Christian Geologists on Noah's Flood:
Biblical and Scientific Shortcomings of Flood Geology

Gregg Davidson, Ph.D. davidson@olemiss.edu
Ken Wolgemuth, Ph.D. wolgemuth2@aol.com
July, 2010

SOLID ROCK LECTURES
EARTH AS GOD'S CREATION

Introduction

As Christians and geologists, we frequently encounter people with stories of storm tossed and shipwrecked faith that started when they began to wrestle with apparent conflicts between science and the Bible. The stories have a common thread. The Bible, they were told, clearly teaches the earth was created a few thousand years ago with life forms fashioned more or less as we find them today. Because the earth is very young, the incredibly complex sequence of rock, sediment, and fossils found on our planet must have been deposited in a very short period of time. Noah's Flood, as the only plausible causal agent, was obviously a global and violent event. Theories of an ancient earth and adaptation of life forms, they were further informed, have been constructed on flimsy evidence created by atheistic scientists searching for ways to expunge God from modern culture. But as these sojourners began to explore and understand the actual evidence for an ancient earth, they found themselves increasingly convinced of its legitimacy, and thereby increasingly questioning the veracity of their faith – many to the point of relegating Christ to just another wishful myth.

It is our conviction that these stories of strained or lost faith derive not from an inherent unwillingness to trust the Bible, but rather from misguided teaching on the message of Scripture. Those insisting the earth is young are not simply putting their faith in God's Word, they are putting their faith in their own particular interpretation of that Word. As such, an entirely unnecessary stumbling block to faith is created, where faith in Christ first requires rejection of sound science.

As we have prayed and studied this subject, we have felt God's call to speak out against this misplaced stumbling block. We are sensitive, however, to the fact that when scientists speak on issues of faith, there is a natural suspicion that science will be regarded as the ultimate arbiter of truth, and Scripture will have to yield whenever conflict arises. It is thus important for us to state here that both of us ascribe to the authority and inspiration of Scripture, the reality and necessity of Christ's death and resurrection, the existence of genuine miraculous events, and the truthfulness of the Biblical historical narratives. In our understanding, science will never trump Scripture, but by virtue of science being a study of God's natural creation, it may occasionally assist in our understanding of God's written Word. Where this has occurred historically and has been accepted by the Church, the invariable result has been the abandonment of an interpretation of some secondary importance, without any change in our understanding of the intended central message.

This phenomenon is illustrated well by the 17th century clash between Galileo's claims that the earth revolves around the sun, and the multiple passages in Scripture that appear to clearly present a static earth as the physical center of God's natural creation. The Bible tells us repeatedly that the earth is fixed upon its foundations (Ps 93:1, 104:5) and the sun rises and sets (Eccl 1:5, Ps 19:6). Within the context of the historical narratives (which we are not accustomed to interpreting in any figurative manner) we read statements about "the sun rising over the land" (Gen 19:23), and a miraculous event during a famous battle where "the sun stopped in the middle of the sky and delayed going down a full day" (Josh 10:13). Likewise in the Levitical law, we find commands to complete the Passover sacrifice "when the sun goes down" (Deut 16:6).

God's people had interpreted these verses for thousands of years to be authoritative statements about both spiritual and physical realms, and 17th century believers understandably struggled with allowing science to alter traditional interpretations. If God says the sun rises and the sun sets, how could it be otherwise?

Fast forward a few centuries, and we are now somehow quite content to have allowed science to alter our thinking on these verses, without abandoning notions of inerrancy or inspiration. The reason is simply because it was eventually recognized that the primary message of these verses was never on the nature of nature, but on the nature of man and his experience with his environment and his God. Solomon and Joshua accurately recorded their experience from an earthly perspective (sun rising and setting), and David praised God for holding the earth fixedly in His hand (Ps 93:1, 104:5), without requiring a meaning of fixity in space. The central message of these verses was apparent to readers before and after Galileo. Only a secondary interpretation, likely never intended by the writers, was cast off after scientific advances.

So what is the issue regarding Noah's Flood? The modern debate centers around two questions. Was it truly global in extent, and can the Flood account for the earth's complex geologic record? To address the first, it is worth being reminded of the Apostle Paul's letter to the church in Rome where he makes a statement that "your faith is being proclaimed throughout the whole world" (Rom 1:8). Entire people groups existed at this time in China, Australia, and North and South America who knew nothing of the church in Rome. Though using wording that literally means the entire world population, Paul is clearly referring to the world known to him and his readers at the time.[1] Paul speaks truthfully from his experience. Allowing for the possibility that Noah's Flood encompassed all of known humanity without necessarily covering the entire planet is thus consistent with how other passages in Scripture are interpreted by Christians who believe the Bible is authoritative and trustworthy.

