Fountains of the Great Deep and Noah's Flood

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Introduction

Genesis 7:11 ***"In the six hundredth year of Noah's life, in the second month, on the seventeenth day of the month, on the same day all the fountains of the great deep burst open, and the floodgates of the sky were opened."*** (New American Standard Bible)

There has been much controversy **(a)** over where the bursting of "the fountains of the great deep" occurred that supposedly contributed huge volumes of water to Noah's flood and **(b)** over what were the "floodgates of the sky"?

The Floodgates

The "floodgates of the sky" likely comes from an early unscientific understanding that water in the heavens was held up by a canopy (Genesis 1:6 "the waters above the firmament,") from which water could pour down in huge quantities and that this canopy (firmament) was a solid dome that held up such water. But modern scientific meteorological understanding shows that our atmosphere can hold water only as moisture in clouds or as invisible molecules of water in very small volumes in comparison to the total volumes of water that occur in the Earth's oceans and that such a relatively small amount that is held in the atmosphere is dependent on temperature. Rain occurs when water in clouds becomes cooled and reaches a saturation point for a given temperature and falls either as liquid water or as snow. Therefore, the "opening of the floodgates" can simply mean that a lot of rain fell during the "40 days and 40 nights" of rain (Genesis 7:12), and this expression between quotation marks need not be precisely

numerically 40 but is the ancient Hebrew way of saying that it rained a lot and for a long time.

The Source of the "Fountains of the Great Deep"

Young-Earth creationists who believe that the Earth is 6,000 years old and that Noah's Flood was worldwide generally suggest that this water in the "fountains of the great deep" emerged from mid-ocean spreading centers (rift zones) during volcanic eruptions when cracks occurred in the Earth's crust to allow large quantities of water to emerge from the interior of the Earth (Taylor). Such spreading centers are known to exist from modern geologic studies (**Figures 1** and **2**).

