

Understanding Noah's Flood Story

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Abstract

Scientific evidence is presented that shows that Noah's Flood likely happened but it was local in southeastern Mesopotamia and is a theological story presented by Moses that nearly duplicates ancient Gilgamesh, Atrahasis, and Sumerian flood stories. The scientific evidence includes the fact that giant hurricanes or tsunamis cannot erode, transport, or deposit sedimentary debris over long distances (to the Grand Canyon, for example) because the water molecules in the waves that are generated by strong winds (no matter how strong) or in earthquake generated tsunamis only move in a circular pattern and have no lateral translation.

Keywords: Noah's flood, Mesopotamia, hurricanes, tsunamis, Coriolis effect. Tigris River, Euphrates River.

Introduction

In order to understand Noah's flood, it is helpful to consider the known effects of hurricanes and tsunamis. In today's world when we have observed what has happened during major hurricanes that have hit the coast of the United States and when tsunamis have hit Japan,¹ Sumatra,² and Alaska,³ we recognize what damage can be done to the coasts of these places and how much erosion occurs (*almost none*) during these hurricanes and tsunamis. Of course, horrific damage is done to inland man-made structures but little erosional damages are done to the beaches and off-shore, island sandbars. These observations give us an idea of what could have happened during the alleged Noah's Flood.

In order to understand what happens during hurricanes, we need to see how the Coriolis Effect acts on storm systems. Hurricanes are big low-pressure systems, which mean that they suck air into their centers. When air in these systems travels for a long distance across the Earth, it does not move in a straight line, but is deflected to the right in the northern hemisphere and to the left in the southern hemisphere because of the different speeds in which the air in the atmosphere is rotating around the Earth at different latitudes (slower toward the poles). Because of the different speeds, the air that is being sucked into the storm is deflected, and this deflection is what causes it to spin, and the spin is counter-clockwise in the northern hemisphere.

Next, we need to understand what happens when winds are blowing as much as 156 mph in a category 5 hurricane. In that

case, friction of fast-flowing air over the ocean-surface builds up waves of large height (**Figure 1**), and the ocean water tends to pile-up ahead of the winds in a storm surge. If the timing is such that this piling-up is simultaneous with a spring tide (maximum high tide during a full moon), the amount of flooding over the land can be huge with depths of many feet. Such a storm surge in combination with huge amounts of rainfall in a hurricane that is moving very slowly then can cause extra amounts of flooding. Furthermore, when the circular motion of the waves spills forward where the ocean depth is shallow near the shore (**Figure 1**), the spilling forward then can cause erosion of the beach or off-shore barrier-island sandbars.

Waves –circular motion

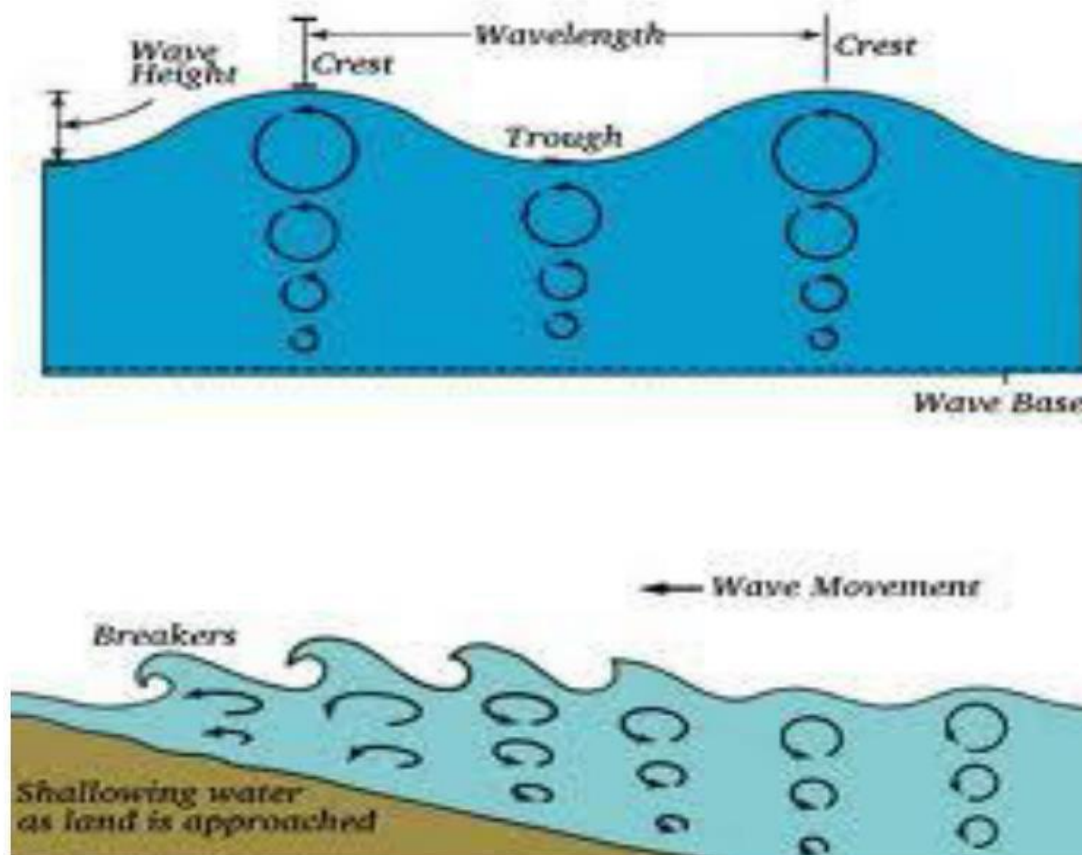


Figure 1. Circular motion of water in ocean waves. (free download)

Such a category 5 hurricane was the Katrina hurricane⁴ (**Figure 2**) that came into the shores of Texas and Louisiana with 10 to 20 inches of rainfall that caused great amounts of damage in and near New Orleans.



