanic Canyon

⁴² <https://creation.com/en-us/articles/age-of-the-earth>



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TERMS & CONDITIONS

The present Agreement constitutes a legally binding contract between the Client (“Submitter”, “They”, “Their”, “Client”) and International Chemical Analysis, Inc. (“ICA”, “We”, “Us”, “Our”, “Ours”). By sending a Submission Form and/or any Sample(s) to be analyzed in our labs, the Client acknowledges and agrees to the Terms and Conditions outlined below.

1. ¹⁴C Natural Levels Disclaimer

ICA's Laboratory does not work with ¹⁴C-enriched material. By submitting this form, the Client confirms that their samples do not contain any enriched material. If any enriched material from the Client's samples or packaging causes contamination of equipment or instrumentation resulting in the need for cleanup or replacement, additional charges will be incurred.

2. Submission of Samples

The Client must provide a completed Submission Form along with the samples requested to be analyzed. We reserve the right to decline any samples submitted. By sending samples to ICA, the Client certifies that they have the legal authority to enter into binding contracts related to the work requested on behalf of themselves, their supervisor, and/or their company.

3. Chain of Custody

ICA assumes no responsibility or liability for any loss or damage to Samples during the time ICA is in possession of the Sample. The Client acknowledges that the analysis process is destructive, and unless otherwise communicated by the Client, any remaining sample material will be retained for a period of at least six (6) months, then discarded. If the Client expressly requests the return of any remaining Samples, a shipping charges will be applied to their invoice.

4. Liability

The Client acknowledges that the analyses and data provided by ICA's laboratory are "as is"; and that ICA as well as its agents or representatives shall not be liable for any direct, indirect, incidental, punitive, or consequential damages related to the analyses and data. The Client assumes risks, if any, associated with relying on the analyses and data, and retains title and risk of loss with respect to submitted Samples at all times. We do not provide any implied warranties of merchantability and fitness of submitted samples or their resulting analyses for any particular purpose, nor do we offer any opinion or agree to be witness in any legal proceedings related to the Samples and data. Our liability to the Client, whether arising from contract, tort, negligence, breach of statutory duty, or any other cause, shall not exceed the price paid for the analysis. In any case, the Client agrees not to sue ICA for any warranty, breach of contract, or negligence.

5. Indemnification

The Client agrees to indemnify, defend, and hold harmless ICA, its officers, directors, and employees (the "indemnified parties") from any and all claims, demands, actions, liability, and expenses arising from the tests, samples, data; or the Client's use of the data. The Client is responsible for any damage to ICA's facilities or its personnel that might be caused by the Samples.

6. Confidentiality

Any information related to the submission, sent materials, written information, and data that the Client, including analysis results, will not be disclosed to third parties who are not listed on the Submission Form without the written consent of the original Submitter. We will make reasonable efforts to maintain the confidentiality of the Confidential Information, as permitted by law. Our obligation does not extend to information that is already in the public domain or independently known or obtained by ICA. The Client acknowledges that ICA is subject to the laws of the United States, and therefore records in its possession or control, including Confidential Information, may be subject to access to information requests.

7. Antiquities

The Client confirms that any samples of artwork or cultural artifacts submitted to ICA belong to the Client or that the Client is legally acting as representative of the owner. If requested by ICA, the Client must provide evidence of ownership. The Client declares that all articles have been legally imported and exported from any country they have passed through, and if requested, the Client must provide documentation to support it. The Client agrees not to use the radiocarbon date in any advertisement, authentication or descriptions of the samples for sale, and to not share that information with any third party who may act in that regard. ICA will not sub- sample artifacts or artwork, and our analysis report will only reference the material that is submitted and not the artwork or cultural artifact itself.

8. Payment

Payment for invoices is due upon receipt. The rates for all laboratory units are determined based on the billing address provided on the Submission Form and the pricing listed on our website at the time of submission. The Submitter is responsible for any duty charges, which will be added to their invoice. Unless agreed otherwise, the Client is required to remit payment in full prior to release of the analysis results.

9. Work Suspension

In the event that the Client fails to make timely payment of their invoices, we reserve the right to suspend work and/or withhold data delivery. The Client agrees and understands that ICA will not be liable nor responsible for any damages incurred as result of our work suspension or withholding of data due to failure to promptly pay invoices.

10. Delivery of Results

ICA will provide the Client with results via the email address provided in their Submission Form once the requested analyses have been successfully completed, and agreed payment have been fulfilled. Please be advised that results will not be released to any third parties not listed on the Submission Form without the written consent of the original Submitter.

11. Failed Analyses Policy

ICA charges the client only if we get a result from a sample. Failed analyses for any reason will not be invoiced.

12. Force Majeure Clause

ICA will not be held liable or responsible in for any failure to perform any of our contractual obligations, or for any unforeseen delay, that is caused by events unforeseeable, unavoidable, or outside our reasonable control.

13. Legal Agreement

The present agreement between the Submitter and ICA supersedes all other written or verbal communications between the two parties. Any amendments to this agreement can only be made in writing by mutual agreement. ICA will not accept nor recognize conditions or terms under such wording as "by accepting this work you agree to the following terms".

14. Jurisdiction

This Agreement shall be governed by and interpreted in accordance with the laws of the State of Florida, and the United States of America. In case of any conflict, the Submitter expressly accepts jurisdiction of the Courts of the State of Florida.