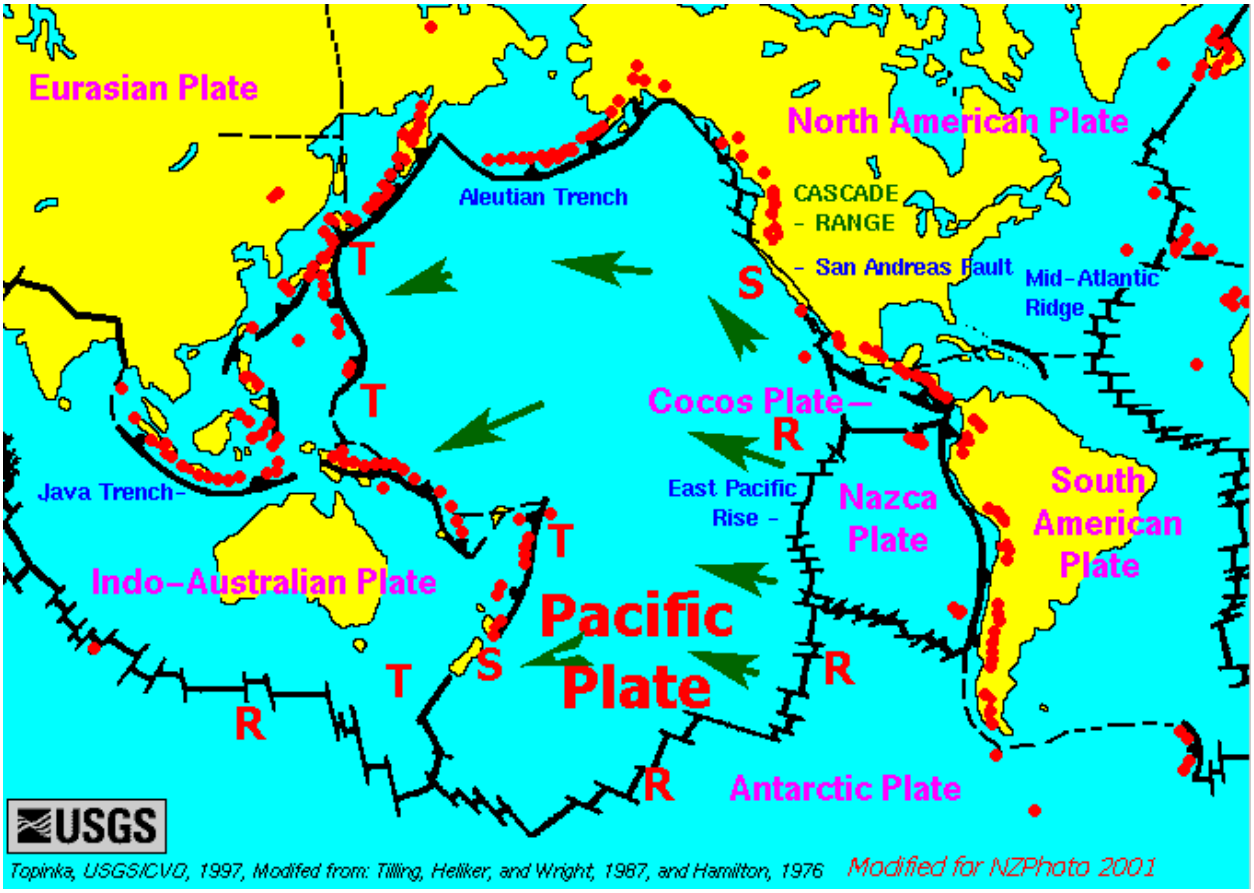

Figure 1. Mid-ocean spreading centers or rift zones (R).

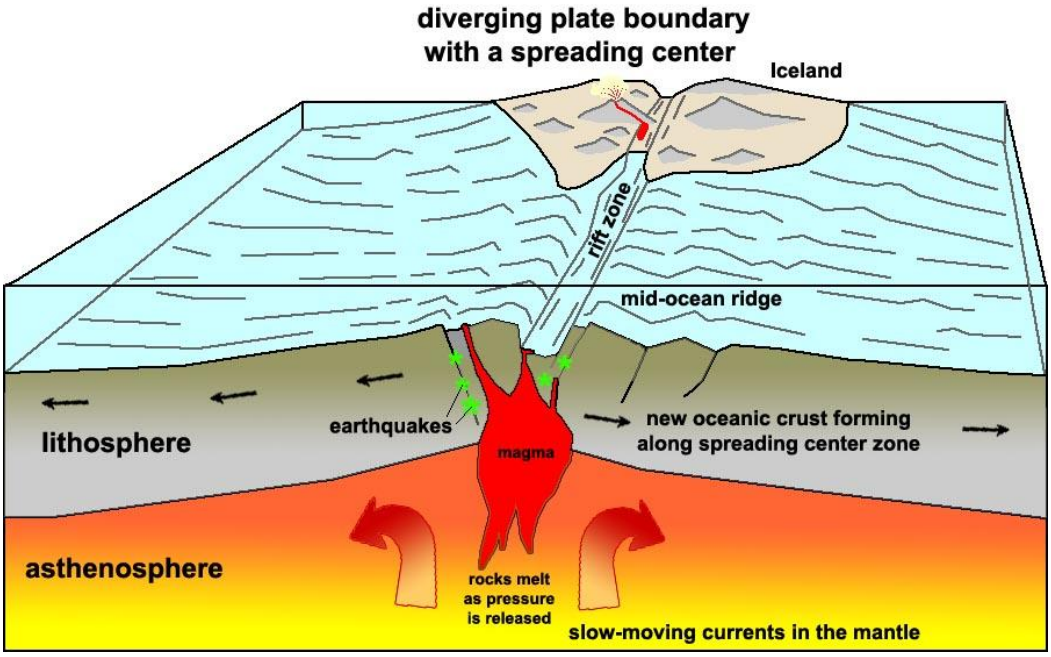

Figure 2. Cross-section of a mid-ocean spreading center with a central rift zone.

Water does emerge in such places as a component that is dissolved in the volcanic lava that makes the lava explosive and fluid. That is, water can be dissolved in magma at depth in the lithosphere and asthenosphere (**Figure 2**) or in lava at the Earth's surface as invisible steam under high pressure, but when this water is under less pressure, as occurs at or near the Earth's surface, 1 cc of water at 100ºC will expand to 520 cc of gaseous steam at 100ºC when the right lower pressure boundary is reached. Therefore, volcanic eruptions can be quite explosive when the molten rock (lava) comes to the Earth's surface.