Figure 2. Category 5 Katrina hurricane, NASA image, August 2005, from space.

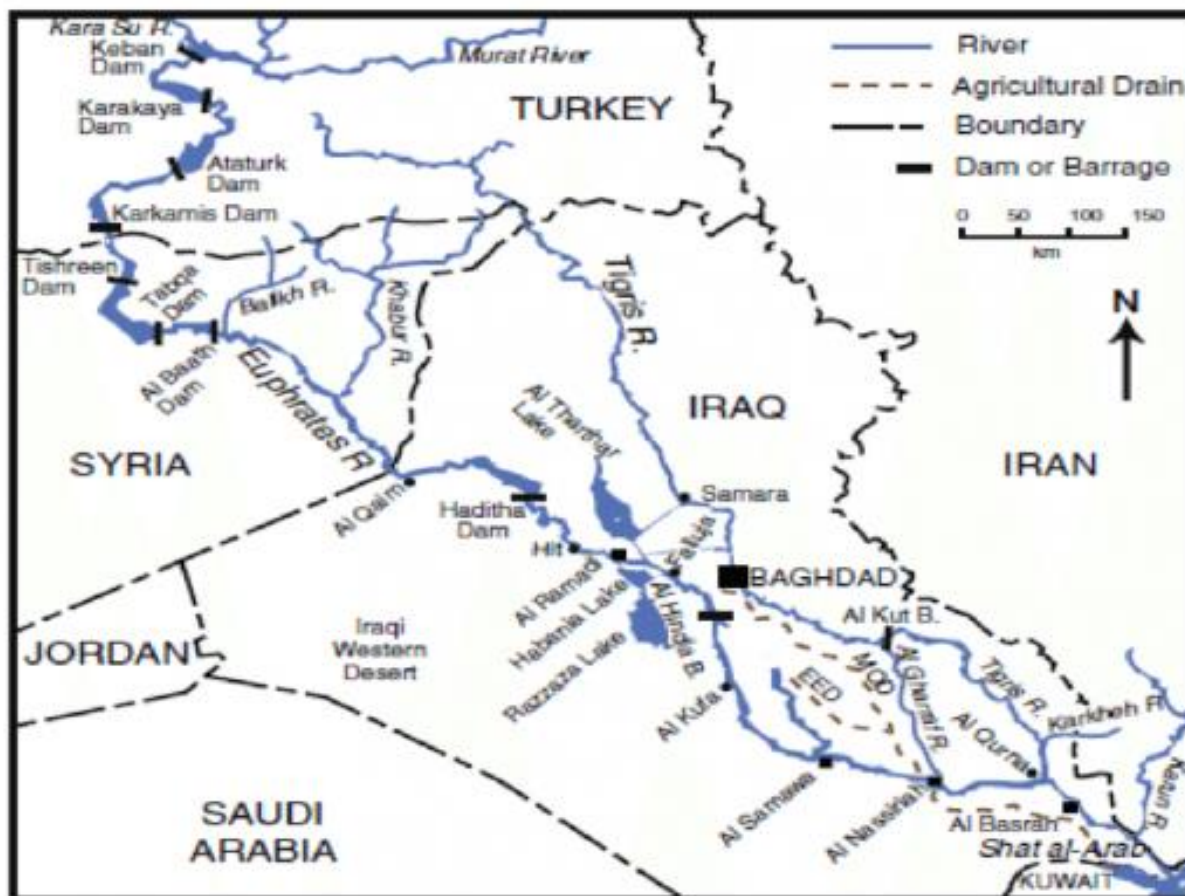


Figure 3. Map of Mesopotamia (Iraq), showing the Euphrates and Tigris Rivers (light blue lines), the city of Baghdad that straddles the Tigris River, the city of As Samawah (south of first D in the BAGHDAD label) on the Euphrates River, and the Persian Gulf in the lower right corner. (Source: <https://www.syriahr.com/en/179262/> Syrian villages accuse Turkey of cutting water access. August 12, 2020)

On **Figure 3** the Tigris River and the Euphrates River (**Figure 4**) flow from higher land in Syria, Turkey, and northwestern Mesopotamia and enter a nearly flat area about 130 km north of Baghdad.