Our primary interest in this paper is the second question, the widely promulgated notion that the Flood can account for the earth's complex geology, and that all genuine Christians should accept this viewpoint. *Flood Geology* derives from a belief that Genesis teaches that the world is very young – less than 10,000 years. To explain the vast thicknesses and incredible complexity of the earth's sedimentary deposits within a short history, it is argued that the Flood must have been both global and violent. Flood Geology is thus synonymous with belief in a young earth. It is our conviction that this position is unreasonable from both a biblical and scientific perspective.

From a biblical perspective, Young-Earth/Flood-Geology advocates consistently argue that "the plain reading of Scripture," with six literal 24–hour days is the only interpretation of Genesis that is free of textual and theological problems. All other approaches are claimed to require hermeneutical manipulations that ultimately undermine the simple and clear message of the Bible. Nothing could be farther from the truth. In fact, conservative Biblical scholars (the group of theologians who believe the book to be genuinely God's Word) debate how Genesis 1 and 2 should be understood, independent of any scientific challenge. Some indeed insist that a word-literal rendering is best, while others have argued that the construction of the text, while not typical poetry, nonetheless bears evidence of literary tools designed to emphasize God's creative activity and providence, not days and a specific sequence of events.[2]

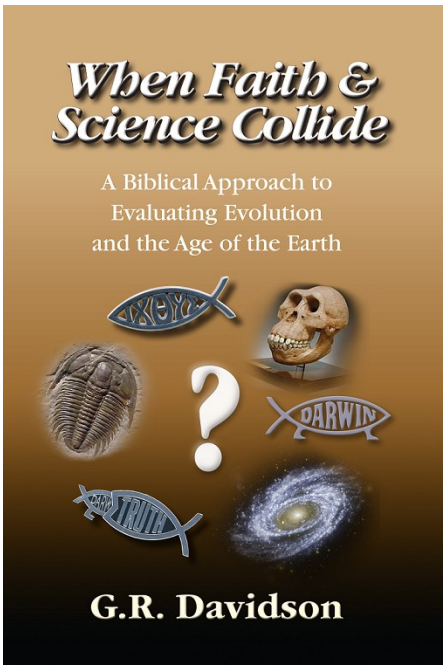
One reason that theologians think to look for literary devices is that there are internal textual problems if insisting that Genesis opens with plain historical narrative. Three examples follow.

> 1) Light and dark are separated twice. Light is first separated from darkness in Day 1, then again in Day 4 with the creation of the sun, moon and stars – "God made them … to govern the day and the night, and to separate the light from the darkness" (Gen 1:18). A forced word-literal interpretation here suggests that God's first attempt failed, and he had to try a different approach.

2) Evening and morning are declared for three days without a sun. Evening and morning have meaning only in the context of the earth rotating about its axis adjacent to the sun. Without a fixed light source, there is no evening or morning. To say God himself was the source of light is insufficient, for this would require that God was "off" prior to Day 1, and that he was fixed in one position and not omnipresent until Day 4. The standard reply is that this is an expression of a 24 hour day as it would be observed for the rest of time. Which is to say, a figurative interpretation is called upon to support a literal interpretation.

3) In Genesis 1, all animals were created before Adam, but in Genesis 2, many of the animals were created after God saw that Adam needed a helper (Gen 2:18-20). Many English Bibles fix this problem by translating the Hebrew word for "created" as "*had* created," but justification for the "had" is based wholly on an *assumed* intention of the writer.

None of these observations mean that the creation story is not true; they simply indicate that a word-literal interpretation is not likely to be the most appropriate. More importantly, any impression given by the Church that belief in a young earth is synonymous with being a Christian is entirely unjustified, and in fact, does little more than create a stumbling block to faith in Christ.



It is readily acknowledged here that there are many other Scriptural issues that are important to consider when contemplating the best understanding of Creation and Noah's Flood. Because these cannot be adequately addressed in a short (or even long) article, readers are encouraged to refer to *When Faith and Science Collide: A Biblical Approach to Evaluating Evolution and the Age of the Earth* by G.R. Davidson.

So what about the scientific perspective? What does God's natural creation reveal about its history? Before launching into a discussion of evidence, it is important to clarify the debate. The contention between geologists and Flood Geology advocates is not about natural vs. supernatural mechanisms. The underlying assumption throughout all Flood Geology arguments is that *natural mechanisms* occurring during and after the Flood can account for the majority of the sedimentary rocks that we find on the earth. It is this assumption that is the basis for claiming that scientific studies can be undertaken to find support for a global, catastrophic flood. The question before us, therefore, is what is actually revealed by studies of the earth's layers? Do they speak to a global deluge and recent age, or to a more complex and ancient history?

