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USE OF SEDIMENTARY MEGASEQUENCES TO RE-CREATE PRE-FLOOD GEOGRAPHY

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ABSTRACT

Knowledge of pre-Flood geography and the location of the Garden of Eden have eluded Bible-believing scientists and theologians. This study attempts to reconstruct the gross geography of the pre-Flood world by examining the detailed stratigraphy that was deposited during the Flood. Over 1500 stratigraphic columns were constructed across North and South America and Africa, recording the lithology and stratigraphy at each location. Sedimentary layers were examined using Sloss-type megasequences which allowed detailed analysis of the progression of the Flood in six discrete depositional segments. The three earliest megasequences, Sauk, Tippecanoe and Kaskaskia, were the most limited in areal coverage and volume and contain almost exclusively marine fossils, indicating a likely marine realm. The 4th megasequence (Absaroka) shows a dramatic increase in global coverage and volume and includes the first major plant and terrestrial animal fossils. The 5th megasequence (Zuni) appears to be the highest water point of the Flood (Day 150) as it exhibits the maximum global volume of sediment and the maximum areal coverage, compared to all earlier megasequences. The final megasequence (Tejas) exhibits fossils indicative of the highest upland areas of the pre-Flood world. Its rocks document a major shift in direction reflective of the receding water phase of the Flood. Results include the first, data-based, pre-Flood geography map for half of the world. By comparing the individual megasequences to the fossil record, patterns emerge that fit the concept of ecological zonation. The paper concludes with a new ecological zonation-megasequence model for Flood strata and the fossil record.

KEY WORDS

Sloss sequences, megasequences, pre-Flood geography, shallow seas, uplands, lowlands, Pangaea, stratigraphic columns

INTRODUCTION

Secularists, theologians and creation scientists have all had an interest in pre-Flood geography, particularly when applied to the search for the Garden of Eden (Cosner and Carter 2016; Carter and Cosner 2016; Moshier and Hill 2016; Hughes 1997; Munday 1996). The creation model is weak in its knowledge of the pre-Flood world partly because the Bible only gives us a few details of 'the world that then was.' Although there has been much speculation about the pre-Flood geography in creationist literature, very little has been based on empirical data. Most creationists readily admit that we know very little about the actual pre-Flood world and its geography (Cosner and Carter 2016; Carter and Cosner 2016). Other creationists have relied heavily on secular interpretations for their continental configurations and for their pre-Flood geography (Dickens 2017; Dickens and Snelling 2008; Snelling 2014a; Snelling 2014b). Very few have addressed this issue from an examination of the sedimentological record.

Today, much of the Phanerozoic rock record has been divided into sequences of deposition. Sequences are defined as discrete packages of sedimentary rock bounded top and bottom by erosional surfaces, commonly with coarse sandstone layers at the base (Sloss 1963). A transgressive surface of marine erosion (TSE) marks the base of most Sloss-type sequences, representing the base of a rapid transgressive tract. A maximum flooding surface (MFS) marks the top of each Sloss sequence and represents the maximum sea level highstand. Because the terminology of sequence stratigraphy has ballooned since 1963, some researchers have begun to refer to the largest-scale sequences as "megasequences" beginning with Hubbard (1988). Several creation geologists have also adopted this nomenclature for the Sloss sequences (Morris 2012; Snelling 2014a), and therefore, this term will be used hereafter to designate the Sloss-defined megasequences.

According to secular geologists, megasequences formed as sea level repetitively rose and fell, resulting in flooding of the North American continent up to six times in the Phanerozoic (Sloss 1963; Haq *et al*. 1988). Upper erosional boundaries were created as each new megasequence eroded the top of the earlier megasequence as it advanced. The megasequences stack vertically as shown in Fig.1. Well log, seismic data and biostratigraphic data allow correlation of the upper (MFS) and lower (TSE) unconformity bounding surfaces for each megasequence across the continents.

In contrast, creation geologists take the view that most (if not all) of the Sloss megasequences were deposited during the one-year global Flood. Most creationists generally assume the Flood record began with the large-scale deposition of the Sauk megasequence, although there are locations where the Flood record may have begun earlier in localized areas, such as Grand Canyon (Austin and Wise 1994) and the Midcontinent Rift (Reed 2000). The Sauk contains the rocks of the 'Cambrian explosion' or the first appearance of hard-shelled, multicellular marine organisms in great abundance. For the purpose of this paper, our analysis will begin with the Sauk megasequence.

There is presently active debate among creation geologists as to where the Flood ends in the rock record. This issue will not be directly addressed in this paper. We merely included the Tejas megasequence as the 6th and final megasequence for the purposes of this study. However, we will discuss some rapid changes in the rock record at the Zuni/Tejas boundary that may identify the shift from rising water to receding water.

Finally, this paper presents the preliminary pre-Flood geographical results of a multi-continent study of 1543 stratigraphic columns across North America, Africa, the Middle East and South America. We conclude with a new model that attempts to explain the rock and fossil record of the Flood.

METHODS

Stratigraphic columns were compiled from published outcrop data, oil well boreholes, cores, cross-sections and/or seismic data tied to boreholes. Lithologic and stratigraphic interval data were entered into a database, allowing thickness maps to be generated for the six, Sloss-defined, megasequence intervals. These data were used to create a three-dimensional stratigraphic model across each of the three continents in this study. These models, when examined megasequence-by-megasequence, allow the interpretation of pre-Flood geographic relief. We also assumed the historical accuracy of the global Flood account as recorded in Genesis.

1. Collection of stratigraphic and lithologic data

Our database consisted of selected COSUNA (Correlation of Stratigraphic Units of North America) (Childs 1985; Salvador 1985) stratigraphic columns across the United States, stratigraphic data from the Geological Atlas of Western Canada Sedimentary Basin (Mossop and Shetsen 1994), and numerous well logs and hundreds of other available online sources. Using these data, we constructed 710 stratigraphic columns across North America, 429 across Africa, and 405 across South and Central America from the pre-Pleistocene, meter-by-meter, down to local basement. We recorded detailed lithologic data, megasequence boundaries and latitude and longitude coordinates into RockWorks 17, a commercial software program for geologic data, available from RockWare, Inc. Golden, CO, USA. Figure 2 is an example stratigraphic column from the Michigan Basin, showing the 16 types of lithology that were used for classification and the sequences. Depths shown in all diagrams are in meters.

We included volcanic deposits in our lithologic data as there are often significant amounts of ash and lava at many locations. Instead of leaving these layers out, we decided to include them in our compilations. Although they are not attributed to changes in sea level per se, they are important to the local geology and the timing of volcanic activity. RockWorks 17 also allows easy exclusion of the volcanic deposits and lava flows when doing purely sedimentological analysis.

2. Analysis of Animal and Plant Fossils

The global distribution of fossil animals and plants were examined using the global fossil occurrences found in the Paleobiology database (https://paleobiodb.org). This analysis looked at the stratigraphic distribution of 12 aquatic animal phyla: bivalvia, brachiopoda, bryozoa, cephalopoda, cnidaria, crustacea,

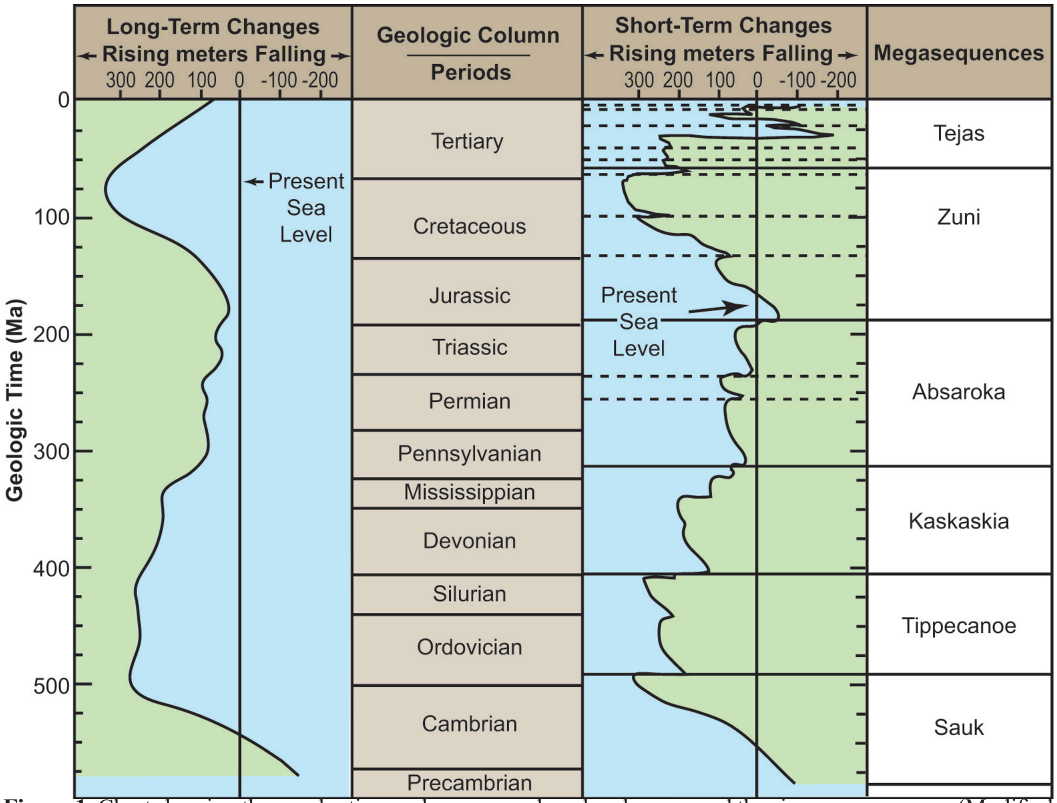

Figure 1. Chart showing the secular timescale, presumed sea level curve, and the six megasequences (Modified from Snelling 2014a). The horizontal dashed lines are merely references to minor sea level fluctuations in between the megasequence boundaries.

Table 1. Plant occurrences in the Paleobiology database by stratigraphic interval. Values compiled by Dr. Nathanial Jeanson.

Cambrian	24
Ordovician	202
Silurian	13
Devonian	636
Carboniferous	1473
Permian	4457
Triassic	3588
Jurassic	4677
Cretaceous	7329
Cenozoic	16776
Late Miocene-Quaternary	4690

echinodermata, foraminifera, gastropoda, porifera, radiolaria, and trilobita, and 3 terrestrial phyla: insecta, mammalia, and reptilia. Plants were simply lumped into one group and examined by stratigraphic interval (Table 1). This analysis was performed by Dr. Nathaniel Jeanson while he was employed at the Institute for Creation Research, Dallas, Texas.

3. Establishing criteria for pre-Flood paleogeography

One of the issues that had to be addressed before we could attempt to reconstruct the pre-Flood geography was what to use as a guide. In other words, how do you determine the elevation of a world that was completely destroyed in the global catastrophe of the Flood (II Peter 3:3-6)? What data do we choose to examine? We approached these questions by reviewing the stratigraphic data one sequence at a time and looking for patterns, letting the data lead us to possible answers.

RESULTS

We identified six major patterns in the stratigraphic data set. Collectively, these patterns allowed a data-driven interpretation of the relative topographic relief and paleogeography for the pre-Flood world.

1. Similarity in Areal Extent of STK Megasequences

One of the first patterns we noticed was the consistency in the areal extent of the first three megasequences, namely the Sauk, Tippecanoe and Kaskaskia (STK). Figures 3, 4 and 5 show the thickness (isopach) maps of the STK megasequences of North America, Africa and South America, respectively. Note the near identical areas of coverage across the respective continents as each megasequence was deposited, especially in North America and Africa, and less so in SA.

2. Similarity in Fossils within the STK Megasequences

A second pattern we observed was the similarity of the fossils in the first three megasequences, compared to the latter three megasequences. Fig. 6 shows a graph of global fossil occurrences taken from the Paleobiology database, as compiled by Dr. Nathaniel Jeanson. Note that the over 99% of animal fossils from the STK megasequences (Cambrian-Mississippian Systems) are aquatic and primarily marine. In other words, there are very few land-type animals found in the first three global megasequences of strata deposited by the Flood. Admittedly, amphibians were not included in this study, which could slightly alter these results depending on their classification as aquatic or terrestrial.

Secondly, Table 1 shows the global distribution of large numbers of plant occurrences in the fossil record begins in the Devonian System (Upper Kaskaskia megasequence) and jumps nearly an order of magnitude in the Permian System rock strata (Lower Absaroka megasequence). These results further support the similarity and the unique nature of the fossils buried in the first three megasequences, namely the Sauk, Tippecanoe and Kaskaskia.