Figure 4. Locations of Euphrates and Tigris Rivers. (Source: biblestudy.org Euphrates River Map, Pinterest image)

In this 130-km interval, the gradients of these rivers are small, with the elevation dropping about 2 m per km along the course of the rivers. Both the Euphrates and Tigris Rivers near Baghdad where the two rivers are nearest to each other have elevations of about 30 m above sea level, and at the city of As Samawah (280 km south of Baghdad), the Euphrates River has an elevation of 9 m (a drop in elevation of 21 m) (NOAA).⁵ A similar 21-meter drop occurs along the Tigris River. On that

basis, the gradients of the two rivers in these intervals are 0.075 m per km. In the additional 360 km to the Persian Gulf (sea level), the gradients are only about 0.025 m per km. Therefore, in both southeastern and central Mesopotamia the gradients are so low that the rivers barely flow downhill. Moreover, the joined floodplains of the Euphrates and Tigris Rivers are more than 200 km wide where their floodplains are connected together.⁶ Therefore, the combination of this width and the extension of exposed land to the ancient shoreline of the Persian Gulf another 200 km to the southeast in 6000 BC (not shown on this map) increases the area of nearly flat land by a very large amount and would explain why more than 6 months was needed for all the flooded land to drain so that Noah could find dry land on which to disembark from the ark.

All this nearly flat area means that the early humans living in this area (who later became the Hebrews after the time of Abraham) built their cities on the high lands of the natural levees adjacent to the two rivers or they built raised man-made brick-mounds (tells) on which houses were placed so that these early humans, raising barley or tending goats and sheep on the adjacent lower floodplains, could have a place to escape to when flooding occurred in ancient times, which commonly occurred nearly every year. But a huge flood of great depth could submerge the levees and tells, and people without a boat (ark) would drown.

Significance of the above

Now, what does all these relationships mean in understanding Noah's Flood story?

First of all, Noah's Flood likely did not happen about 1000 BCE because the Genesis flood narrative is almost a duplication of events that happened as reported in two ancient Babylonian epics that describe a huge flood. One is the Epic of Gilgamesh (2150-1400 BCE), describing a flood on the Euphrates River.⁷ The other is the Epic of Atrahasis (1646-1626 BCE, which has a huge flood on the Tigris River.⁸

Also, an older Sumerian large flood event (4000 BCE) is reported prior to the Noah account whose history was passed down orally until written down.

“Over a thousand years prior to this account, scholars from the ancient Sumerian civilization authored a remarkably similar account of the flood. In the Sumerian flood story, a hero builds an ark to preserve the species of the Earth from a great "Deluge" (flood) that is sent by the gods. The Sumerian civilization emerged from what is now called Iraq in 4,000 BCE.”⁹

In the Epic of Gilgamesh, Gilgamesh is warned that a god plans to destroy all humanity and is told to build a ship to save himself, his family, friends, and cattle. In the Epic of Atrahasis, a tribal chief survived with his family by floating in a boat down to the Persian Gulf. After the flood subsided, the chief got out on dry land and erected an altar and sacrificed to a water god so that such a flood would not happen again.¹⁰ Noah also built an altar when he got off the Ark and offered sacrifices (Genesis 8:20). Because these stories all describe an ancient huge flood in Mesopotamia, it is extremely likely that a huge flood could

have occurred in ancient times. Therefore, on the basis of the three older flood accounts, Noah's Flood story should not be considered to be a scientific account of the flood when the early humans were alive near the time in which Moses lived, but is a way in which Moses, if he is the author of Genesis, used the pagan epics to produce great theology that would have meaning for the early humans. That is, Moses taught something to the early humans that made sense to them in their time and culture without being concerned that what he was telling them was not correct or possibly scientifically accurate as we recognize today with our modern knowledge. **He was not giving a science lesson but a theology lesson.** Likely, Moses was smart enough to recognize that when Gilgamesh was warned that a god plans to destroy all humanity and is told to build a ship to save himself, his family, friends, and cattle, he recognized that a huge flood would have also destroyed all the animals on the Earth at the same time as humanity was being destroyed. Because animal life existed in the world where he and the early humans lived, he knew that the animals needed to have been saved as well as himself, his family, friends, and cattle. Therefore, in his Flood story, he had Noah build an ark big enough to also house all the local animals. During these ancient times perhaps as many as 1500 different animal species¹¹ lived in that area and housing pairs (male and female) of this number of kinds (species) of animals on the large-sized ark could have been possible without bringing all the animals in the whole world to the ark as a global flood model would require.

Note that the Muslims also have a similar flood story in their Bible (the Koran; Quran) in two places (Sura 11 and Sura 71) with a “chieftain” whose name was Nuh (similar to Noah), so the author of the Koran wanted to get in on the flood story.¹²

What evidence is there that Noah’s Flood did not cover the whole earth?

First of all is the fact that Genesis was written at a time in which the early humans believed in a three-tier universe (**Figure 5**).