Flood Geology proponents would have us believe that there is extensive evidence for a violent, earth-wide flood that is apparent if one is willing to consider the possibility. As Christian geologists, we have no philosophical objection to a cataclysmic event of divine origin, and have long been willing to consider evidence of such an event. What we have observed, however, is that evidence for Flood Geology is largely, if not entirely, non-existent. Given the placement and character of sedimentary deposits currently on earth, deposition by a single flood is not only implausible, but utterly impossible unless God temporarily suspended His natural laws in order to establish layers and fossil beds that would subsequently communicate a story vastly different than what actually happened.

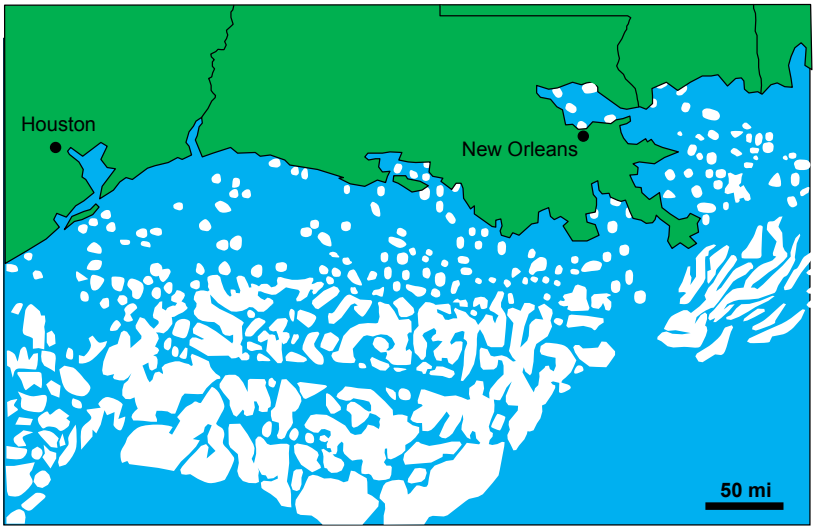
To relate the evidence effectively, we recognize the need to present more than one example, though we also wish to keep the content manageable. Our solution for this article is to present three examples with very brief narratives, and finish with a more detailed description of a fourth example.

Salt Deposits

There are many places around the earth with layers of salt, some thousands of feet in thickness. Just off the southern coast of the United States in the Gulf of Mexico, thick salt deposits sit beneath thousands of feet of sediment (Fig. 1). These deposits lie within the layers that are said to have been deposited by the Flood.

We understand how salt beds form. At locations such as the Bonneville Salt Flats of Utah, or at the Dead Sea at the border of Israel and Jordan, salt is actively forming. Salt beds form when water is evaporated. During evaporation, the concentration of dissolved ions increases until the water cannot hold the salt in solution anymore and mineral salt begins to form. If a presently unknown or poorly understood process could produce salt without evaporation, as argued by young-earth advocates,[3] it would quickly dissolve as soon as it came into contact with flood water, just as the salt from your saltshaker rapidly dissolves when added to water or moist food.

One might argue that the waters from the Flood could have evaporated to leave behind the salt deposits we see today, but there is a serious problem. The thousands of feet of sediment on top of the salt is *also* said to be from the Flood, meaning the flood waters cannot have evaporated to produce the salt and still be present and violent enough to transport thousands of feet of sediment to the same location. In other words, a single flood cannot be called upon to explain both the salt and the overlying sediment. For those who wish to argue that natural processes could have been vastly different during the Flood, there are at least two replies. First, under such a scenario, there is no point in Flood Geology studies any more than in normal studies, for nothing could be gained by the study of unknowable processes. A more important question, however, would be to ask why God would alter natural processes just to make Flood sediments look like they are not flood sediments. What would the purpose be? (We will revisit this thought later.)



(modified from www.glossary.oilfield.slb.com/DisplayImage.cfm?ID=155)

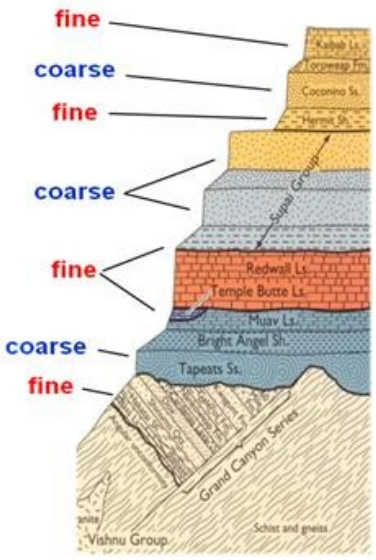
Figure 1
Salt deposits in the Gulf of Mexico, some lying beneath thousands of feet of sediment. Here and in other locations, some salt deposits are thousands of feet thick.