But no large amount of water in cavernous chambers has ever been known to exist in the Earth's mantle or crust that could be free to erupt as a large body of liquid water in "fountains from the great deep" to provide the large volumes of water in a worldwide Flood. **Scientifically, such is not possible.** The great rock pressure at depth forces all available water **(a)** to be in the pore spaces between packed mineral grains in sedimentary rocks, **(b)** to exist as steam dissolved in molten or solid mantle rock (as indicated above), or **(c)** to be combined into hydrous minerals as part of their crystal structures. Likely, there is four to five times the amount of water trapped in these hydrous minerals in the mantle and in igneous, metamorphic, and sedimentary rocks in the Earth's crust than occurs in the present oceans (Coghian, 2017).

On the basis that water at great depths in hot magma only moves up toward the Earth's extremely slowly because of the attraction of the water molecules to electronic charges of ions in adjacent silicate crystals in the solid mantle or molten magma easy upward flow of any water molecules is prevented. The most frequent time that volcanic eruptions can occur is only perhaps as often as 5 to 10 years that basalt volcanoes erupt in Hawaii (Historical). Moreover, the amount of water escaping as steam from the Earth's interior during such eruptions is very small. Therefore, the quantities of water emerging from spreading centers cannot be the "fountains of the great deep" that fed Noah's flood waters.

> ***From principles of physics and chemistry, such as density, pressure, temperature, phase behavior, and solubility, bodies of water in chambers in the crust or mantle are not scientifically reasonable.***

Impossibility of a Worldwide Flood

Furthermore, a worldwide Noah's Flood is virtually impossible for many reasons. Four of these reasons include the following facts:

(1) Fossilized raindrop prints are found in Triassic, Permian, Mississippian, Devonian, and Cambrian aged rock layers around the world (Senter, 2011), and such cannot exist if the sediments of these ages (as in the Grand Canyon) were transported and deposited ***under water*** during a one-year Flood (**Figure 3**)

Figure 3. Fossilized raindrop prints on the top of a wave-rippled sandstone from the Horton Bluff Formation (Mississippian), near Avonport, Nova Scotia

(2) Salt deposits (halite beds) are only formed by evaporation of sea water and occur in four of the five continents on Earth (except for Antarctica), Such salt deposits occur at many different geologic periods that fall within the supposed one-year time frame during which Noah's Flood is said to have happened. Some of these salt deposits are many hundreds of feet thick (even 3,000 feet thick) (Collins, 2006). A seismic section of the North Santos Basin offshore Brazil has 9,000 feet of salt (**Figure 4**).