The slightly earlier occurrences of plants in the rock record before land animals may reflect a difference in mobility, similar to the observation that dinosaur footprints begin appearing lower in the rock layers than the actual dinosaur bones, first identified by Brand (1997).

3. Limited Sediment Volume in the STK Megasequences

A third pattern was the consistently low volumes of sediment deposited in the STK megasequences, compared to the latter three megasequences. Figure 7 shows the graphs of the three continents in this study, by volume and type of sedimentary rock. Across each of the three continents, we consistently found the lowest volume of sedimentary rocks preserved in the STK megasequences.

4. Increasing Terrestrial Fossils within the AZT Megasequences

Another pattern we identified was the similarity in fossil content

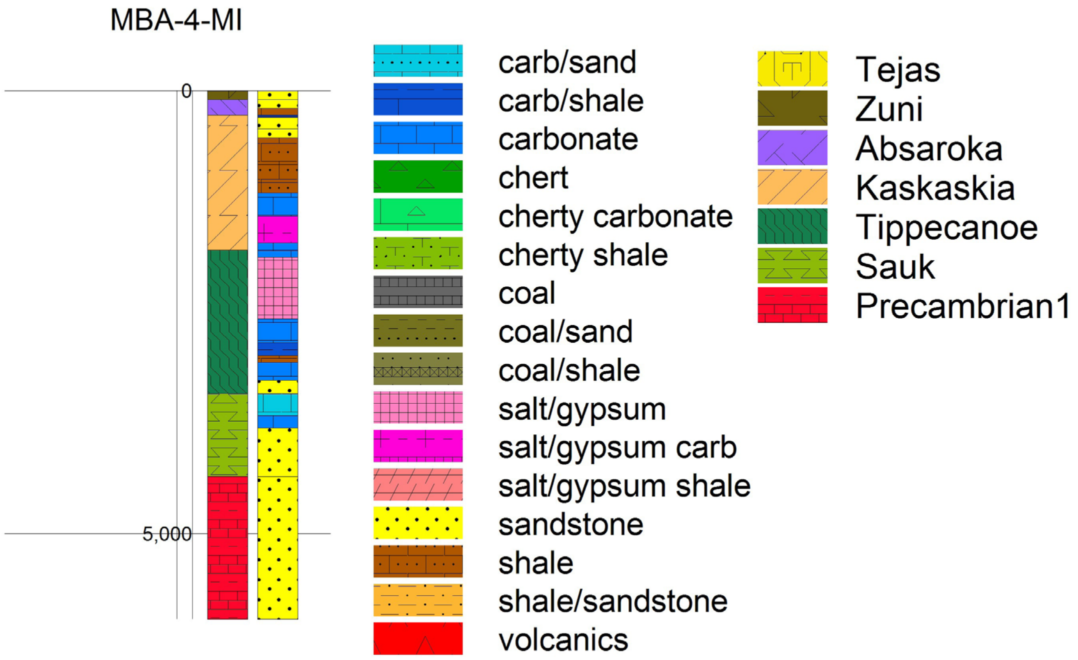

Figure 2. Example stratigraphic column from the Michigan Basin illustrating the 16 types of lithology that were used for classification and the six megasequences that were used in this study. Depth is in meters. © 2017 Institute for Creation Research. Used by permission.

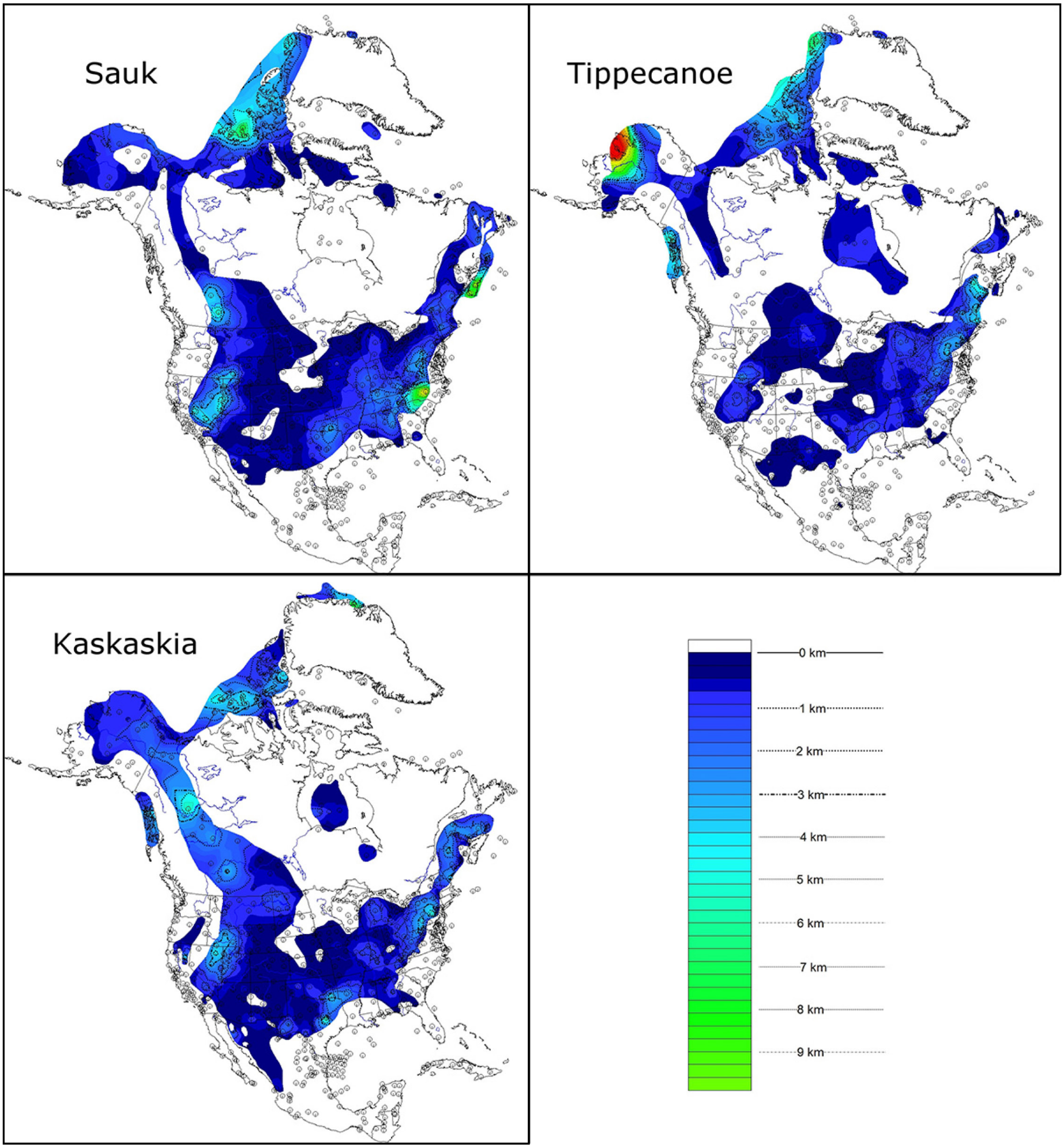

Figure 3. Isopach maps of the Sauk, Tippecanoe and Kaskaskia megasequences of North America. Scale is in meters. © 2017 Institute for Creation Research. Used by permission.

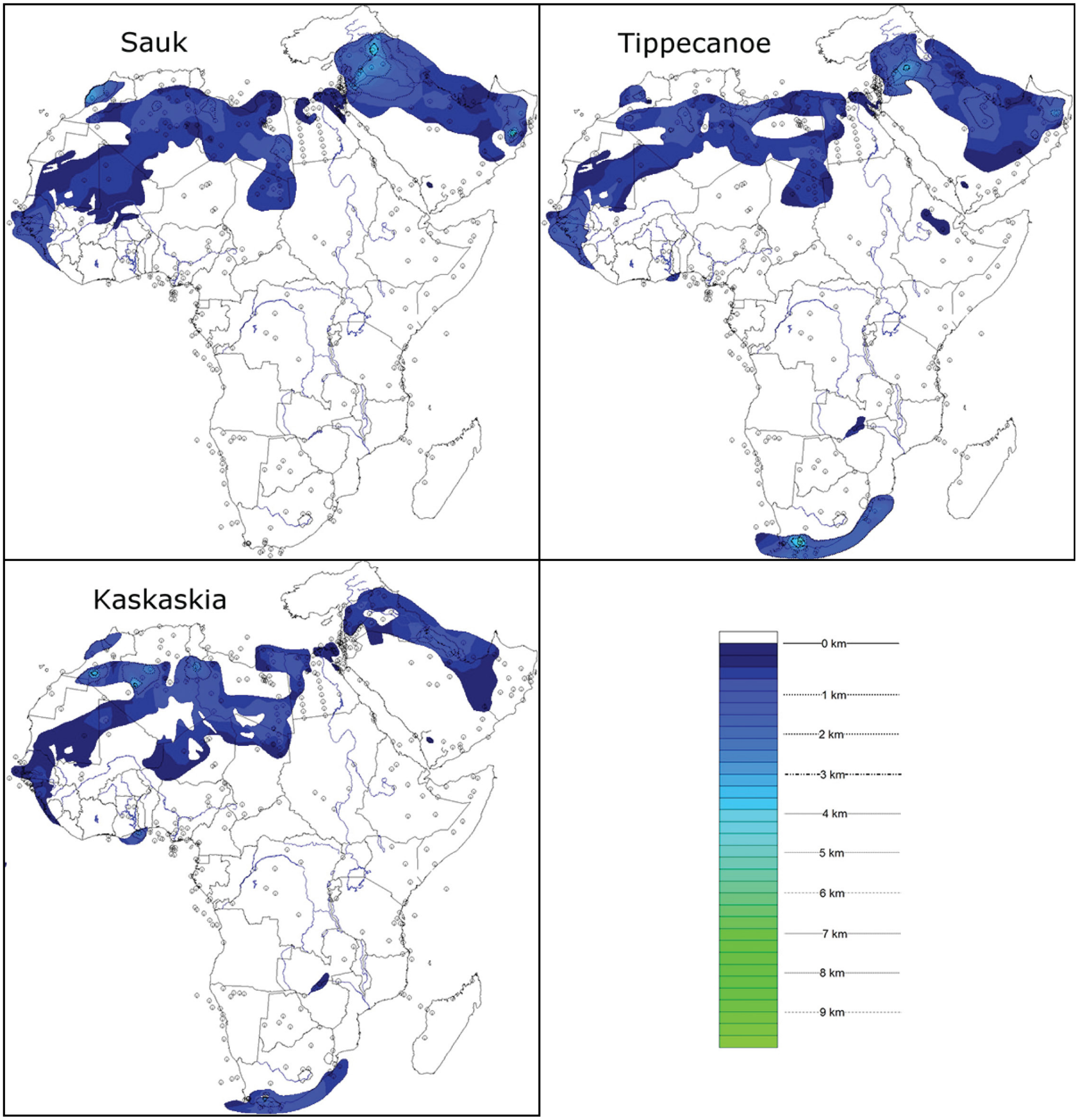

Figure 4. Isopach maps of the Sauk, Tippecanoe and Kaskaskia megasequences of Africa. Scale is in meters. © 2017 Institute for Creation Research. Used by permission.