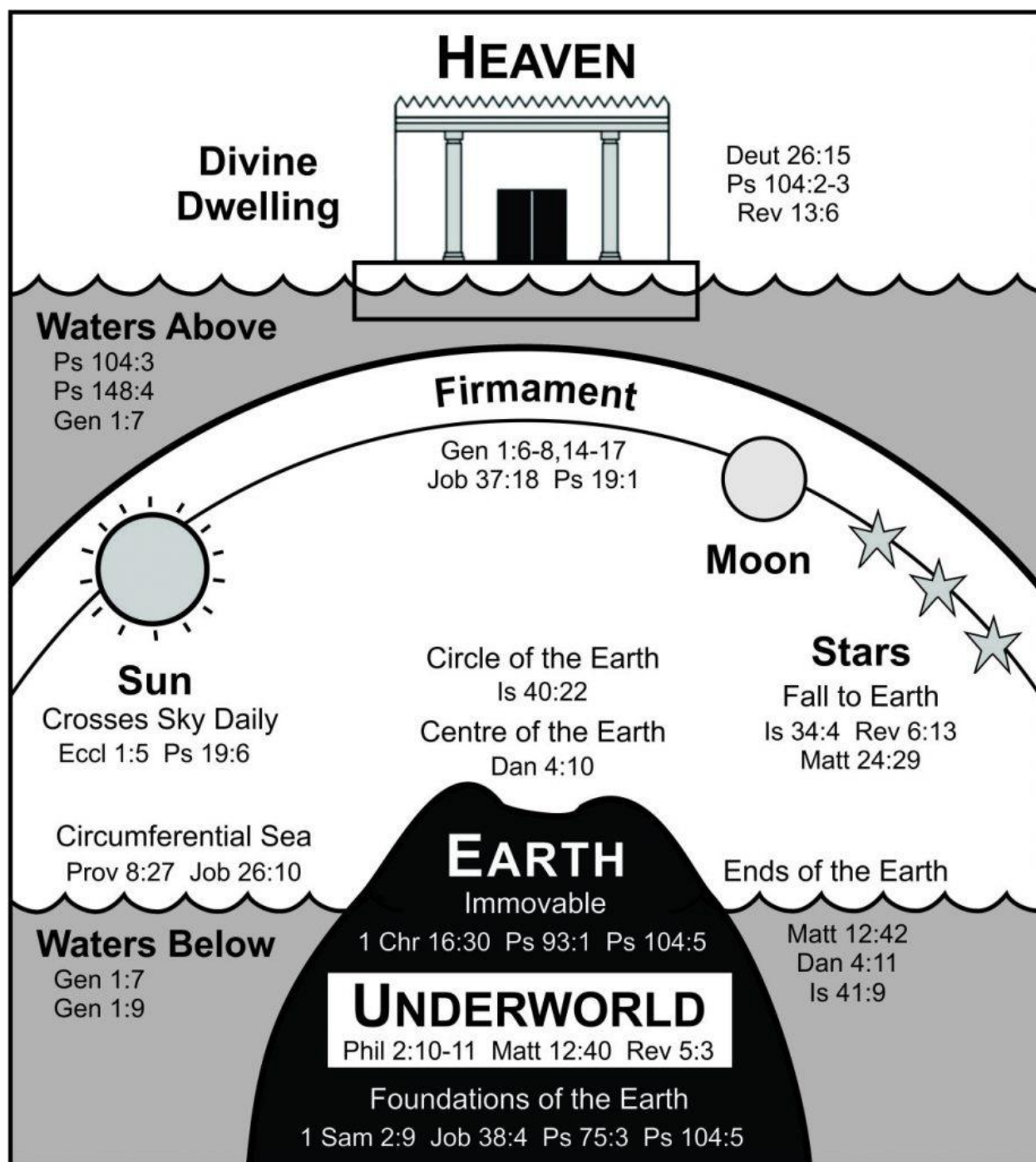


Figure 5. Three-tier universe. (Source: biologos.org. Interview with Denis Lamoureux. Scripture and Nature say “Yes” to Evolution)

On that basis, the nearly flat area south of Baghdad that could have been submerged by the huge flood that is mentioned in the Sumerian, Gilgamesh, and Atrahasis accounts would have been on the flat “immovable” Earth of the ancient universe (**Figure 5**). The mountains in Turkey (to the north), Arabia (to the west), and Iran (to the east) would have been unseen by Noah (or some early ancient chieftain) because the curvature of the Earth would have dropped these highlands below the horizon and out of sight. Everywhere the “chieftain” looked would have been underwater during a huge flood, and for that person this area was the whole world and not the global world.

Second, the huge flood could have been created by a category 5 hurricane, like the Katrina hurricane (**Figure 3**), that moved into southeastern Mesopotamia in ancient times, perhaps coming in from the Persian Gulf. If it came in from that direction during a spring tide and slowly moved through this area for several days, the combination of 40 days and 40 nights of rain (meaning lasting for a long time) would have submerged this area with water, perhaps 25-50 meters above the tops of the levees and tells. Moreover, it does not really matter if the storm came into this area from the Mediterranean Sea instead of the Persian Gulf because hurricanes have a rotating pattern and if the fringes of the rotating system reached the Persian Gulf from the Mediterranean direction, then its created waves would still erode the southeastern shore line of Mesopotamia.

Third, the evidence in **Figure 1** that shows how water molecules move in an ocean wave gives scientific proof that such a huge ancient flood never transported any sedimentary particles long distances to as far as the Grand Canyon if Noah's Flood was supposed to have transported and deposited sediment there. At most, the breaking (spilling) waves along the Persian Gulf shore line might have eroded sedimentary particles from the deltaic deposits of the Euphrates and Tigris Rivers and moved them a few 100 meters from their original shore position deeper into the Persian Gulf but not thousands and thousands of miles to the Grand Canyon. No hurricane waves (or multiple tsunamis),¹³ no matter how great the category number of a storm exists, can move sedimentary particles or suspend them for transport across great distances because oceanic waves only have a circular motion with no significant lateral translation of the water molecules (**Figure 1**).