Grand Canyon: Order of Deposition

The Grand Canyon is made up of a sequence of layers that defies any reasonable attempt to explain by a single flood. The alternating layers of limestone, sandstone and shale each form in unique environments. If these deposits were formed at different times under various sea-level stages, it is quite simple to explain the different grain sizes and rock types as a function of depth and distance from the shore line. If explained with a single catastrophic flood that abided by God's natural laws of physics and chemistry, logic must be stretched beyond the breaking point.

As a very simple observation, consider instructions given in virtually every gardening book. A good soil will have a mix of sand, silt and clay. To determine the quality of your soil, you take a handful or two, put it in a clear container, add water and shake it up. When you stop shaking, the coarse grained material will settle out first resulting in a sequence of layers: sand on the bottom, then silt, then clay. You can readily see how much of each you have by the thickness of each layer.

This is informative of what we see in flood deposits. As moving flood waters slow down, finer and finer grained sediment settles out resulting in a "fining upward" sequence. If most of the Grand Canyon layers were laid down by the Flood, then we should see the same thing – a "fining upward" sequence. Instead, we see a series of alternating layers of fine and coarse grained material, with smaller-scale alternating layers within the larger ones (Fig. 2). Increasing the violence of a flood does nothing to negate the standard order of deposition. Repeated surging of flood waters across the surface likewise offers little explanatory power; in this case we might expect successive layers, each with their own "fining upward" sequence, but such is not what is observed. Further, the Grand Canyon includes multiple layers of limestone, which are never found in flood deposits of any magnitude. Even in floods as massive as one thought to have catastrophically deluged the once dry Mediterranean Sea basin with thousands of feet of water – limestone beds are conspicuously absent.



Cross-section from Press and Siever, Understanding Earth, 1994, W.H. Freeman & Co.

Figure 2
Photo and cross-section of the Grand Canyon, Arizona.

Fossil Sequence

If a massive flood were responsible for the fossil record, what would we expect to see? If the Flood was violent enough to rip chunks of rock up from the earth and move entire continents (standard Young Earth claims),[4] then it should be obvious that life forms from every imaginable niche would be tumbled and mixed together (Fig. 3a). We should find numerous examples of mammoths mixed with triceratops, and pterodactyls mixed with sparrows. Ferns and meadow flowers should be found in the same deposits, along with trilobites and whales. Further, we should find all major life forms still living today, for Genesis 7:8-9 is clear in stating that all terrestrial animals were preserved on the ark.

What we actually observe is far different (Fig. 3b). There is an orderly sequence where trilobites only occur in very old rocks, dinosaurs in later beds, and mammoths in still later layers. Organisms like flowers and ferns are present together in more recent deposits, but only ferns with no flowers are found in older deposits. Some readers will recognize this as an example from the "geologic column" and be tempted to discount it as a fabrication. For those thinking this way, consider what Henry Morris had to say in both editions of *Scientific Creationism*:

> "Creationists do not question the general validity of the geologic column, however, at least as an indicator of the usual order of deposition of the fossils…" [5]

If we revisit the Grand Canyon for a moment, is it not striking that there is not a single dinosaur, mammoth or bird in the entire exposed sequence? Not one. To find these, you have to go to younger sediments found in deposits outside the canyon that have not been fully eroded away yet. How could such a lack of mixing be possible if the Flood was violent enough to move continents?

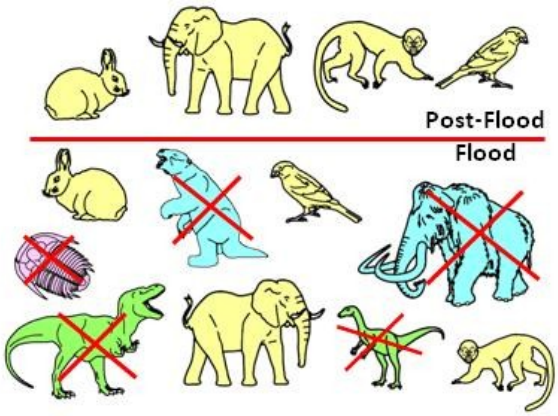


Figure 3a
Expected distribution of fossils after global catastrophic flood, with select extinctions (X's).