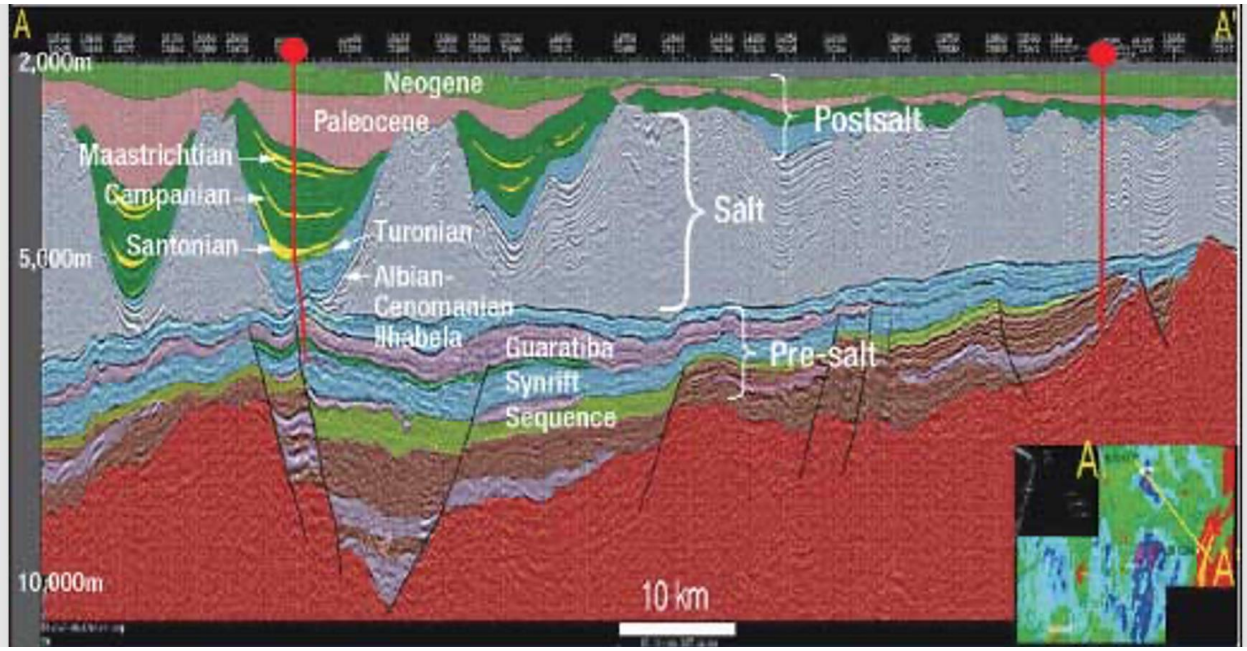

Figure 4. Late Cretaceous Santorian salt deposits, offshore Brazil. Source: Ken Wolgemuth.

Another example within the United States includes the Silurian Salina salt deposit (over 400 feet at its thickest part) that underlies the state of Michigan (**Figure 5**).