The little to almost no erosion of rocks on continental coastal areas by hurricanes and tsunamis is because where these rocks are composed of igneous or metamorphic rocks or of well cemented sandstone sedimentary rocks, the short time of wave-pounding on these rocks by water of hardness of less than 1 on the Mohs hardness scale in comparison to hardness 6 for feldspars and 7 for quartz in the continental rocks produces no erosion of these rocks except for the erosion of un-cemented sands of beaches and sandbars.

Fourth, all kinds of scientific evidence exist that a global flood never happened.^{14, 15, 16} An example is fossils of growing *Lepidodendron* trees that became as tall as 100 feet in successive

15 coal layers of Carboniferous Age (mid-Noah's flood time of one year) that overlies each other.¹⁷ Trees do not grow 100 feet high in one year let alone in each of 15 successive layers, and these trees had to be growing at the time of the supposed Noah's global flood to be buried in Carboniferous coal layers. Also, 4,000 different species of very tiny radiolarians cannot be sorted out into an evolutionary sequence from the Cambrian to the present time by supposed rushing water of a global flood.

Fifth, thick salt layers (as much as 5,000 feet thick) cannot be deposited at many different geologic times on four different continents in the midst of Noah's Flood when the only time of drying and evaporation of the ocean waters that would chemically precipitate salt that is reported in the Bible is at the end of the Flood.¹⁸

Sixth, the sedimentary particles in Noah's supposed global flood deposits have to come from somewhere. The layers of sandstones and mudstones (shales) that occur in the Grand Canyon and around the world contain sand (quartz particles) and clay mineral particles that if the Creator were to arrange for their availability to be deposited, these particles are just not miraculously produced on Day 3 of the Genesis Week to be moved around the globe during a flood – if science is used to explain the origin of these sedimentary layers. That is, quartz and clay particles come from granitic rocks that have been weathered and eroded. First, the granite has to be formed from molten magma at depths as much as 5 km down in the Earth's crust and then cooled and crystallized, which takes millions of

years because of the slow cooling rate of the granite in the crust. Then, this granite must be uplifted and the overlying rock eroded off before the granite can be eroded to release the quartz grains from its matrix and its feldspar contents must be weathered by hydrous fluids to produce the clay minerals. Because sandstones account for 20 to 25 percent of the Earth's sedimentary crust and because mudstones (shales) account for ~65 percent of the sedimentary layers in the Earth's crust – to produce enough quartz grains and clay mineral particles for all these layers would take millions of years.¹⁹

Also, the limestone layers are composed of calcite crystals or of shells of animals, both with calcium carbonate (CaCO_3) compositions. If Noah's Flood waters transported the calcite crystals, those crystals have to be created somewhere before they can be transported. But to provide the calcium ions (Ca^{+2}) to form the calcium carbonate in calcite, the calcium has to be dissolved out of calcium-bearing rocks, such as in plagioclase feldspar crystals in basalt. However, this basalt must be erupted from volcanoes and the lava solidified before it can be weathered to release the calcium ions. The amount of time to provide enough calcium for limestone layers that are as much as 10 to 15 percent of the volumes of sedimentary rocks around the world would take millions of years.²⁰ Where in the Bible verses is the reported existence of great amounts of volcanic basaltic eruptions and for the long periods of time necessary for such weathering of basalt prior to Noah's Flood to occur?

Also, the quartz particles in the sandstones and the clay mineral particles in the shales in the Grand Canyon show evidence of having been transported by streams and not by fast moving currents in ocean waters. For example, the Tapeats Sandstone at the bottom of the geologic column of sedimentary rocks on top of the Great Unconformity has stream cross-bedding and contains muscovite and potassium feldspar and the underlying Precambrian rocks have very little muscovite and potassium feldspar. In fact, this sandstone contains illite (a kind of clay mineral) which forms from the hydrous weathering of potassium feldspar and, therefore, the sand and clay particles that occur in the Tapeats Sandstone likely came from a very distant source. That source could have been from the former 12,000 to 15,000 foot high Appalachian Mountains 3,000 miles away, and these mountains contain granite and have folded sedimentary rocks that were once deposited in the Atlantic Ocean before being shoved by plate tectonics onto eastern North America. The eroded sedimentary particles from these high mountains were carried west by these streams across the United States to be deposited in layers in the Grand Canyon as well as in other layers of the same geologic ages that are equivalent to those in the Grand Canyon. In other words, the sedimentary layers in the Grand Canyon, in part, represent re-cycled sediments from the Atlantic Ocean and not sediments transported by Noah's Flood waters.²¹

Seventh, raindrop prints cannot exist on shales and sandstones if the layers of sedimentary rock are alleged all to be deposited under water by Noah's Flood. Nor can dune cross-bedding exist in the Coconino and Navajo Sandstones in and

near the Grand Canyon.²² Desert conditions do not exist in the middle of a flood.²³

Eighth, volcanic ash layers cannot be separate in depositional burial sequences with clay layers in shales if Noah's Flood carried rushing water to deposit these layers because the rushing water would have mixed the volcanic ash and the clay minerals.²⁴

Ninth, if the sedimentary rocks around the world were deposited by Noah's Flood, how can the flood waters that are deposited in one year result in rocks that in some places are deposited from fresh water and other places form salty marine sea water? How can diatomite²⁵ be deposited in one locality and chalk²⁶ in another locality?