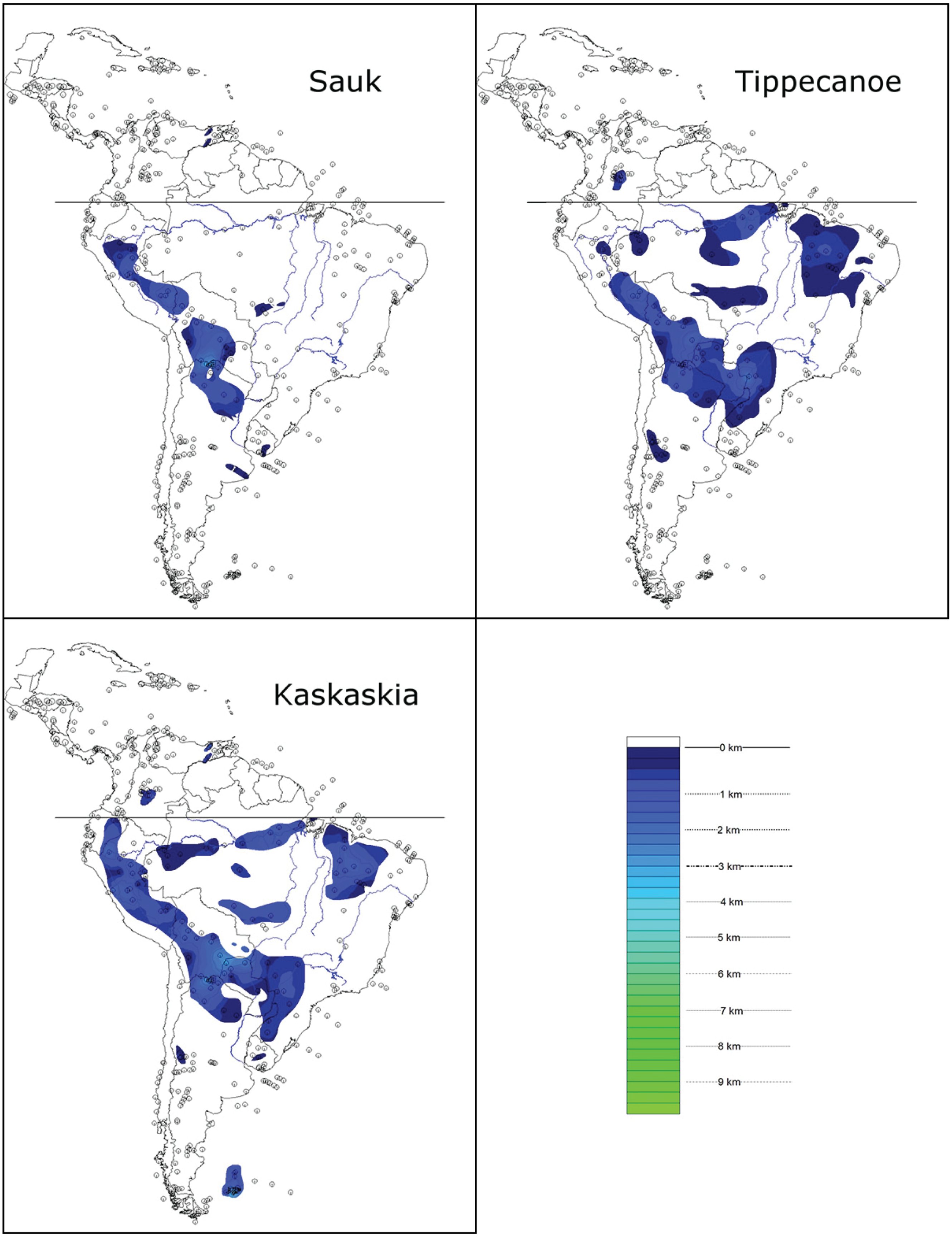

Figure 5. Isopach maps of the Sauk, Tippecanoe and Kaskaskia megasequences of South America. Scale is in meters. © 2017 Institute for Creation Research. Used by permission.

of the Absaroka, Zuni and Tejas megasequences (AZT), the last three sequences deposited. Figure 6 shows an increasing number in percent of the occurrences of terrestrial organisms from the Absaroka upward through the Tejas megasequence.

It should also be noted, that angiosperm plants make their first appearance in Cretaceous System rocks (Zuni megasequence), although this was not part of this study.

5. Increasing Areal Coverage of Absaroka Megasequence

Areal coverage and sediment volume generally increases greatly in the Absaroka megasequence, compared to the three earlier megasequences. This trend is most noticeable across Africa and South America, and less obvious across North America. In southern Africa, much of the Absaroka includes the Karoo Supergroup and equivalents.

6. Similarity of Maximum Sediment Volume and Extent of Zuni Megasequence

Finally, we observed the highest volume of sediment deposited, and generally the maximum areal extent also, in the Zuni megasequence deposits across most of the continents. Figure 7 shows the volume and types of sediments deposited for the three continents in this study. Note that the Zuni megasequence easily contains the highest volume of sediment preserved across Africa. In fact, the Zuni volume (over 57.2 million km^3) is more than double the volume deposited by any other megasequence across Africa. In contrast, North America had the highest total rock volume deposited during the Tejas megasequence. However, when the volcanic rocks are excluded, the Zuni megasequence contains more sedimentary rocks than all other megasequences across NA, including the Tejas.

South America has a greater volume of Tejas than Zuni (Fig. 7). However, after summing the totals from each of the three continents, the Zuni megasequence still contains the highest global volume and maximum extent of any Flood megasequence (Zuni total = 97.4 million km^3 vs. Tejas total = 79.5 million km^3).

DISCUSSION

By looking at the thicknesses of the various stratigraphic intervals of the Flood, we were able to make inferences about the relative topography of the pre-Flood world. We assumed that the pre-Flood lows would be filled in first by the earliest deposits (first three megasequences) and the uplands later as the Flood levels increased, as described in Genesis 7. Combining these data with the fossil record contained in the rocks of the megasequences, we were able to make a reasonable interpretation of pre-Flood shallow seas, lowlands and uplands.

Finally, we created a pre-Flood geography map for the three continents in this study (Fig. 8). This is the first pre-Flood map created by creationists that is based on actual rock data. We placed the continents into a Pangaea-like (although slightly modified) configuration that allowed for a narrow pre-Atlantic Ocean and projected our interpreted locations of shallow seas, lowlands and uplands onto the base map. We recognize that debate exists over the pre-Flood continental configuration, with some advocating for an initial created supercontinent that was Rodinia-like (Snelling

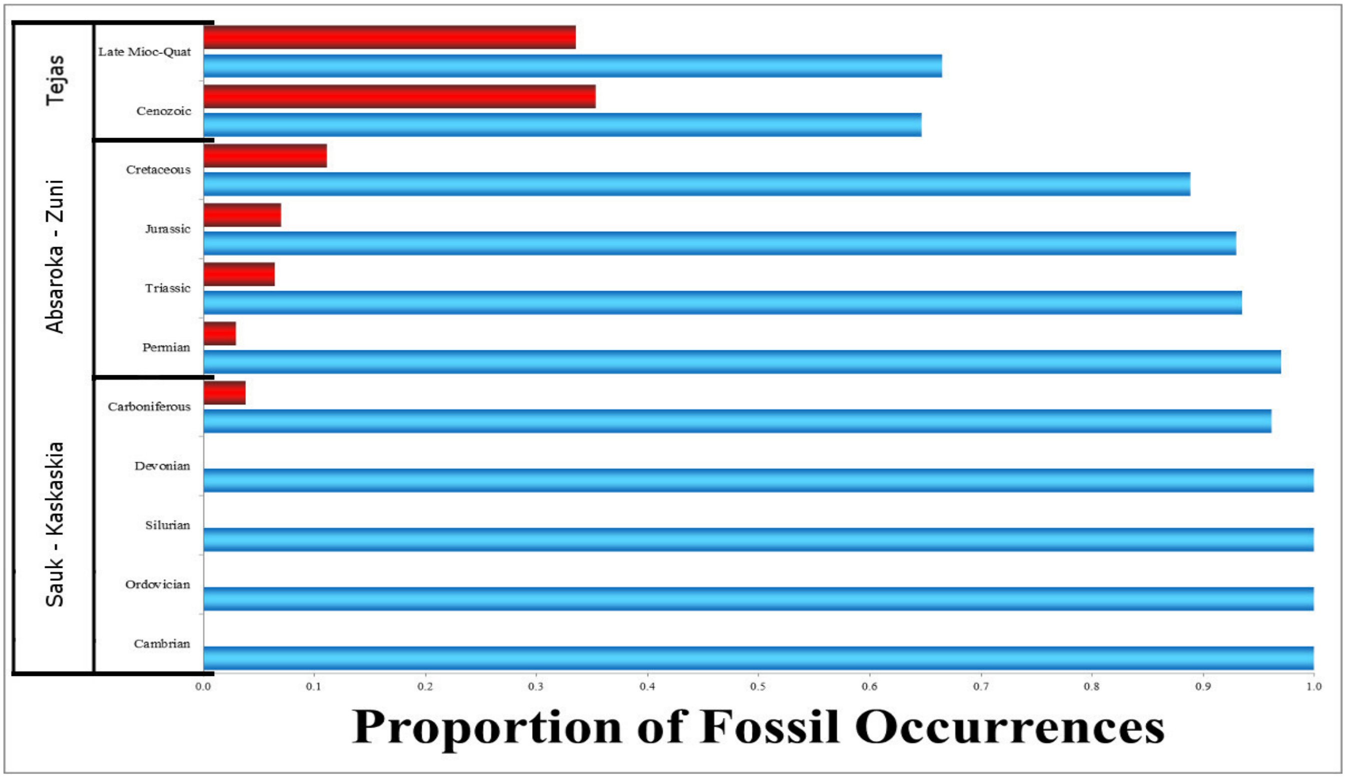

Figure. 6. Graph of global animal fossil occurrences from the Paleobiology database (courtesy of Nathaniel Jeanson). Blue represents aquatic animals and red represents terrestrial animals. The approximate Sauk through Kaskaskia, Absaroka and Zuni and the Tejas megasequences are shown on the left. Note the Kaskaskia/Absaroka boundary is in the middle of the Carboniferous, near the base of the Pennsylvanian System. Few land animals appear as occurrences until the end of the Kaskaskia. Then, the graph shows increasing proportions of terrestrial animals appearing progressively upward in the rock record, beginning in the Carboniferous. © 2017 Institute for Creation Research. Used by permission.

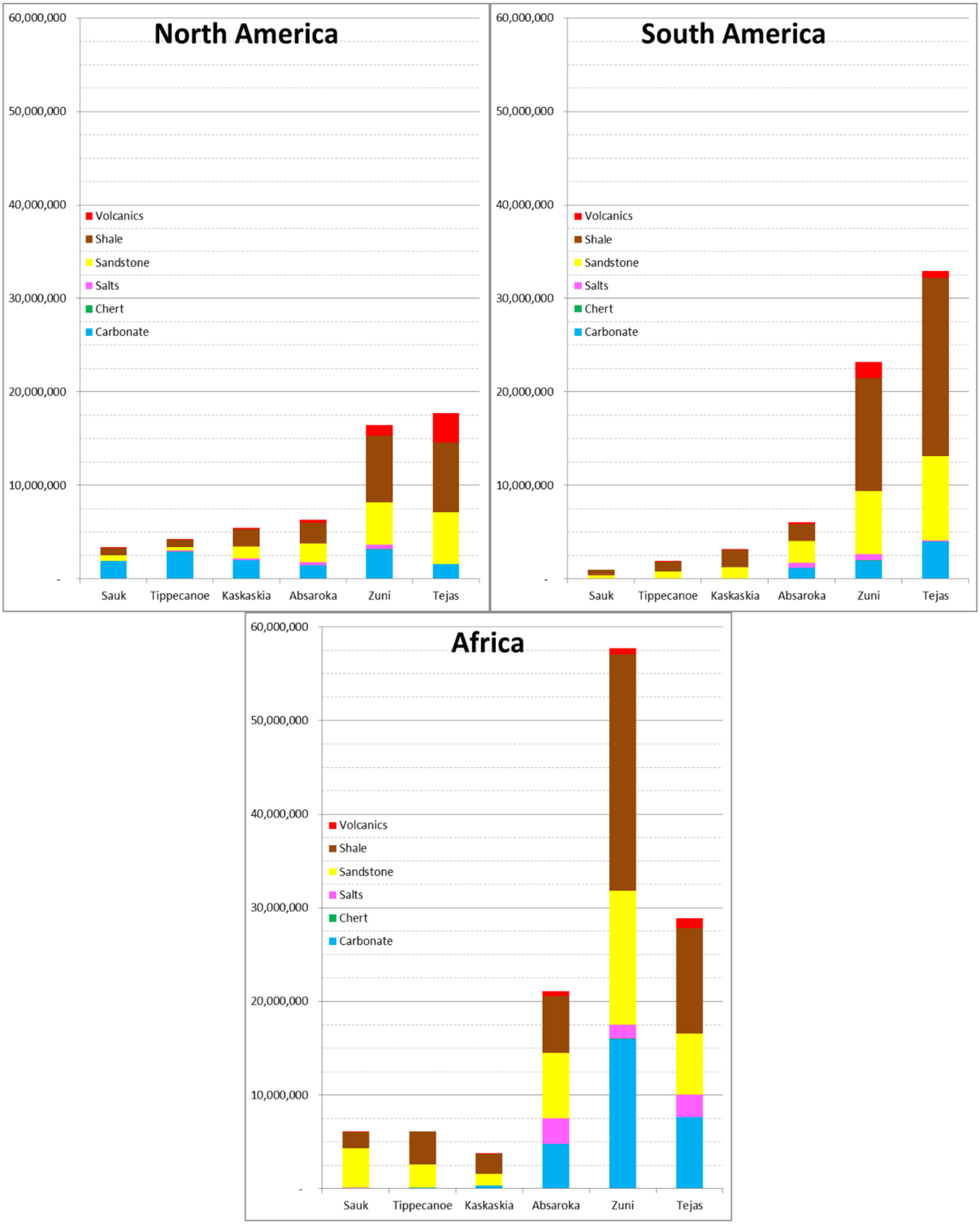

Figure 7. Graphs of the total volume of each rock type by megasequence for North America, Africa and South America. All values are in cubic kilometers. Six major rock types are shown by color. We estimated the 'sand/shale' lithology to be approximately 2/3 shale in order to determine a total sand and shale volume for each megasequence. Note the highest volume of sedimentary rock is consistently in the Zuni and Tejas, globally. © 2017 Institute for Creation Research. Used by permission.