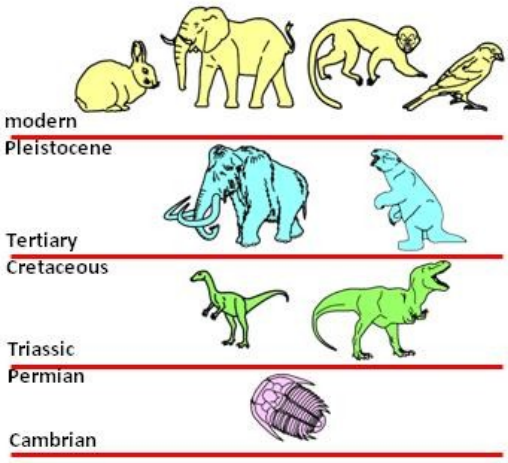
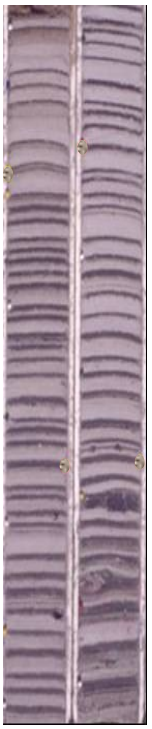


Figure 3b
Observed fossil distribution.

Tree Rings and Varves



Most people know what a tree ring is. Summer growth produces a wide lighter-colored ring, followed by a narrow, darker-colored ring in winter. The two rings together represent one year.

Varves are sediment layers formed in lakes in certain environments. In northern latitudes where lakes freeze over, fine-grained material will settle out in winter, followed by coarser-grained material in spring as ice thaws and increased stream flow carries larger particles into the lake. Each winter-spring cycle produces a fine-coarse couplet called a varve (Fig. 4).

In other places, varves may form from diatom blooms. At all times of the year, fine particulate matter settles out to the bottom, but during the spring, single-celled organisms with a solid shell rapidly reproduce near the surface of the lake. As they die, the shells rain out onto the lake floor and form a light-colored coating. Each winter-spring cycle produces a dark-light colored sediment couplet, or varve. In both examples, each varve represents one year.

Varves form in many lakes around the world. In one lake in Japan, Lake Suigetsu, a sediment core was collected in 1991 nearly 250 feet in length.[6] The core contained an uninterrupted sequence of varves, with a total count in excess of 100,000. To the researchers, it was logical to think that 100,000 varves likely represented 100,000 years, but perhaps they were making unwarranted assumptions. What if in the distant past, multiple varves were deposited per year? More specifically, what if a massive flood with thousands of surges back and forth across the land laid down thousands of varves in a single year? Fortunately, we do not have to depend on assumptions, but can actually make measurements to determine if this happened. To do so, we will revisit tree rings for a moment.

Figure 4
Example photo of sediment varves (two core sections shown). Each light and dark couplet represents one varve. (Image courtesy of Tufts University).

We will employ tree rings and carbon-14, but not in the way readers may be accustomed to seeing. We will not use carbon-14 to determine an age at all. We will simply measure how much carbon-14 is currently found in each tree ring. Carbon-14 decays with time, so if each tree ring represents one year of growth, we should see a steady decline in the carbon-14 content of each successive ring. Figure 5 shows tree-ring carbon-14 data from living trees extending back 4000 rings.[7] The nearly straight line formed by the data means that it might be possible for a year here or there to have a missing or double ring, but overall, each ring represents one year at least back 4000 years. A straight line (as opposed to curving upward or downward) is also confirmation that radioactive decay rates have remained constant over this time period.