Finally, tenth, if the Bible is supposed to represent all of human history, shouldn't the history of humans on Earth also include what happened in Roman, Egyptian, Chinese, and North American Indian histories of their civilizations whose people of these other places are not mentioned in the Bible?

Observations and Conclusions

In an ancient world pagans worshiped the sun as a god, and because the sun provided them with heat and food from crops, they were worried as they watched the sun get lower and lower in the sky as wintertime progressed that the sun would leave them and never come back. So, they kept watch on a shadow of a vertical stick which would reach its longest length on

December 21 (the winter solstice), and on December 25 when they were certain that the shadow was shortning and indicated the sun was returning, they had a great celebration. Modern humans have turned this ancient celebration into the celebration of Christmas to honor the birth of Jesus.

In a similar fashion, Moses turned the three, ancient, pagan, flood stories into the Genesis Noah's Flood story to create a theological message that God was an awesome God that they could celebrate because God promised the early humans with a rainbow never to have such a large flood again. That is, the Genesis flood story was never intended to be interpreted scientifically as modern people do who want to make the Bible a perfect science book. In reading the Bible modern people need to "think Hebrew"²⁷ and read the Bible keeping in mind that authors of the Bible, although what they wrote was inspired by God, it was still done on the basis of the scientific knowledge (**Figure 5**) that they had in the time and culture in which they lived.²⁸

Those people who want to make the Bible a science textbook cannot just choose data that fit what they want to believe and ignore data that do not fit. That is not the way proper science is done. The evidence provided in this article clearly shows that Noah's Flood was never global and must be understood as a presentation by Moses to give the early humans a wonderful theological message. Modern people need to understand Noah's Flood story for what it was intended to be by Moses. Moses, also, told the early humans in Genesis 1 that the sun was not a god that was out to get them and needed to be worshipped, but there was only one God and this God created

the sun and other things (night, water, moon, stars, planets, animals, plants) that nearby tribes were also worshiping as gods and they were all GOOD and not bad and need not be feared. In that way Moses gave us great theology and not science in two places (the Noah's Flood story, and the Genesis Week story) that we can all believe in.^{29,30}

The reader also needs to understand the science that is involved. Young-Earth creationists now seem to think that hurricanes would have been necessary to cause the extensive deposition of all the sedimentary rock layers in the Grand Canyon and around the world during Noah's Flood, but they do not seem to recognize the necessary steps to produce the final result. These steps are the following.

First, warm water from which a large amount of evaporation of water occurs is required, and this warm water heats the overlying air so that it expands and creates a low-pressure area in the overlying atmosphere that is heated.

Second, this heated air moves across the Earth's surface and because of the Coriolis Effect – the air in the overlying atmosphere becomes the low-pressure site to which air is sucked into and spins.

Third, the extra amounts of water coming from the heated water spins in the atmosphere in a counter-clockwise motion in the northern hemisphere. On that basis, great volumes of water-saturated air are spread over a large area.

Fourth, when a hurricane then moves to the shoreline and then over rocks in a continent where a cooler region exists, the water condenses in the cool air and creates the abundant falling-rain that does the erosion of the rocks. The ocean waves of the hurricane do not cause the erosion. That is, the circular motions

of water in the hurricane-generated-waves (or giant waves in tsunamis) neither erode nor transport suspended eroded particles. It is the great amounts of water falling on the continental rocks that gravity causes this water to flow rapidly and produce fast-moving eroding currents that transport the rock debris that eventually form the sedimentary rocks that are in the Grand Canyon and around the world, depending on where the local area is over which hurricane-generated-water moves and upon the high elevation of the rocks in the continental areas whose relatively steep slopes create the rapid flow of the water.

Fifth, the minerals in the rocks on the continent need to have been first created by magmatic processes and then to have been deeply weathered to change the hard feldspars (hardness 6) into soft clay minerals (hardness 1) and loosen quartz grains (hardness 7) from the enclosing clay minerals in these rocks in order for the rain water to erode the rocks and transport the quartz sand and clay mineral particles across a continent. Some of these particles are deposited in river floodplains or in fresh water lakes while some of them are carried to ocean basins and deposited to form layers of sandstones and mudstones (shales). This fast-moving water draining off a continent would also transport dissolved calcium ions that can be precipitated in calcite in limestone or be incorporated in shells of marine animals.

Sixth, of course hurricanes are not necessary to produce all the sedimentary rock debris in layers around the world. Normal storms with falling rain on high elevations on the continental areas will also erode and transport eroded debris to the floodplains, fresh water lakes, and ocean basins.

All of the above cannot be accomplished in 6,000 to 10,000 years and requires millions of years of producing the igneous

rocks (granite and basalt) and then more millions of years for uplift, weathering, and erosion of the altered rocks.