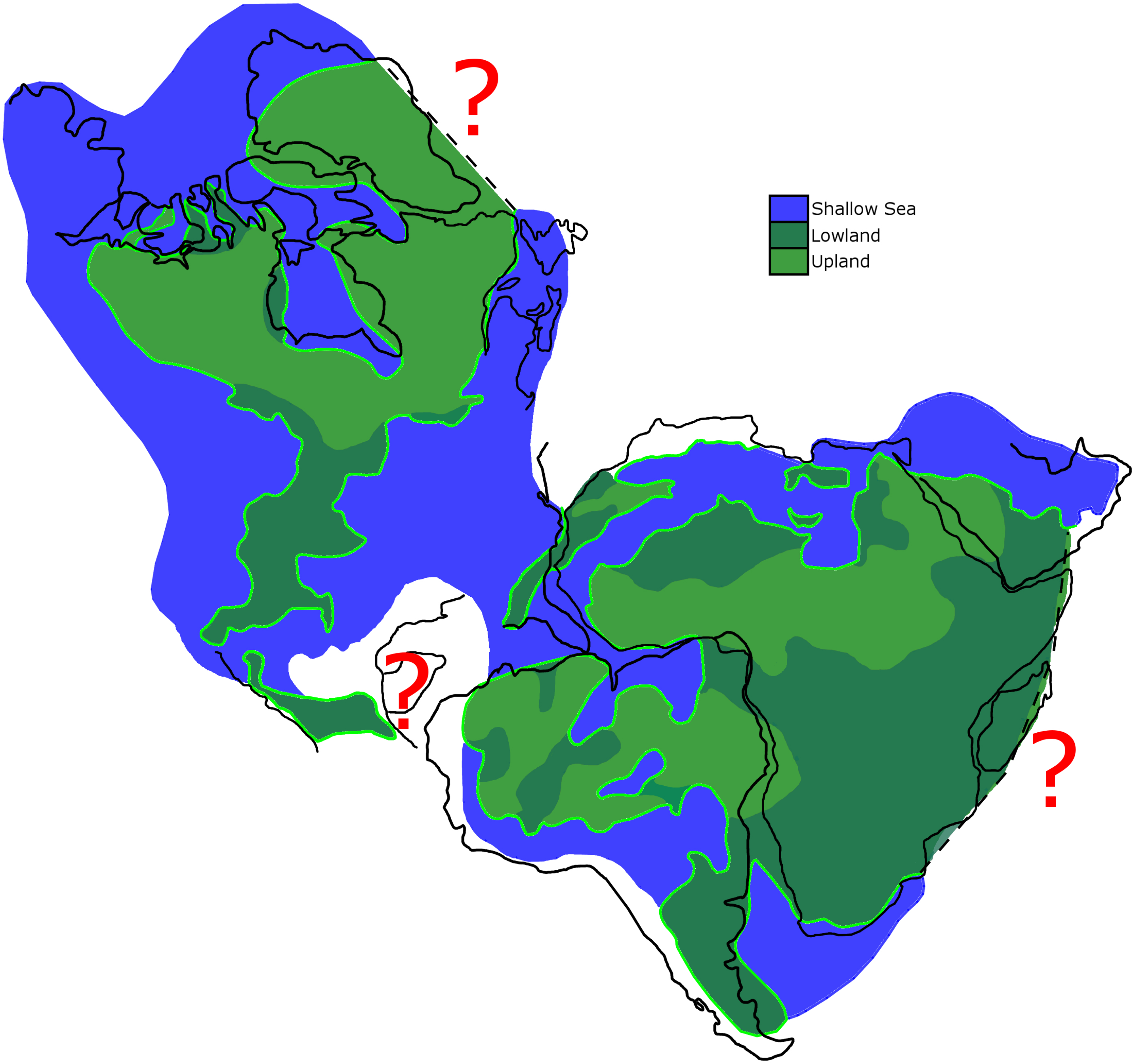

Figure 8. Pre-Flood geography map for North America, Africa and South America, using a Pangaea-like configuration. Question marks reflect areas of uncertainty. The pre-Flood land masses likely continue to the east of the dashed lines near Greenland (Europe) and East Africa (India). Note that the west edge of North America does not include the modern West Coast states as these terranes (Wrangellia and Sonoma) were added later during plate motion as part of the Flood. Likewise, much of Central America is not shown as it was formed from volcanic activity during the Flood. © 2017 Institute for Creation Research. Used by permission.

2014a, 2014b). However, we chose a modified Pangaea because it has the most observable geological evidence to support it, including the best fit of the continents (Clarey 2016), and significantly reduces the plate motion required by not having to transform Rodinia into Pangaea (Baumgardner 2018). Baumgardner (2018) calls our Pangaea-like configuration Pannotia, but notes that they are very similar if Pannotia is rotated 110^0 clockwise. In addition, the narrow sea (300 km) we placed between North America and Africa/Europe still allows for an early Flood subduction and closure of the pre-Atlantic and the formation of the Appalachians/Caledonians. The width of this pre-Atlantic is based on P and S wave anomalies that diminish beneath the Appalachians below 300 km (Schmandt and Lin 2014).

1. Shallow Seas

The patterns recognized above indicate a commonality within the first three megasequences, namely the Sauk, Tippecanoe and Kaskaskia (STK). Each of these megasequences shows consistency in the small amount of sediment deposited, in their limited areal extent, and in the shallow marine fossils they contain.

Results indicate shallow seas existed across much of the eastern United States and the Southwest (including Grand Canyon) and across North Africa and the Middle East where the STK megasequences were deposited (Figs. 3, 4, 5). These areas show extensive deposition of early Flood sediments (the first three megasequences) and were filled almost exclusively with fossils of shallow marine life.

In South America, it appears that pre-Flood shallow seas were present along the western coast and possibly in the Amazon Basin region (Fig. 5). The pattern of deposition for the first three megasequences varied in their extent of coverage more in SA compared to North America and Africa, where the first three megasequences more closely mimic one another in extent. Figure 5 shows the Sauk has the least areal extent across SA, followed by increasingly more coverage for the Tippecanoe and Kaskaskia megasequences. This made the outline for the shallow seas in SA a bit less conclusive.

In an effort to better delineate the extent of these pre-Flood shallow seas, we used RockWorks 17 to sum the isopach maps of the first three megasequences, creating a total thickness map of each continent, called the STK isopach (Fig. 9). The common extent of the first three megasequences across North America and Africa, in particular, provided justification for these combined isopach maps. The lack of plant fossils, for the most part, and the lack of significant numbers of terrestrial fossils within the STK megasequences, further justified this interpretation.

We chose the 500 m thickness line on the combined isopach maps, similar to Clarey (2015), in order to delineate the extent of the pre-Flood shallow seas and define the boundary of the adjacent land mass. In other words, anything less than about 500 m was assumed to represent dry land. Anything greater than about 500 m was assumed to be part of the pre-Flood marine realm. We also assumed many fossils were transported (possibly up to a few 100 km) from their original *in situ* locations, blurring an exact boundary between land and sea. For this reason, and as a first approximation, the 500 m line was chosen to balance this transport factor. In some places, we deviated from this 500 m line to smooth the interpretation.

The lack of dinosaurs in Grand Canyon rocks is one of the big complaints often raised by old-Earth geologists in their arguments against a global Flood (Stearley 2016). The shallow seas interpretation shown across northwestern Arizona on Fig. 8 helps explain why there are no dinosaurs found in Grand Canyon, even if there were Mesozoic rocks present. Simply put, the Grand Canyon area was likely underwater in the Pre-Flood world, just like much of the Midwest USA. The Sauk, Tippecanoe and Kaskaskia (STK) megasequence (Early Paleozoic) rocks exposed in Grand Canyon pinch out to the north and east as shown in Figure 10. The oversimplified diagrammatic cross sections so common in historical geology textbooks, and even some creationist publications, showing Grand Staircase rocks and Zion and Bryce Canyon rocks stacked on top of Grand Canyon rocks are misleading and erroneous (Austin 1994, his Fig. 4.1, p. 58; Helble and Hill 2016, their Fig. 3-2, p. 32-33; Ross *et al*. 2015, their Fig. 6.13, p. 164; Snelling 2014c, his Fig. 2, p. 151). The stratigraphic column data clearly demonstrate that there are only limited STK rocks beneath Zion and Bryce Canyon and beneath the Rocky Mountain states in general, and in some locations, none at all (Figs. 9, 10 and Clarey 2015). Therefore, dinosaurs found in Mesozoic rocks north and east of Grand Canyon did not have to "tread water' while 1000s of meters of rock were deposited beneath them. Instead, they were able to stay on the 'dry' land to the north while the Paleozoic strata were being laid down in Grand Canyon to the south. Clarey (2015) has labeled this dry land 'dinosaur peninsula.'

We can only speculate on the timing of these first three megasequences in the Flood event. Genesis 7:17 may imply that the ark was not afloat until Day 40. If this is the case, then the Sauk, Tippecanoe and Kaskaskia strata, as almost exclusively filled with marine fauna, may represent deposits during the first 40 days of the Flood. It was not until Day 40 or after, that the ark, which was presumably built on land, began to float.

2. Lowland Areas

During the deposition of the Absaroka megasequence (the fourth megasequence) the sediments began to extend onto the land proper, starting with the lowland and wetland areas as water levels further increased as described in Genesis 7. Figures 11, 12, 13 show the isopach maps of the Absaroka and Zuni megasequences across North America, Africa and South America, respectively.

In the Absaroka megasequence, we observe the first prolific deposits of coal (Pennsylvanian lycopod forests) and land animals mixed with marine flora and fauna. This indicates the Flood water levels were now impacting significant amounts of pre-Flood land, including the broad lowlands in East Africa and the central United States. These areas contain many amphibian and reptile fossils as well as gymnosperm-dominated flora. Few angiosperms are found as fossils until late in the subsequent Zuni megasequence.

For these reasons, we used the Absaroka isopach maps (Figs. 11, 12, 13) for each of the continents as a guide for the identification of the lowlands. We assumed that the Sauk-Tippecanoe-Kaskaskia (STK) combined isopach maps (Fig. 9) only reflected the boundaries of the pre-Flood shallow seas as described above. We then overlaid the Absaroka maps on the pre-Flood continental configuration. Any