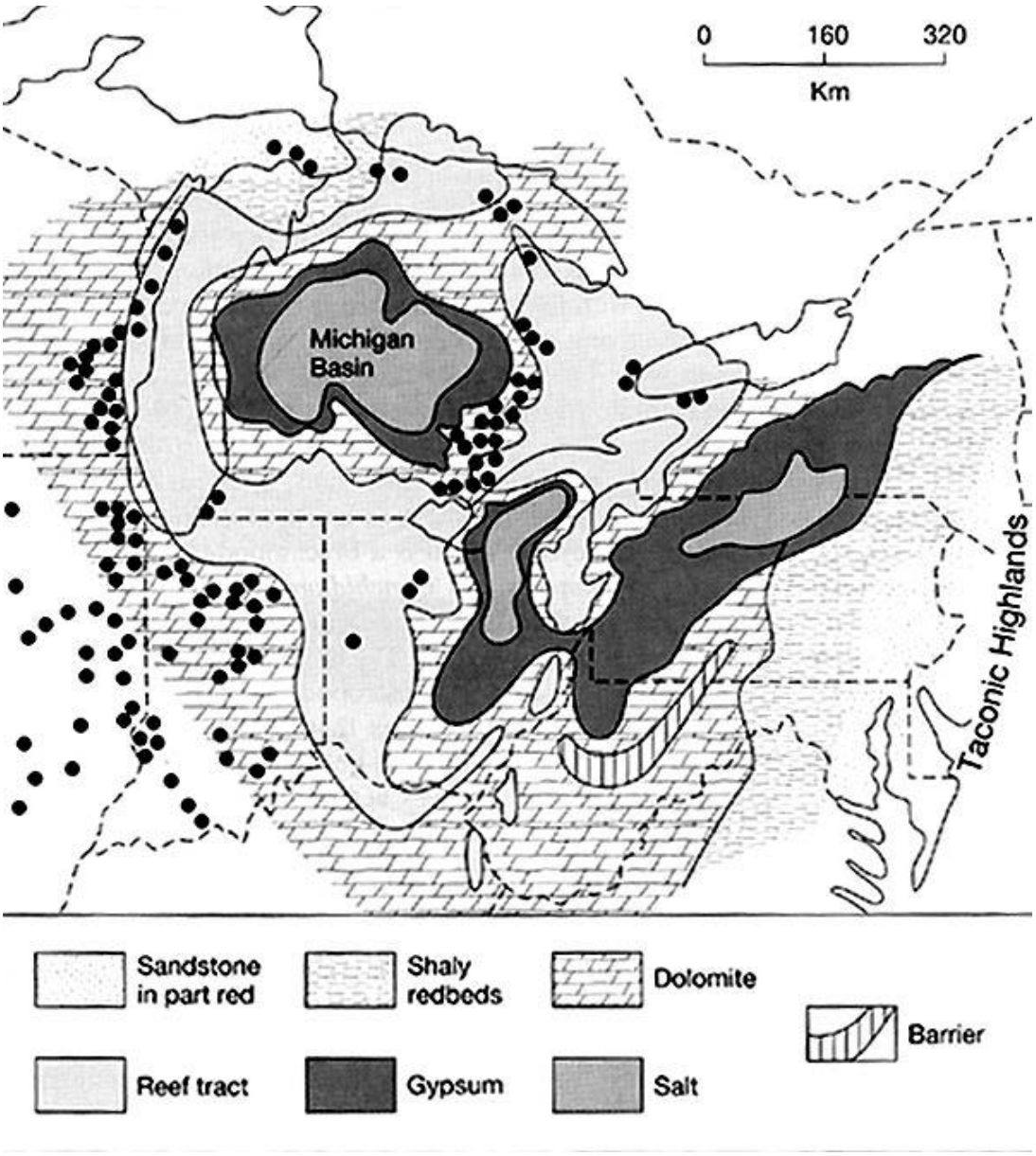

Figure 5. Silurian salt deposits in Michigan Basin, overlying gypsum and shaly redbeds.

This salt layer overlies a bed of gypsum, a mineral that also precipitated from bodies of evaporating sea water prior to salt precipitation. This gypsum bed is bordered by shaly redbeds in which tiny, black, transported magnetite (iron oxide) grains that were transported with clay particles in the redbeds have been oxidized in air to become red hematite. This red oxidized iron compound clearly shows that these layers were deposited in open air where abundant oxygen is available and not underwater during Noah's Flood. Young-Earth creationists claim

that the salt precipitated from hot water that came up from spreading centers, but the chlorine ion in water is so chemically soluble that wherever (or if) this chlorine-bearing salty water landed in Noah's flood waters, the chlorine ions in the salty water would have been dispersed and no salt would have been precipitated (Collins, 2006; Collins, 2018a). Moreover, the only time that Noah's flood story (Genesis 7:12 to 8:16) reports a period of drying that might result in sufficient evaporation to cause salt (sodium chloride) to precipitate is at the end of the Flood, and not during the middle of the Flood.

(3) Tiny sedimentary clay particles in shale in all the sedimentary rocks around the world (such as in the Grand Canyon) that were supposedly transported there across many thousands of miles during a worldwide Flood **(a)** had to be carried in suspension in very turbulent water by Noah's Flood in which the clay particles ***that are interlayered with volcanic ash layers in some places*** (e.g., the Cretaceous Belle Fourche shale; Morton, 2001) could not possibily settle out of turbulent water without the clay and ash being thoroughly mixed and **(b)** when clay particles in shale layers cannot settle out in less than one month during the 6 months in which Noah's flood was depositing sediment where the shale layers are as much as 3,000 feet thick or more, as in the Late Cretaceous Mancos shale in Colorado (Collins, 2019), and when each inch of clay particles in the shale would take more than two weeks to settle out of the water column (**Figure 6**).

Figure 6). Late Cretaceous Mancos shale in Colorado (more than 3,000 feet thick). In some places the sandstone layer shown on top of the Mancos shale has river channels that erode down into the Mancos shale with large tree logs in them, and turbulent floodwaters of Noah's Flood would have scattered such logs and not deposit them in river channels.

And (4) the Permian Coconino Sandstone in the Grand Canyon and the Jurassic Navajo Sandstone in Arizona and Utah are composed of desert sand deposits, and deserts cannot exist in the midst of Noah's Flood (**Figure 7**; Collins, 2020).