In the Noah's Flood story, a hurricane in that area was likely rare in the Mediterranean Sea or in the Persian Gulf (or in the ocean beyond the gulf) that could have moved over Mesopotamia and produced the "40 days and 40 nights" of rain to create the large so-called Noah's Flood. But evidence exists that it happened because it was recorded in the three, ancient, pagan flood stories and by Moses in a modified theological-meaningful story in Genesis and also by the author of the Koran.

Acknowledgments

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Notes

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Figure captions

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Figure Images

Waves –circular motion

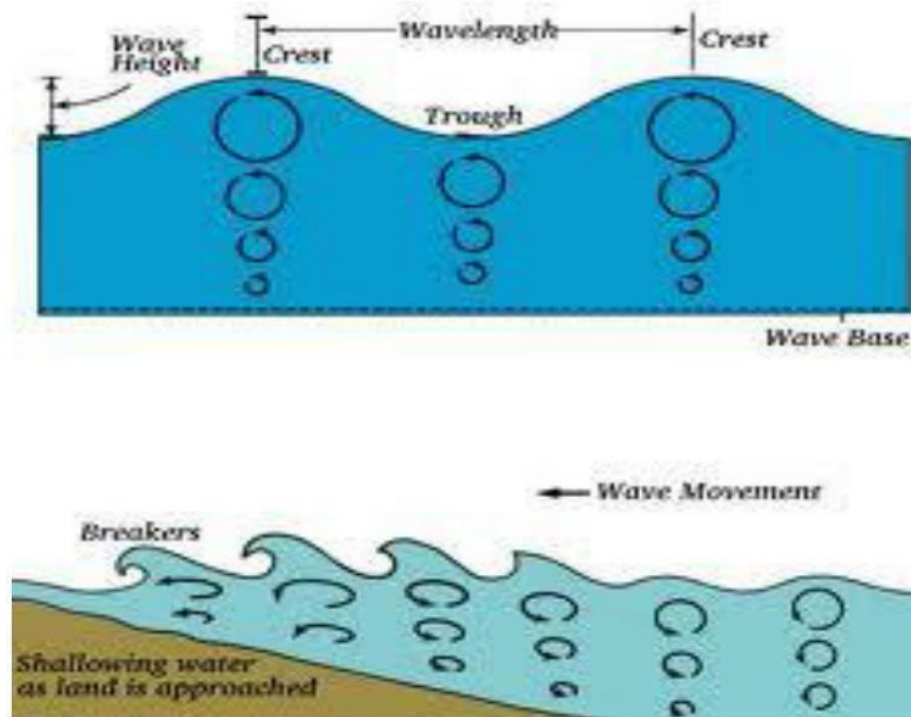


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Figure 2.
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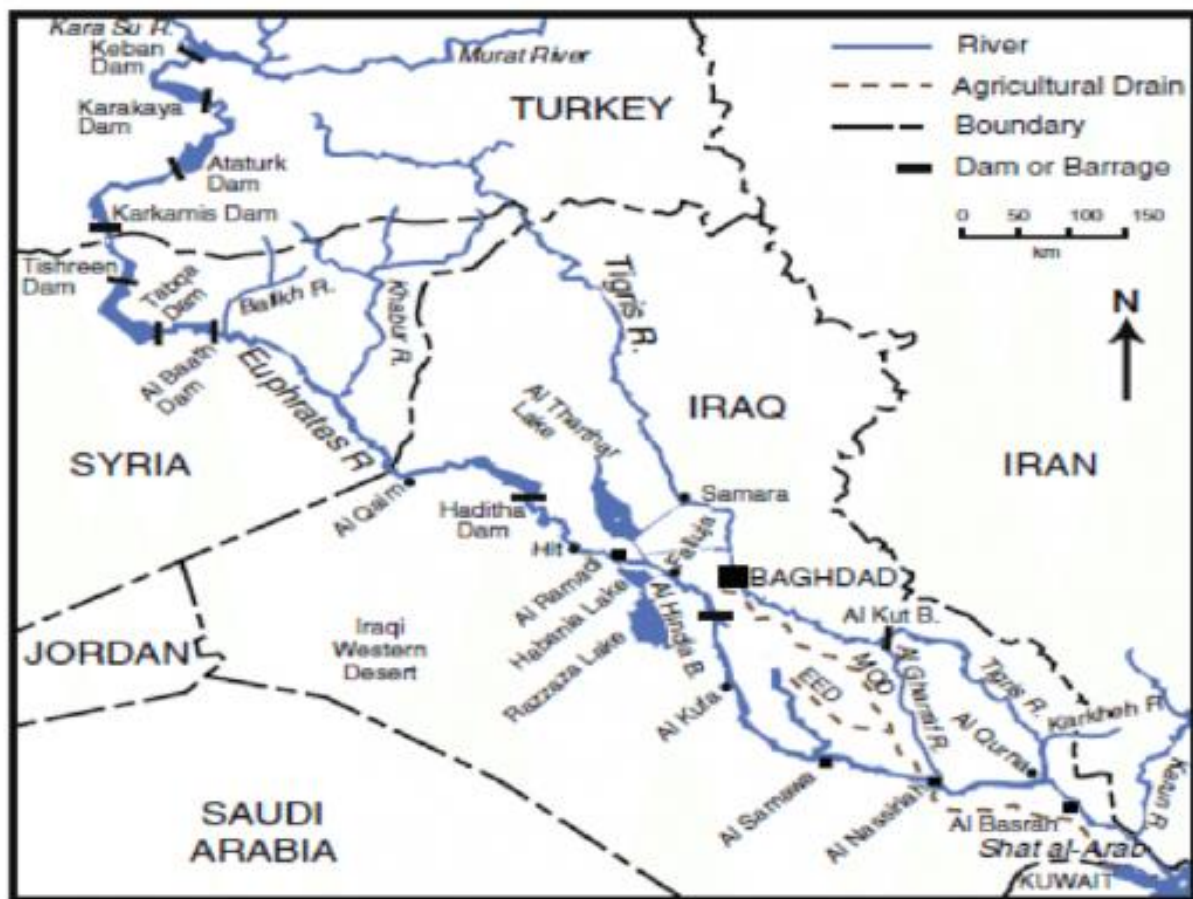