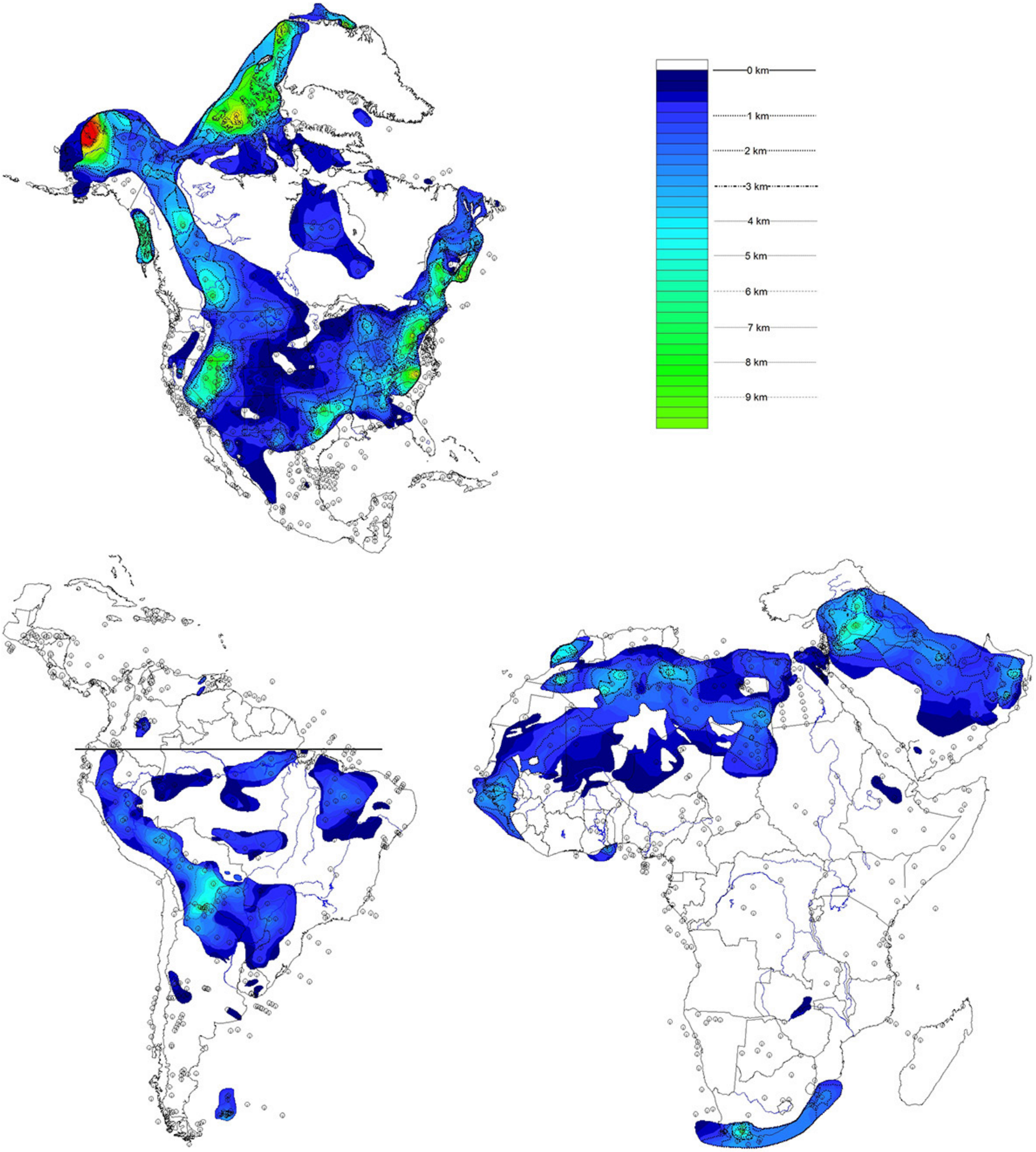

Figure 9. Cumulative Sauk-Tippecanoe-Kaskaskia isopach maps of North America, Africa and South America. © 2017 Institute for Creation Research. Used by permission.

new areas that showed the Absaroka sediments extending beyond that of the STK were assumed to be flooded lowlands.

Furthermore, we recognized that the deposits and fossils of many of the dinosaurs found in Zuni megasequence rocks may also partially reflect this lowland environment. Clarey (2015) argued that many of the dinosaurs found in quarries across the American West straddle this proposed lowland 'peninsula' that extended from Canada to New Mexico (Fig. 8). Many dinosaur discoveries in Morocco, Egypt, East Africa, and Tanzania, also seem to fall on or near these interpreted lowland areas and/or islands. However, Zuni deposits may extend beyond the lowland environments in places as they likely reflect the highest water level of the Flood, achieved on Day 150 (see below) (Fig. 7). In conclusion, we primarily relied on the Absaroka deposits to identify the lowlands, with some modification from the higher Zuni strata also.

The concept of a 'dinosaur peninsula' also explains how dinosaurs may have survived in the earliest part of the Flood (Clarey 2015). They simply were not inundated until later in the Flood (primarily the Zuni megasequence) and were able to stay on the lowland areas while Lower Paleozoic strata were deposited in the adjacent shallow seas. Oil well data show that the Sauk, Tippecanoe and Kaskaskia megasequences are very thin or nonexistent beneath the locations of these lowland areas, such as 'dinosaur peninsula' (Clarey 2015).

3. Upland Areas

Our study found that all megasequences thinned toward the crystalline shield areas on all three continents. The sedimentary units do not merely show evidence of erosion and truncation, but become thinner in the direction of the shields, implying they were deposited on the flanks of extensive uplands. Figure 14 shows four stratigraphic profiles across the northern USA. All show dramatic

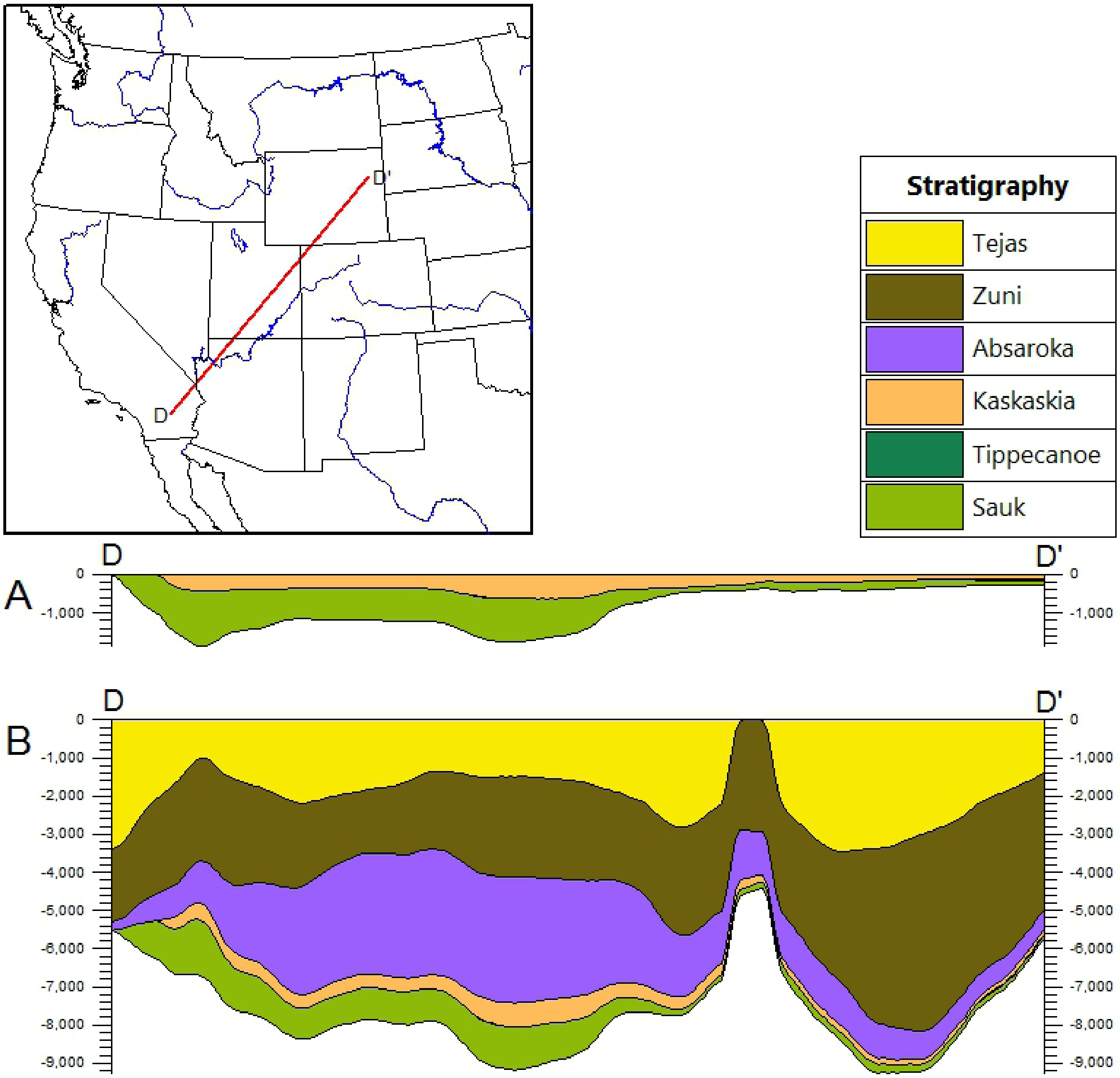

Figure 10. Cross-section D-D' showing the thicknesses of the megasequences from southern California, through Grand Canyon, to Wyoming. Note the Tippecanoe is nearly non-existent on this line of section. A=shows only the Sauk through Kaskaskia (Tapeats SS through Redwall LS). B=all megasequences present. Note, the bulk of 'Grand Canyon' rocks thin and pinch-out significantly toward the northeast and under the Grand Staircase. © 2017 Institute for Creation Research. Used by permission.

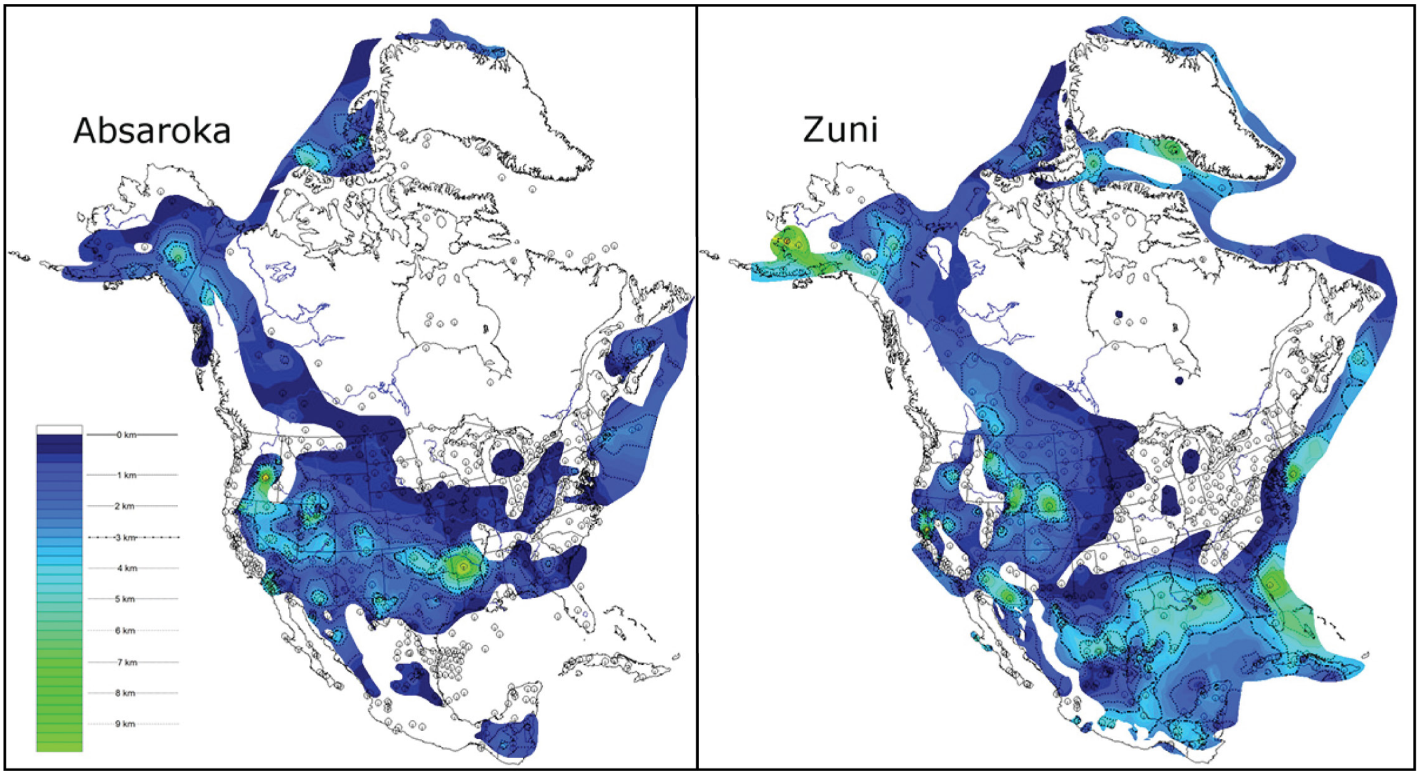

Figure 11. Absaroka and Zuni isopach maps of North America. © 2017 Institute for Creation Research. Used by permission.