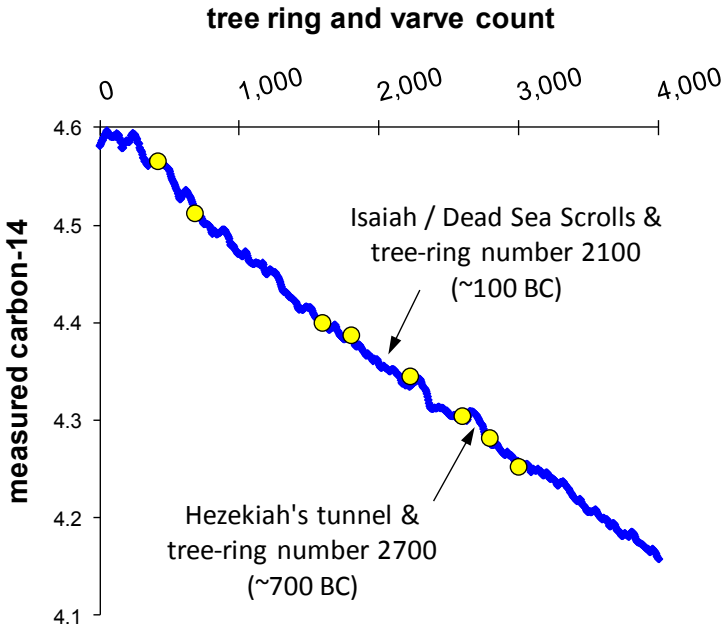


Figure 5
Measured carbon-14 in tree rings (solid line) and in varves (circles) back to 4000 rings or varves. Varve data is from Steel Lake, Minnesota.[7] See text for discussion of Hezekiah's tunnel and the Dead Sea Scrolls.

"Measured carbon-14" is shown as the natural log of ^{14}C activity.

If additional confidence in this data is desired, it may be helpful to note that the amount of carbon-14 found in a timber from a tunnel in Jerusalem thought to have been built by Hezekiah is approximately the same as the amount found in tree ring number 2700, which places its ring-counting age where expected from Biblical records if each ring equals one year. Even better, consider the Dead Sea Scrolls – the book of Isaiah in particular. Isaiah 53 describes Christ in such detail that Bible critics have long argued that it must have been written after the time of Christ. The amount of carbon-14 in the Isaiah scrolls is equal to or less than the amount in tree ring number 2100, meaning carbon-14 confirms its before-Christ historicity.[8]

Carbon-14 has also been measured in varves. The carbon-14 record for varves in Steel Lake, Minnesota is shown as circles in Figure 5. Note that they fall on top of the tree ring data, which means 4000 varves, at least in this lake, must also equal 4000 years.

Now we are ready to consider that at some time prior to 4000 years ago, a giant flood resulted in myriad varves laid down in a single year. There are a few possible results. The most logical would be that all these varves would have the same carbon-14 content because they were all laid down in the same year. This would yield the projected data shown in Figure 6a.

Alternately, perhaps the Flood caused the normal production of carbon-14 to be drastically altered. Figure 6 (b, c and d) show what the data would look like for different possible scenarios such as much higher than normal, lower than normal, or wildly fluctuating carbon-14 production at the time of the Flood, or an initially fast carbon-14 decay rate that slowed over time.

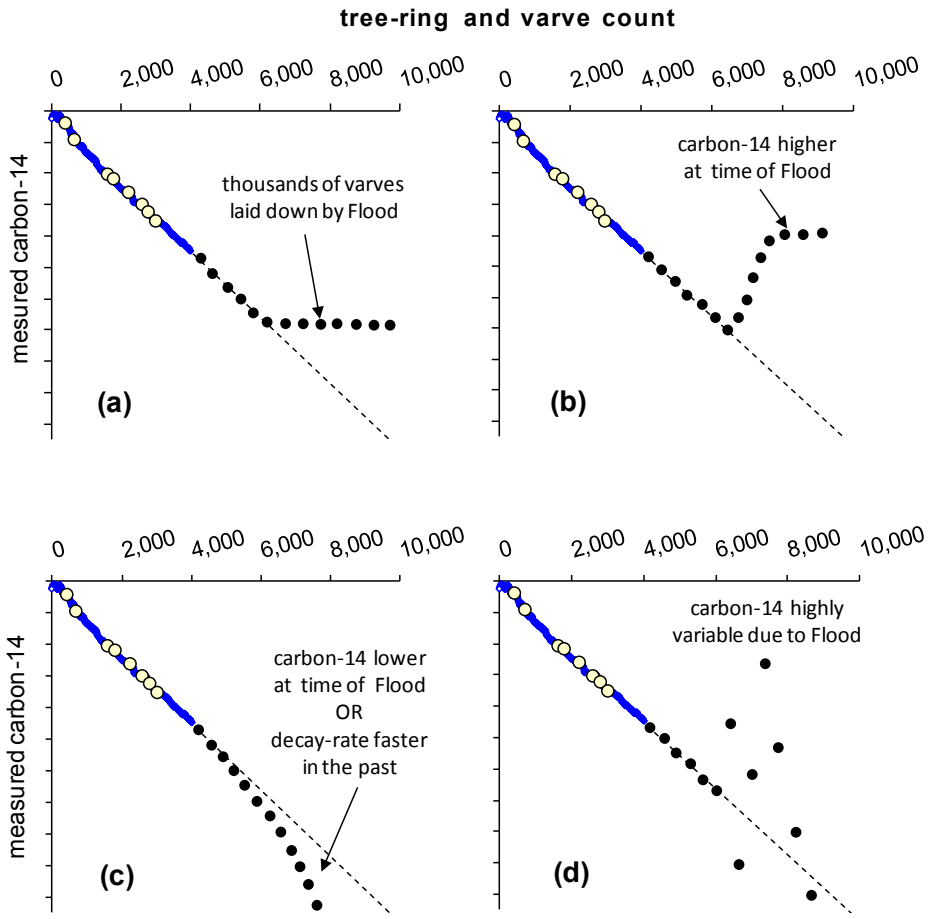


Figure 6
Data from Figure 5 with solid circles added to show what the data would look like beyond 4000 varves for various scenarios. See text for discussion.