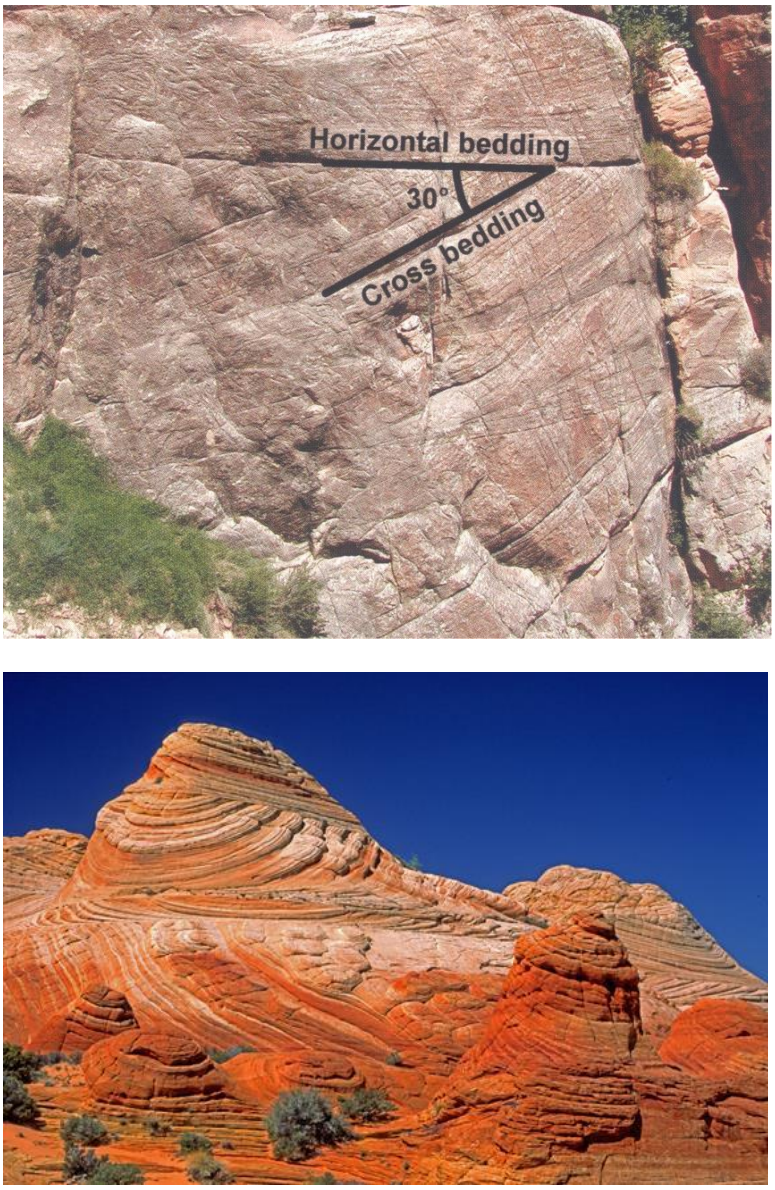

Figure 7. Upper image: Cross-bedding in the Permian Coconino Sandstone in the Grand Canyon with 30 degree angles of dip, indicative of desert dune cross-bedding. Source: Hill et al. 2016, page 70. Lower image: Giant desert dune cross-bedding in the Jurassic Navajo Sandstone with dip angles greater than 30 degrees.

Power of Hurricane Erosion and Sources of Sedimentary Particles

As further evidence of the impossibility of a worldwide Flood, the largest category 5 hurricanes with winds more than 156 mph are able to move 100 cubic miles of sand in sandbars off the coasts of the United States no more than 100 feet

when Noah's Flood water would have had to move more than 30,000 cubic miles of sand more than 2,000 miles if all sand grains in sandstones (Tapeats, Supai Group, and Coconino Sandstones) in the Grand Canyon were transported there in Noah's Flood waters in less than 6 months. To do that amount of transportation that far in comparison to how far category 5 hurricanes can move sand would make Noah's flood waters so turbulent and violent that Noah's ark would not survive if the same kinds of turbulence and velocity of wind occurred in Mesopotamia during Noah's Flood where the ark supposedly was built. If the young-Earth creationists' "flood geology model" is correct, such great turbulence and velocity of wind must have existed in Mesopotamia because there are 32,000 feet of Paleozoic and Mesozoic sedimentary rocks (supposedly deposited by Noah's worldwide flood) underlying where the Euphrates and Tigris Rivers join in Mesopotamia (Hill, 2019, p. 38-39)