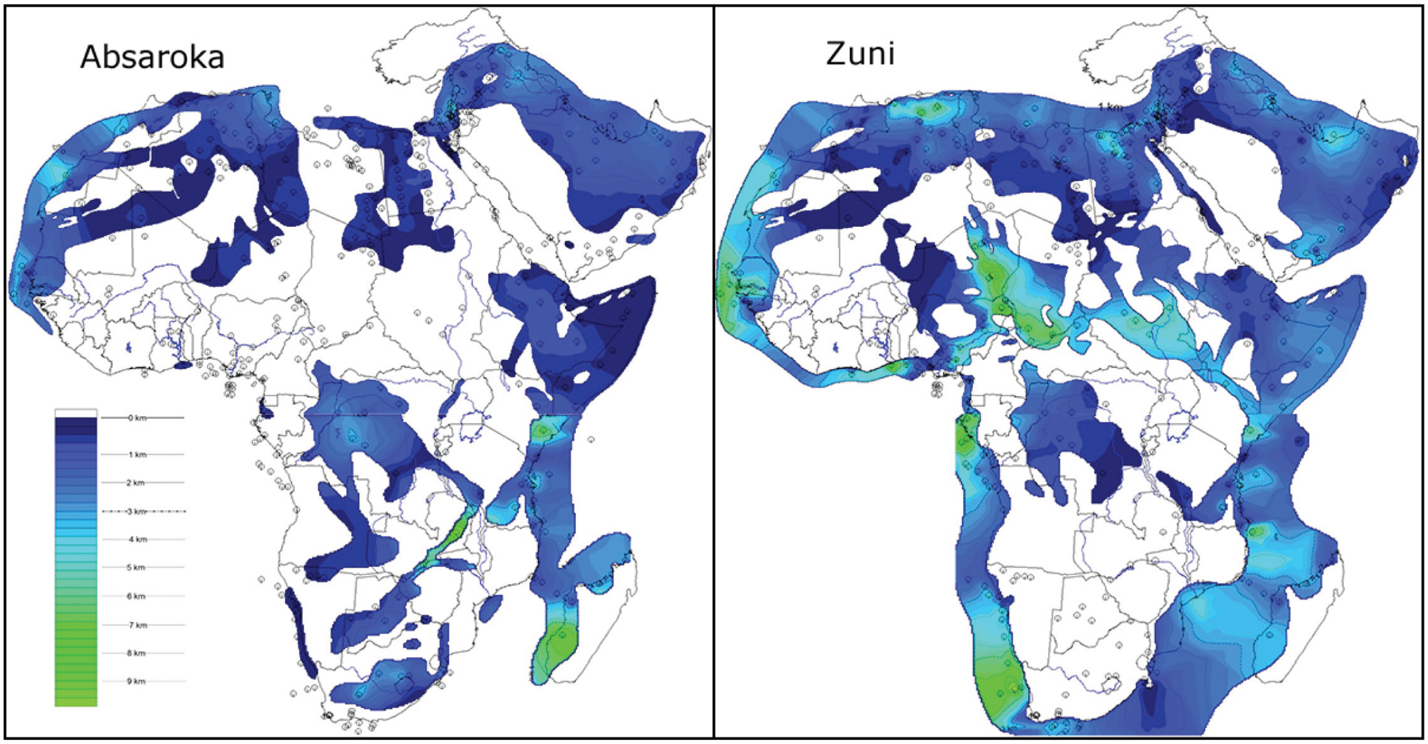

Figure 12. Absaroka and Zuni isopach maps of Africa. © 2017 Institute for Creation Research. Used by permission.

thinning of the megasequences from south to north toward the shield, in support of this interpretation.

The top of the Zuni megasequence (fifth megasequence) seems to represent the highest water level of the Flood as water washed over the top of the pre-Flood high hills and uplands, giving the most globally extensive deposition of any megasequence (Figs. 11, 12, 13). Recall, the Zuni megasequence also has the maximum volume of sediment deposited globally (Fig. 7). This deposit likely represents the Day 150 high water point of the Flood.

Many of these interpreted upland areas are completely devoid of any sedimentary rock as post-Flood erosion has stripped the little amount of possible Zuni sediment that may have been deposited. According to Genesis 7:20, the highest hills were only flooded by a modest amount of water, likely leaving little room for thick sedimentary deposits as the Flood waters receded. However, there are a few Zuni remnants in Hudson Bay and Michigan and Illinois in North America that indicate the highest water level was achieved at this point in the Flood (Fig. 11).

Humphreys (2014, p. 57) in his translation of Genesis 6:7 and Genesis 7:23 suggests the term 'wiped off" to explain this stripping of the land surface right down to the crust: "And the Lord said, 'I will *wipe off* man whom I have created *from* the face of the land, from man to animals to creeping things and to birds of the sky; for I am sorry that I have made them.'"

"Thus He *wiped off* every living thing that was upon the face of the land, from man to animals to creeping things and to birds of the sky, and they were *wiped off from* the earth…" (emphasis in original). Humphreys (2014) goes on to suggest this 'wiping out' meant no earth (or soil) was left behind as in the way one wipes a dish clean (2 Kings 21:13).

"Taking these verses straightforwardly means the waters swept mud, plants, the animals completely off the formerly dry land, the pre-Flood continental surface" (Humphreys 2014, p. 57). And this is exactly what we see across large portions of the continents. The pre-Flood uplands include the major shield areas of Canada, Greenland, Brazil and Central and Western Africa. When placed back together in a Pangaea-like configuration, the upland areas match up across continents and become quite substantial (Fig 8).

The Tejas megasequence rocks likely represent material washed off the highest upland areas of the pre-Flood world and 'backwashed' onto the Zuni as the Flood waters began to recede (Day 150+) (Figs. 15, 16, 17). Fossils in the Tejas megasequence also contain increasingly more angiosperms and mammal fossils compared to the Zuni deposits, indicative of more upland terrains. These areas were apparently wiped free of all life, removing even the pre-Flood soil and any rock layers that might have existed there. Deposits in the Tejas include the thickest and most extensive coal seams in the world (Clarey 2017a). These huge mats of transported trees, almost exclusively non-lycopods, likely represented plants swept

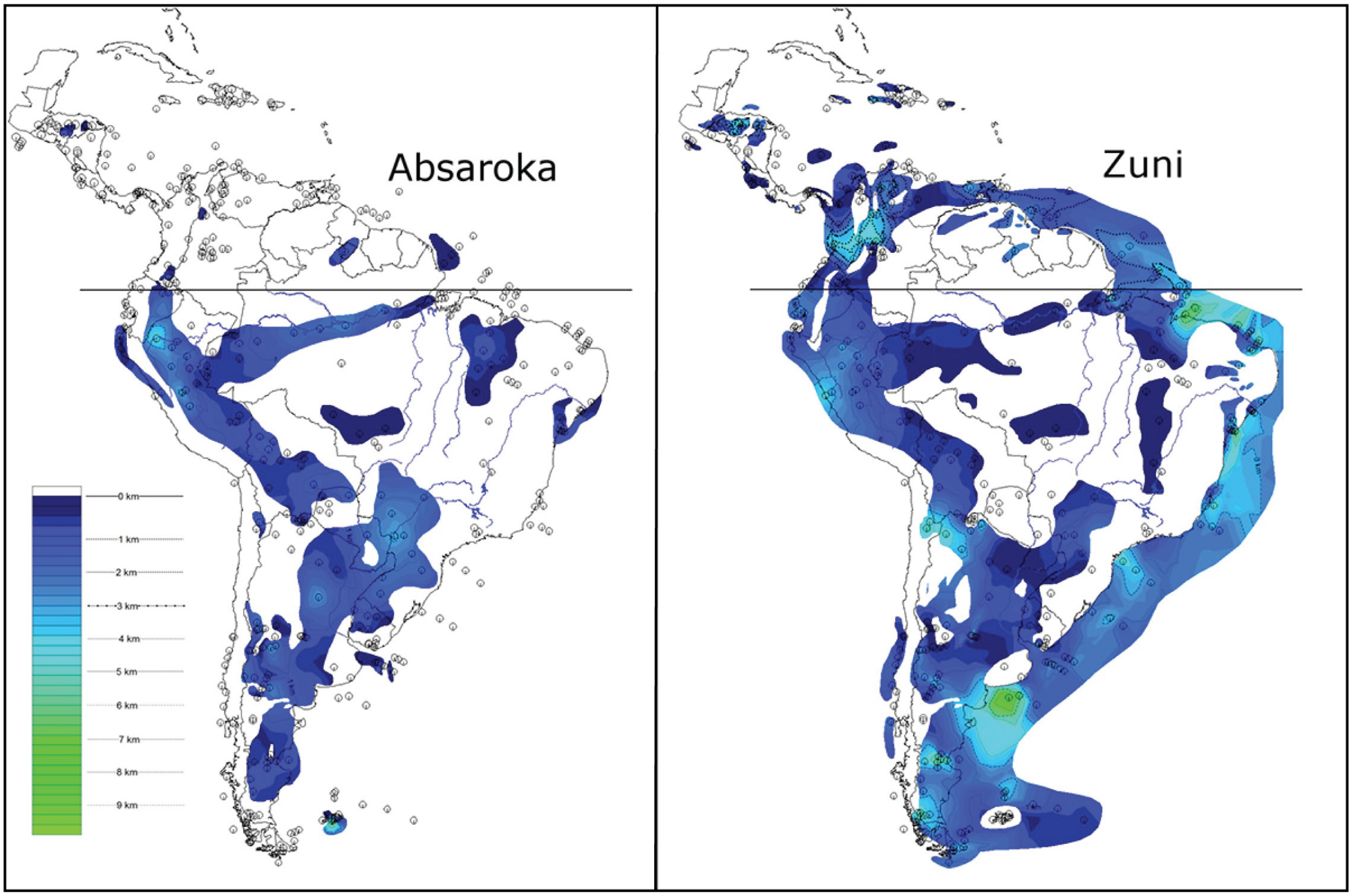

Figure 13. Absaroka and Zuni isopach maps of South America. © 2017 Institute for Creation Research. Used by permission. © 2017 Institute for Creation Research. Used by permission.

off the uplands.

God, through the Flood, apparently ‘wiped off’ these areas of highest elevation, where most of the large mammals, flowering plants and possibly humans may have existed, spreading their remains in sedimentary layers on top of the earlier buried dinosaurs in rocks now identified as Cenozoic strata.

Animals were likely buried closer to their place of origin as the Flood waters were rising (from the Sauk through the Zuni megasequences) until Day 150 was reached. The water and sediment engulfing them nearly *in situ* as the water level increased. Advancing and rising Flood water probably buried marine animals in shallow seas in the first three megasequences and the dinosaurs and other and wetland animals were later buried near their lowland locations (with some obvious transport). Hence, a possible reason for the ‘straddling’ of the dinosaur quarries across this so-called ‘peninsula’ of lowlands that extended through the central USA (Clarey 2015).

But the Tejas depositional pattern appears to have been different. It was the apparently result of a reversal in flow direction as God began to remove the waters from off the continents (post-Day 150). This not only transported the flora and fauna from off of the highest hills (uplands), it spread those deposits more radially toward the continental margins. Animals and plants that lived in areas that are now exposed crystalline rock (the Precambrian shields), were transported great distances and deposited on top of the Zuni strata and sometimes older exposed strata too.

Is there any evidence of a reversal of water flow direction at the Zuni/Tejas boundary as suggested by this hypothesis? The answer is yes. Although Chadwick’s (2001) current direction data is less conclusive across the Zuni/Tejas (K-Pg) boundary (Clarey 2017b), research by Blum and Pecha (2014) using detrital zircons did show a dramatic shift in the direction of drainage from the Cretaceous

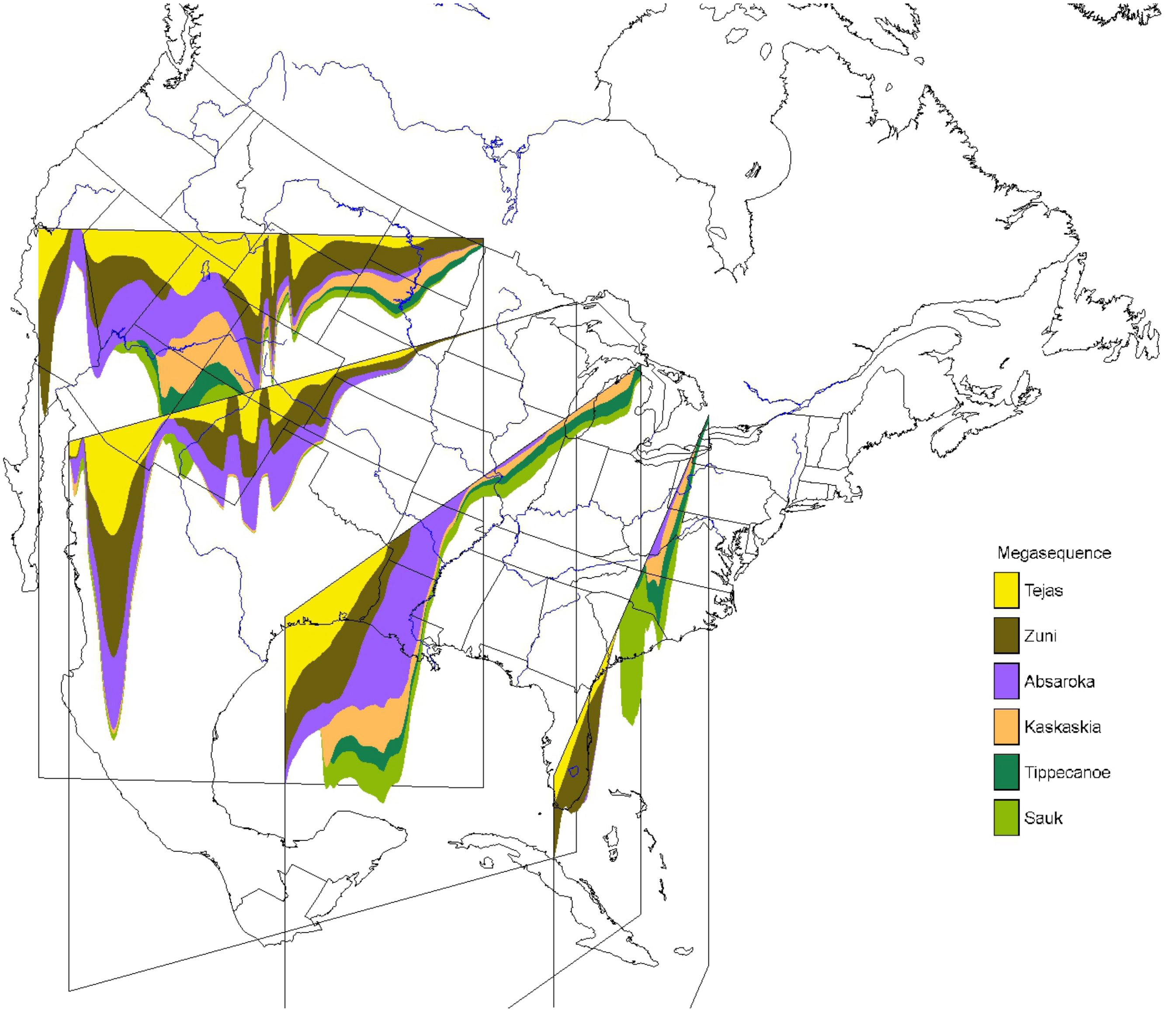

Figure 14. Various cross-sectional profiles showing thinning of megasequences in North America toward Canadian Shield. © 2017 Institute for Creation Research. Used by permission.