"Measured carbon-14" is the same as in Figure 5.

Figure 7 shows varve data from Steel Lake and Lake Suigetsu extended to the limit of carbon-14 detection. Serious consideration of this data should be sobering for the committed Young-Earther.

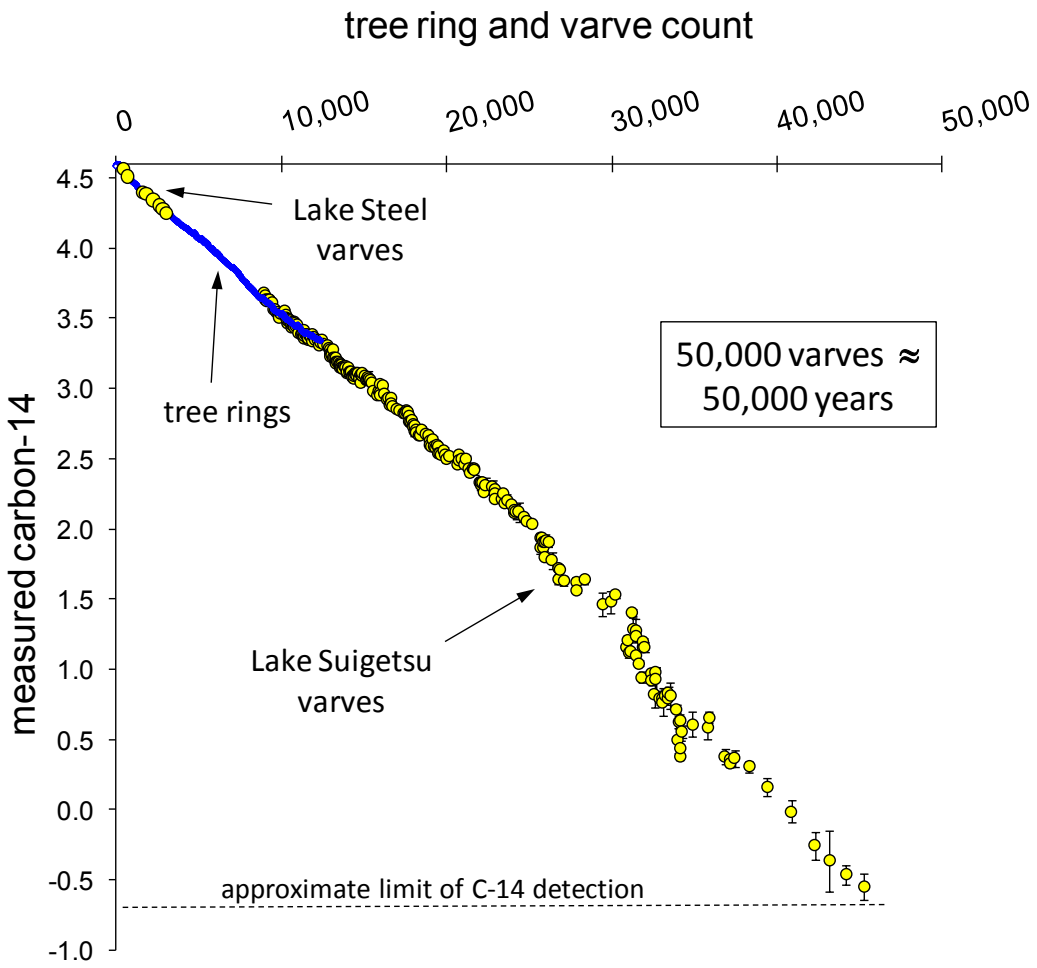


Figure 7
Tree-ring number (solid line) and varve number (circles) vs. measured carbon-14. Varves less than 5000 are from Steel Lake, Minnesota; varves greater than 5000 are from Lake Suigetsu, Japan.

"Measured carbon-14" is shown as the natural log of the carbon-14 activity. Vertical bars represent the magnitude of uncertainty in the measured value. Data comes from references in footnotes 6 and 7.