Furthermore, the particles that make up of sedimentary rocks of clay, sand, and calcite (in limestone) transported by such flood waters would somehow have already been prepared by weathering of huge volumes of metamorphic and igneous rocks so that the sediment would already be ready for transport. This availability of sediment takes millions of years to produce such great thicknesses of surficial weathered soils in which such particles would occur that are loosened and ready to be transported in a "flood geology model." Where on Earth would weathered rock exist to produce soils containing sand and clay particles all over the world that are several thousands of feet thick ready to be moved and what would be the source of calcium ions to make the calcite crystals in shells and skeletons that compose the many thousands of feet thicknesses of limestone sedimentary beds that occur worldwide? All of this calcium and clay and quartz would need to be available on **Day Three** of the **Genesis Week** before Noah's Flood waters could erode and transport such sedimentary components several thousands of miles around the Earth's surface? Moreover, on **Day Three,** the Earth did not even have any oxygen in its atmosphere so that the creatures killed by Noah's supposed worldwide flood could be alive (Collins, 2018b). Where in the Bible is this absence of oxygen reported? Therefore, a worldwide Noah's Flood can only be accomplished by miracles and not by any process that obeys natural laws that the Creator also made.

"Fountains of the Great Deep" in Mesopotamia

Nevertheless, there is a logical explanation for such water as "fountains of the great deep" in Mesopotamia in biblical times for Noah's Flood. To understand how "fountains of the great deep" can occur in Mesopotamia, the climate conditions and local geology must be explained. For example, the Zagros Mountains in Iran east of Mesopotamia (Iraq) (**Figure 8**) are often covered with winter snow and have large amounts of rainfall during storms (as most mountains do because cooler temperatures occur higher up in mountains which causes rain to form and fall). When this snow melts or large amounts of water in rain are produced, some of this water is carried away in surface drainage. However, a large amount of it soaks into the ground and into fractures in bed rock to eventually move through tunnels in limestone and emerge as springs that feed the Tigris River.

Figure 8. Map of ancient Mesopotamia (Iraq) area, showing the drainage of the Tigris and Euphrates Rivers in Syria (Arabia) and Assyria and in the Zagros Mountains in Iran. Turkey is out of view to the north. The modern city of Baghdad is shown on the Tigris River (top center). Locations of ancient cities of Kish, Ur, Shuruppak (Fara) (Raikes, 1966), and Eridu (MacDonald, 1988) are also shown..

If that emergence of water from limestone tunnels happened during Noah's Flood when extra amounts of rain or melting snow occurred, springs that fed the Tigris Rivers could have been **gushing** with large volumes of water, emerging as "fountains from the great deep" (Hill, 2019, page 69). This spring water and surface water in streams flowing from the Zagros Mountains would then flow down the Tigris River and produce perhaps half of the volume of Noah's Flood. However, such water moving through and emerging from the limestone tunnels would produce almost no sediment to be transported because limestone does not erode to form sediment. It merely dissolves in water very slowly to release calcium ions that ultimately may eventually be used by marine creatures to form their shells or skeletons.

However, conditions are different for water flowing down the Euphrates River whose watershed includes Arabia, Syria (Assyria), and Turkey to the west and north instead of Iran to the east. In these places the mountains on which rain fell are composed largely of sandstones and shale beds that could supply quartz grains and clay particles as transported sediments that could have been deposited by a large Noah's Flood. But, if floods prior to Noah's flood had already removed most of the available loose clay and quartz grain sediment in these areas which could have been transported by the Euphrates River during Noah's flood, then even with a large volume of water in Noah's Flood, there could have been only minimal amounts of clay particles and quartz sand grains available to be transported and deposited in the floodplains of southeastern Mesopotamia. That is, a sediment supply has to be available before it can be transported, and it does not matter how great the volume of water is in a particular flood, if there is little sediment available to be transported and deposited by the flood waters. Therefore, people looking for and expecting to find large thicknesses of sediment in Mesopotamia as evidence for the existence of Noah's Flood may never find such thicknesses.

Hill (2006) also addresses this issue in a slightly different fashion. She says that a popular misconception is that a great inundation such as Noah's Flood should have left a widespread layer of sediment all over Mesopotamia. If flood deposits occur at Shuruppak (Fara), then why not at nearby Kish? Why have no flood deposits been found at Ur that correspond to Noah's Flood, and why in the city-mound of Ur do some pits contain thick flood deposits while other pits nearby contain no flood deposits? This presumed problematic situation is completely

understandable to hydrologists − in fact, it is what they expect. Floods erode sediment as well as deposit sediment. Rivers in vegetated terrain (like in northern Mesopotamia) are capable of eroding less sediments than in unvegetated clay silt terrain (like in southern Mesopotamia).