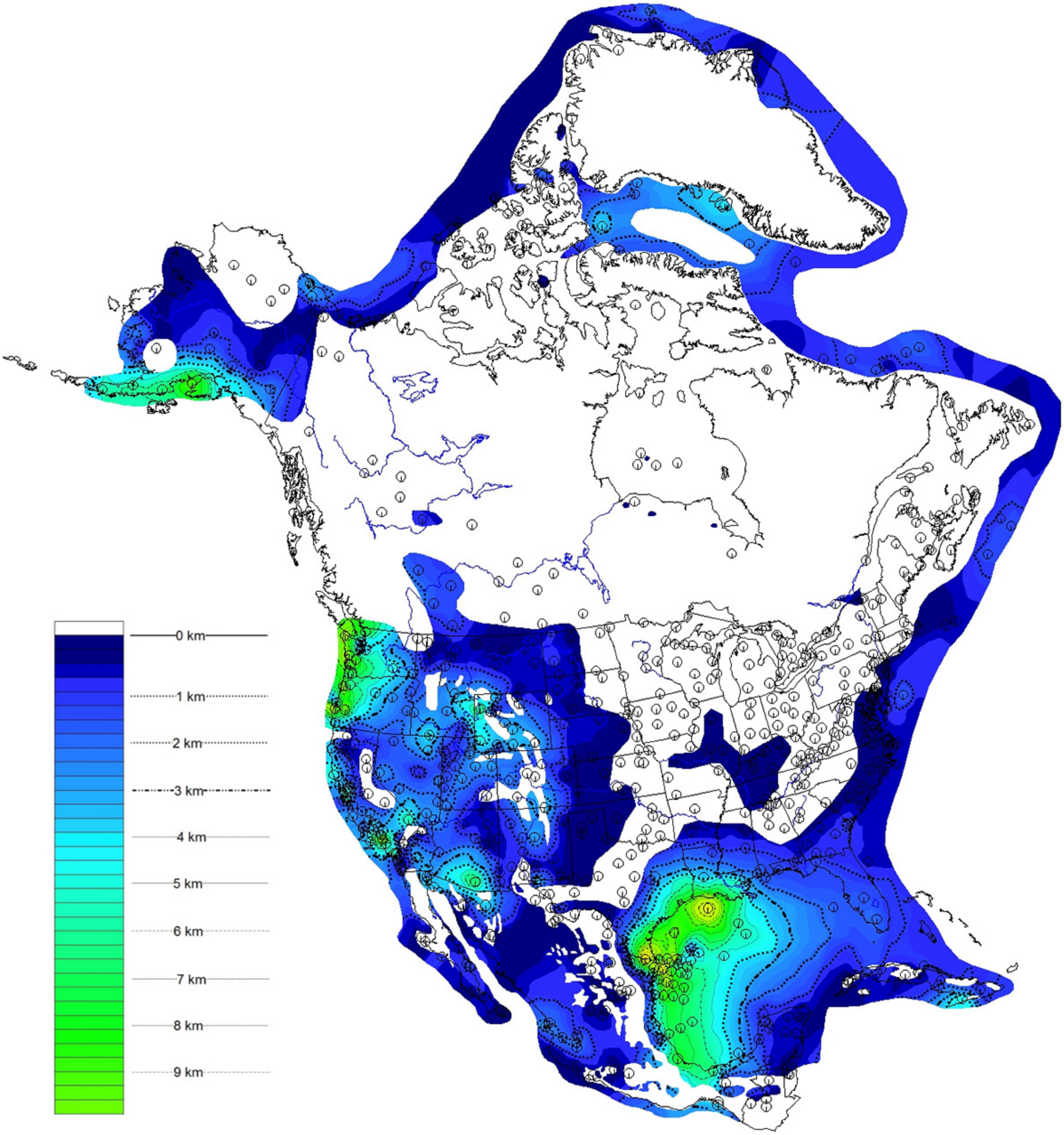

Figure 15. Tejas isopach of North America. Note Tejas remnants near Hudson Bay and the thick deposits in the Gulf of Mexico. © 2017 Institute for Creation Research. Used by permission.

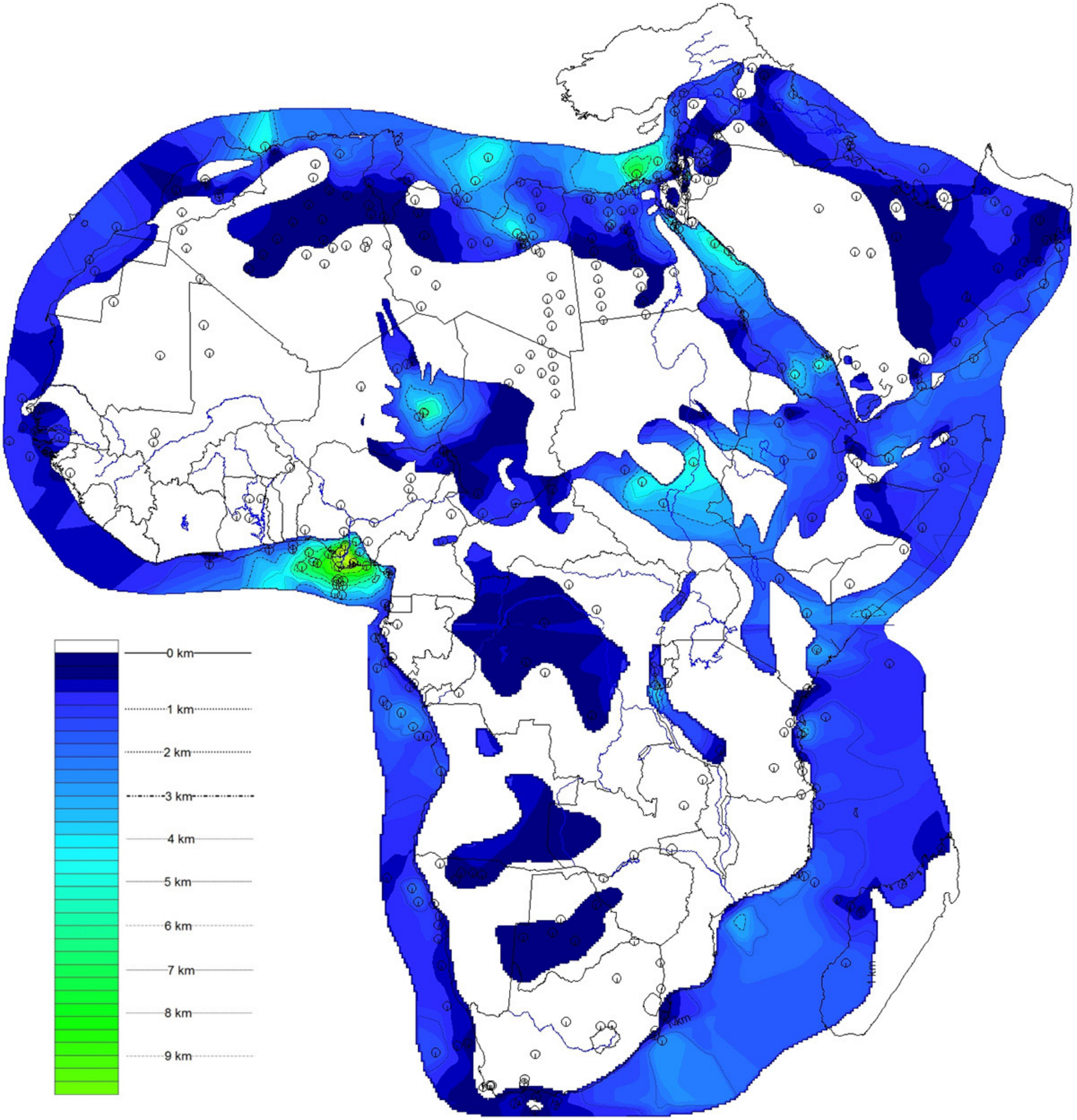

Figure 16. Tejas isopach of Africa. © 2017 Institute for Creation Research. Used by permission.

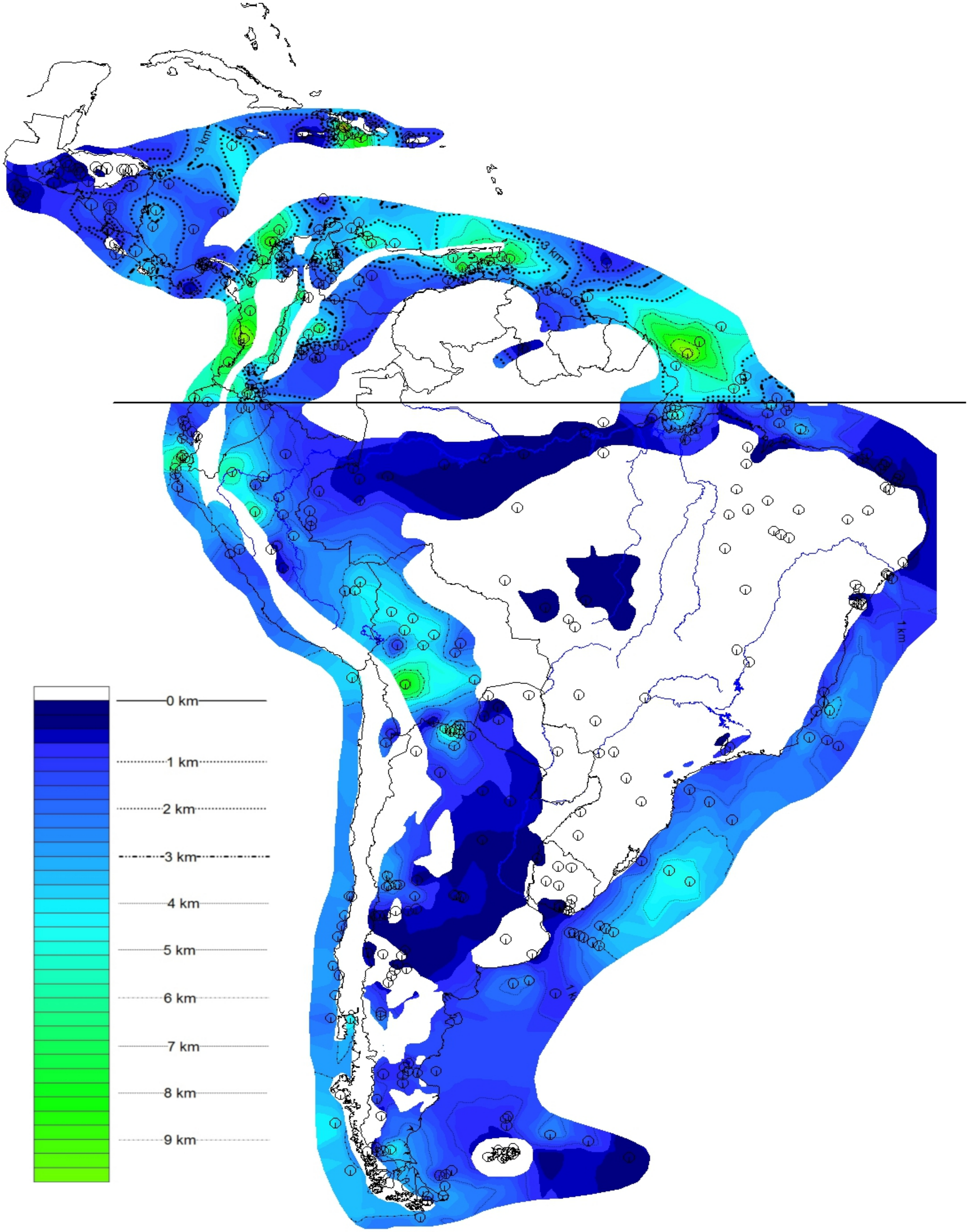

Figure 17. Tejas isopach of South America. © 2017 Institute for Creation Research. Used by permission.