Figure 3.



Figure 4.

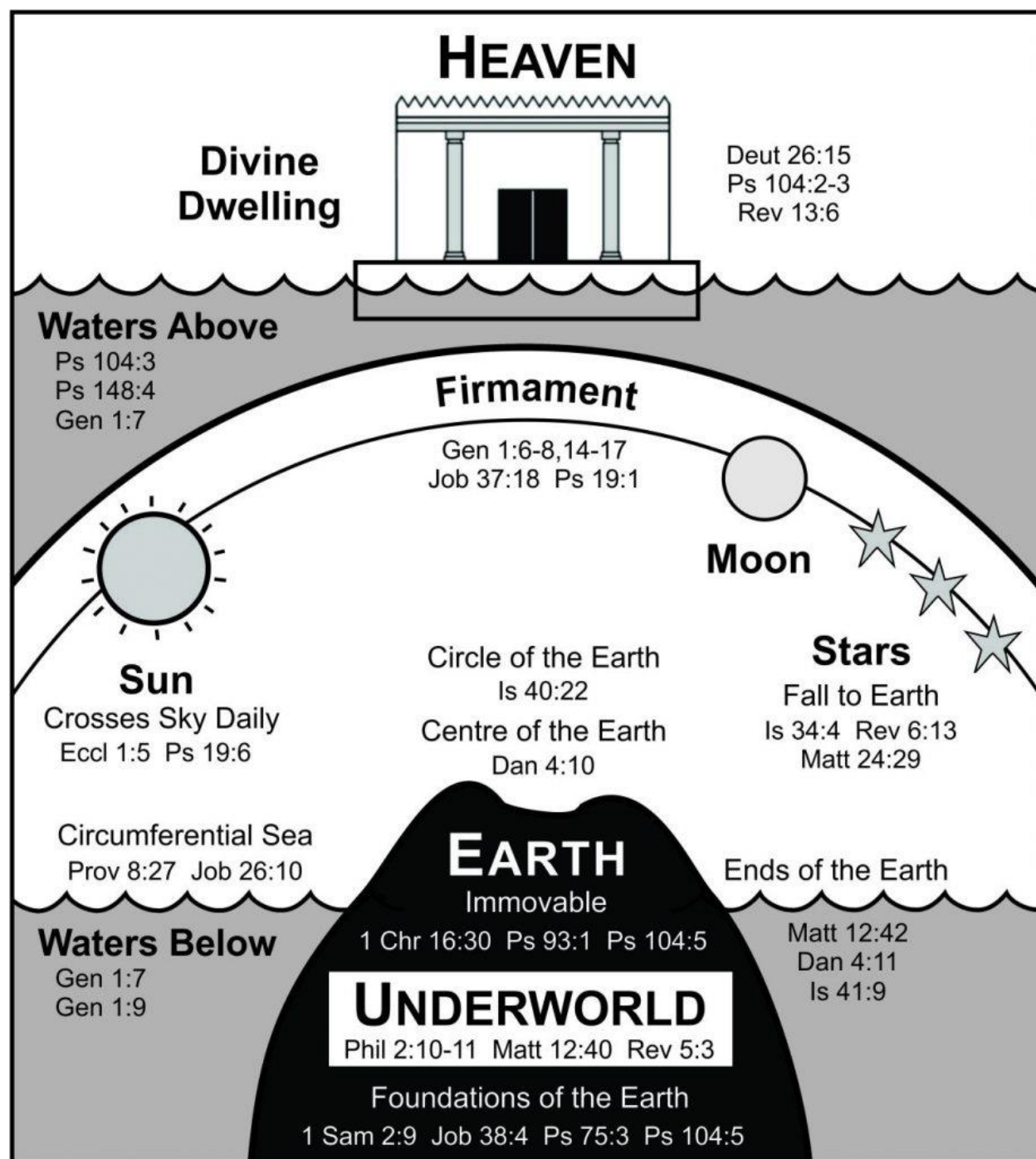


Figure 5.

Author's description

Lorence Collins PhD University of Illinois is a retired professor of geology at California State University Northridge and has written a book “A Christian Geologist Explains Why the Earth Cannot Be 6,000 Years Old – Let’s Heal the Divide in the Church.” He has website in Opposition to Creationism with 97 articles at: <http://www.csun.edu/~vcgeo005/creation.html>.