The high degree of linearity (straightness) of this data has two possible interpretations.

Option 1: 50,000 varves represent roughly 50,000 years, and the fact that the Suigetsu varves continue to about 100,000 means the earth's history also must extend to at least 100,000 years.

Option 2: God started with a fast rate of carbon-14 decay and dozens of diatom blooms and die-offs each year, but then intentionally and precisely slowed down each *independent* and *unrelated* process in such a way as to make it falsely look as if the data confirms the accuracy of carbon-14 and varve counting as legitimate methods of determining age.

Option 2 should be unacceptable to all Christians, for it means God manipulated his creation so that a study of it would convincingly tell a story that was not in fact true.

Conclusions

We argue with great conviction that Option 2 above does not reflect the God of King David who proclaimed that the heavens declare the glory of God (Psalm 19), nor of the Apostle Paul who stated that God's eternal character and divine nature are manifest in what he has created (Romans 1:20). If the creation speaks of a specific history, it is our belief that God's creation speaks truthfully and the history is real.

Where does this leave us? Many in the world marvel at the handiwork of God while denying the Creator. In response, the Church demands that to acknowledge the Creator, we must deny His workmanship. Can there be a more ineffectual witness? If after seeing the results of God's creation in Figure 7 we insist that the *obvious* meaning is not in fact true, we will drive people away from faith in Christ on a misplaced assumption that belief in Christ represents the abandonment of reason. Christ Himself is a sufficient stumbling block – we need not create any other!

For our part in serving our Lord Jesus and furthering understanding of his creation, we are offering a half- or one-day creation workshop to seminaries and related institutions. This workshop provides an overview of current geologic understanding, and a Bible-honoring approach to evaluating Scripture and science anytime the two appear to conflict. To schedule a workshop, please contact Gregg Davidson at davidson@olemiss.edu or Ken Wolgemuth at wolgemuth2@aol.com.

Dr. Gregg Davidson is a Professor in the Department of Geology and Geological Engineering at the University of Mississippi and conducts original research in geochemistry and hydrogeology, often employing radiometric dating methods to determine the age of groundwater and sediments. He earned his BS from Wheaton College in Illinois, and his MS and PhD degrees from the University of Arizona. He has been an active member and teacher in a PCA church since moving to Mississippi in 1996. In 2009 he published a book about his keen interest in integrating a lifetime of studying geology with his firm conviction about the infallibility of God's Word, *When Faith & Science Collide – A Biblical Approach to Evaluating Evolution and the Age of the Earth.* He lives in Oxford, Mississippi with his wife Kristi and their four children. Gregg can be reached at davidson@olemiss.edu or at 662-915-5824.

Dr. Ken Wolgemuth is an Adjunct Professor at the University of Tulsa and a Petroleum Consultant teaching short courses on petroleum geology and "Geology for the Non-Geologist." He has a BS in chemistry from Wheaton College in Illinois, and MS and PhD degrees in geochemistry from Columbia University in New York. He has over 30 years experience in the energy industry, and is passionate about communicating geology to non-scientists. Over the last 10 years, he has developed a keen interest in sharing the geology of God's Creation with Christians in churches and seminaries. He is active with Prison Fellowship's Angel Tree project and at Kirk of the Hills Church, an Evangelical Presbyterian Church. He lives in Tulsa, Oklahoma, with his wife, Helen. They have two children and one grandchild. Ken can be reached at wolgemuth2@aol.com or at 918-852-3082.

Notes

1. Many Biblical scholars define a *literal* interpretation as one that takes into account the literary genre, figures of speech, context, and author/audience perspective in deriving the intended meaning. By this definition, poetry and allegory are *literally* interpreted as *figurative*. In this article, our use of *literal* conforms to its more common definition where a literal interpretation is one that adheres to the precise definition of words without figurative meaning and without requiring additional context to understand.
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3. John D. Morris, Does salt come from evaporated sea water? ICR article 532. http://www.icr.org/article/532/ (accessed July 12, 2010)
4. Ken Ham, ed., T*he New Answers Book, v 1*, Master Books, 2006, Ch 14. http://www.answersingenesis.org/articles/nab/catastrophic-plate-tectonics. (accessed July 12, 2010)
5. Henry Morris (ed), *Scientific Creationism*, 2nd edition, Master Books, Green Forrest, AZ, 1985, p 116.
6. H. Kitagawa and J. van der Plicht, Atmospheric radiocarbon calibration beyond 11,900 CAL BP from Lake Suigetsu laminated sediments. *Radiocarbon*, 2000, 42:370-381.
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