(uppermost Zuni) to the Paleocene (lowermost Tejas) across North America. These authors found that during deposition of the Cretaceous (Zuni Sequence), the drainage pattern was dominantly to the north and northwest across much of the USA. Drainage was to the Boreal Sea near present-day Alberta and Saskatchewan. They also determined that very little area was draining to the Gulf of Mexico (GOM) during this time.

In contrast, they determined that the Paleocene drainage shifted dramatically from that of the Cretaceous, resulting in much of the USA draining southward to the GOM (Blum and Pecha 2014). As noted on their map, this was not a single river like the modern Mississippi River, but a series of rivers, effectively behaving more like sheet wash, draining into the GOM all at once. This shift in drainage coincides nicely with the end of the Zuni megaequence and the onset of the Tejas megaequence.

Blum and Pecha (2014) believe this change in drainage occurred because of the high flooding levels of the North American continent during the Upper Cretaceous, known as the Cretaceous Interior Seaway. They claim that the withdrawal of the flood waters during the uppermost Cretaceous and earliest Paleocene caused significant reorganization in the drainage pattern and a reverse in flow toward the GOM.

Clarey and Parkes (2016) used this documented shift in drainage at the Zuni/Tejas boundary to explain the Whopper Sand in the deep-water of the Gulf of Mexico (Fig. 18). Since 2001, with the drilling of the BAHA-2 oil well, billions of barrels of oil have been discovered in the Paleocene-Eocene Wilcox-equivalent "Whopper Sand" (Higgs 2009). This well reportedly encountered 335 m (1100 feet) of sand in the Lower Wilcox in over 2135 m (7000 feet) of water within the Perdido Fold Belt of Alaminos Canyon. In Keathley Canyon the Sardinia-1 well encountered over 366 m (1200 feet) of sand and in Walker Ridge, the Jack-2 well and Chinook and Cascade-2 wells reached similarly thick Lower Wilcox sands approaching 580 m (1900 feet) thick (Trammel 2006). Average porosity in the whopper sand is 18% and permeabilities range from 10-30 md (Trammel 2006). Up to 15 billion barrels have been discovered in this trend since 2001. What makes the Whopper Sand unusual is its location in deep water, nearly 300 km from the Lower Wilcox shelf margin, and far from any conventional sand source (Higgs 2009).

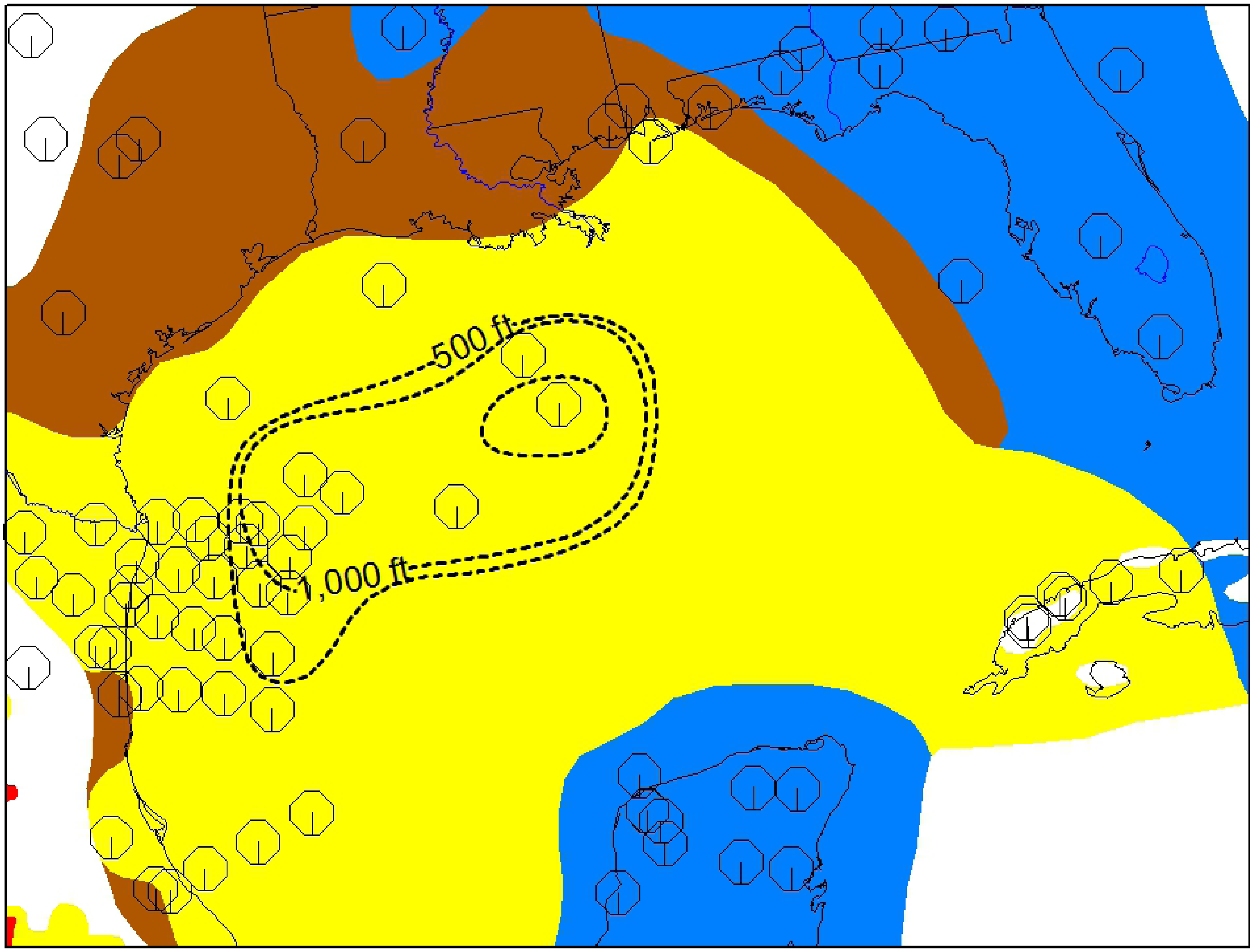

Figure 18. Map of the basal Tejas lithology showing the extent and thickness of the 'Whopper Sand' in the Gulf of Mexico (Paleocene Lower Wilcox SS). 500 ft = 152 m, 1000 ft = 305 m, 1500 ft = 457 m. Yellow represents sand, blue represents limestone and brown represents clay/shale. State outlines are shown for reference. Circles represent stratigraphic columns used in this study. © 2017 Institute for Creation Research. Used by permission.

Clarey and Parkes (2016) believe the Whopper Sand may be a consequence of this rapid drainage shift at the Zuni/Tejas boundary, when water suddenly began to drain off the North American continent (Interior Seaway) into the GOM, permanently reversing the earlier direction of flow. This shift is marked by the sudden change in deposition from the uppermost Zuni layer (the Lower Paleocene Midway Shale) to the lowermost Tejas (Paleocene-Eocene Whopper Sand). In a Flood model, this would coincide with the change in water direction described for Day 150+ of the Flood. Initial drainage rates in the Paleocene, coinciding with a sudden drop in sea level at the onset of the Tejas, were likely high volume and highly energetic, providing a possible mechanism to transport the thick Whopper Sand into deep-water. Over time, the drainage volume lessened, lowering the energy available for transport, until the present-day pattern developed. We now observe small flows compared to what was likely happening during the initial draining of the vast North American platform at the start of the Tejas.

This hypothesis may also help explain the lack of human fossils in the rock record. Most pre-Flood humans likely survived until close to Day 150 and were probably clinging to the areas of highest ground. As the water levels crested on Day 150, humans were ‘wiped off,’ spreading their dead bodies in all directions from a zone of concentration, radially transporting them great distances. This process would have spread their remains and lessened the likelihood of finding a concentration of human fossils. And, if they were not buried deep enough in sediment, they would not be preserved as fossils either. Erosion after the Flood would affect the highest strata the most and any humans buried in the uppermost few meters as a consequence.

As mentioned earlier, South America has a greater volume of Tejas than Zuni (Fig. 7). Why so much Tejas in South America? A lot is probably due to the contribution of Central America which formed mostly in the Cenozoic (Tejas). And it appears the tectonics of both North and South America played a major role in the volume deposited during the Tejas. The higher volume of Tejas sediment on both continents is partly caused by the uplift of Tejas-age (Cenozoic) mountain ranges (the Rocky Mountains and Andes Mountains) that run the length of the respective continents. These major mountain ranges shed tremendous amounts of sediment during their uplift, creating great volumes of Tejas sedimentary rock east of the mountain ranges. And combining that with the increased amount of sediment caused by the formation of Central America, and we get a greater volume of Tejas deposition for South America. Africa, in contrast, has no significant, Tejas-age (Cenozoic) mountain ranges running the length of the continent to provide additional volumes of Tejas sediment.

Finally, note that the Tejas isopach maps of North America and South America show cut-out areas where no Tejas exists in the regions of the Rocky Mountains and the Andes Mountains (Figs. 15, 17). Erosion has exposed the underlying the basement rocks in these location due to Cenozoic uplift. This in effect, separated the various sedimentary basins, particularly in North America. The coarseness of the stratigraphic column spacing prevented us from showing every isolated basin and further details, and as a result, we acknowledge that there are likely some minor errors in the map due to averaging between the columns. However, we feel the cut-out areas on the maps adequately portray the basement exposures and the areas where no Tejas exists. Any averaging errors are extremely minor compared to the continental scale of the maps and the overall totals for the stratigraphic data.

CONCLUSIONS

Stratigraphic data indicate the pre-Flood world was segregated by topography, resulting in an orderly ecological zonation, as some early creationists speculated (Clark 1968). Clarey (2015) had earlier identified a similar topographical/ecological pattern to explain the occurrences of the dinosaurs in the American West. It also appears that the global fossil record can be explained as a direct result of the progressive burial of higher and higher elevations during the Flood. As the Flood waters rose, new and higher areas were subsequently inundated, until all the world was covered by Day 150 of the Flood (Gen. 7:24). The stratigraphic data seem to indicate this coincided with the end of the Zuni megasequence. The Zuni has the most volume of rock deposited globally and has arguably the maximum areal coverage of any megasequence. Whereas, the Tejas megasequence is a close second in both volume and areal extent and likely consists of Day 150+ deposits. Tejas fossils likely reflect the flora and fauna of the uplands areas that existed in the pre-Flood world. However, post-Flood events like the Ice Age are not part of the Tejas megasequence and were not considered in this study.

The relative timing of the break-up of Pangaea can also be inferred from the megasequence data. Deposits on the offshore shelf regions indicate Africa and North America split before (Absaroka megasequence) the breakup of Africa and South America (Zuni megasequence). These data also indicate that Greenland and the Saudi Arabian peninsula did not fully separate from their respective continents until the deposition of the Zuni and Tejas megasequences, respectively, later in the Flood.

This paper fills a critical need for knowledge of the pre-Flood world that is based on observable data and not mere speculation. We conclude with a new, pre-Flood geography map for about half of the world. This map also helps to explain the observable fossil record. Many previous Flood models could not explain the patterns of deposition in the rock record and the differentiation of fossils that is observed within the strata. The proposed ecological zonation-megasequence depositional model is an important step in that direction. It may help explain why human fossils are not found with dinosaur fossils, and why dinosaurs are not found in the earliest Flood rocks (Sauk-Kaskaskia megasequences). It helps explain the major subdivisions of the fossil record in terms of their respective megasequences and their boundaries. And it is data-driven as it is based on a massive set of newly compiled stratigraphic columns from across three continents.

The location of the Garden of Eden will likely never be known, but these results allow the re-creation of the major topographic highs and lows of the pre-Flood world, including past continental reconstructions.

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