Hill (2006, p. 123-127) also says that it is thus possible that based on the various factors huge floods could predominantly affect only certain areas while avoiding others. These factors include winds, springs, rains, etc., that local giant floods at Shuruppak or Ur or any other place could happen while leaving other cities or regions like Eridu or Kish largely undamaged.

Conditions of the Euphrates and Tigris River Floodplains

From Baghdad (**Figure 8**) south where the Euphrates and Tigris Rivers join, (a) the combined flood plains are nearly 322 kilometers (200 miles) wide, (b) the gradient of the two rivers is almost flat (0.025 to 0.075 meters per kilometer; Collins, 2009), and (c) the width of the floodplain narrows southward. This narrowing means that water coming from upstream could pile-up and become deeper and deeper as flood waters flowed from the northwest to the narrowed floodplain part of southeastern Mesopotamia. As a consequence and because of very slow drainage of water on a nearly flat surface, it might take 6 months for most of the water in Noah's Flood to drain into the Gulf during a very large flood. This very slow drainage would explain why Noah's Flood is said to have lasted one year. This condition of slow drainage of water on floodplains is also observed in the United States for large floods where water piles up and drainage takes 1 to 3 months before some floodplains lose their water cover. Moreover, water that is piled-up cannot flow rapidly and, therefore, is incapable of transporting sediment. Only fast moving water can transport sediment. This fact is another reason why large thicknesses of flood-deposited sediment produced by Noah's Flood may never be found in southeastern Mesopotamia because such great amounts of sediment never were transported there by the very slow moving water.

The places where flood deposits in Mesopotamia are reported include the ancient cities of Ur, Kish, and Shuruppak (Fara) (Raike, 1966) and Eridu (MacDonald, 1988) (**Figure 8**), and these cities are in the Euphrates River floodplain areas or in areas west of the Tigris River on the Euphrates River side and not on the eastern side adjacent to the Zagros Mountains. This relationship makes sense because the Tigris River would not be supplying much if any sediment (as indicated above) that would be deposited during a flood.

Large Lakes in the Floodplains

Several large lakes in the floodplains of the Euphrates and Tigris Rivers are localities that are low depression areas where water in a flood does not drain out to the Gulf. Examples include Lake Hawr al Hammar, Hawr as Sa'diya, and Hawr as Saniyalt (Collins, 2009). Of course, water does not flow up-hill over the natural levees that are five to ten miles wide in some places with gently sloping surfaces away from the river channels, and lake water in these depressions cannot escape. Therefore, all floods in Mesopotamia will locally have such lakes on these river floodplains after each flood. Most of the ancient Hebrew cities were built on these natural levees, or the Hebrews built flat-topped mounds called "tells" (or "talls") so that people growing crops on the floodplains away from the tells could escape to high ground when the flood plains became inundated with water during a large flood. However, the water in Noah's Flood was likely deep enough to submerge such tells. Therefore, all people and animals not on Noah's Ark would have been drowned, and because of the Hebrew culture of that biblical time, such loss of life during major or minor catastrophes (e.g., earthquakes, floods, collapse of the tower of Siloam [Luke 13:14] that Jesus reported not to be punishment by God) would have been interpreted as God punishing evil or wicked people when, in fact, both good and bad people were likely drowned when such natural catastrophes or accidents occur.

Conclusion

On the basis of the information provided in this article, we can conclude that the "fountains of the great deep" were local natural occurrences of large volumes of water emerging from springs and that Noah's Flood could have involved a large amount of water that was formed by many days of rain and from melted snow and rain that fell in the mountains of Arabia, Assyria, Turkey, and Iran during a storm of long duration (**Figure 8**). Likely, little sediment was available to be transported by such a huge flood of water because the water coming from the Zagros Mountains east of the Tigris River and entering the Tigris River had little to no sediment in it to be transported and deposited by the Flood. Moreover, water flowing down the Euphrates River may also have had little available sediment in it because such sediment had already mostly been removed from the mountainous landscapes in Arabia, Assyria, and Turkey by previous floods of lesser duration and amounts of rainfall. Therefore, it is logical that Noah's Flood need not have thick deposits of clay and silt sediments in the floodplains in southeastern Mesopotamia that would be evidence for such a large Flood.

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