Tomkins, J.P., and T.L. Clarey. 2023. Developing a comprehensive model of global Flood paleontology: Integrating the biostratigraphic record with global megasequence deposition. In J.H. Whitmore (editor), *Proceedings of the Ninth International Conference on Creationism*, pp. 561-587. Cedarville, Ohio: Cedarville University International Conference on Creationism.

CEDARVILLE UNIVERSITY

9th ICC 2023

DEVELOPING A COMPREHENSIVE MODEL OF GLOBAL FLOOD PALEONTOLOGY: INTEGRATING THE BIOSTRATIGRAPHIC RECORD WITH GLOBAL MEGASEQUENCE DEPOSITION

Jeffrey P. Tomkins and **Timothy L. Clarey**, Institute for Creation Research, 1806 Royal Ln, Dallas, TX, 75010 jtomkins@icr.org, tclarey@icr.org.

ABSTRACT

For the past ten years, the Column Project at the Institute for Creation Research (ICR) has mapped out the sedimentary rock record of the global Flood across the world's continents using extensive geological data from petroleum industry wells, rock outcrops, seismic data, and published cross-sections. Using four basic observations, we progressively examine the fossil record starting at the initial fossiliferous-rich layer (Cambrian) and then sequentially move upwards with each successive megasequence. This allows for the systematic and sequential correlation between the biostratigraphic record and the corresponding megasequences. The basic observations used are 1) sudden appearance of taxa, 2) stasis (similar taxa as living or later appearing taxa in the rock record), 3) marine mixing (a predominant feature throughout the rock record), and 4) burial by ecological zonation (sequential feature of the progressive Flood). We find that the merger of the fossils and the stratigraphic record allows a better interpretation of the progression of the Flood. Each megasequence can be defined by its unique fossil content which reflects distinct ecological zones as the water rose higher and higher during the Flood year.

KEYWORDS

megasequence, geological column, stratigraphic record, fossil formation, fossil record, biostratigraphy, global Flood

INTRODUCTION

The Column Project at the Institute for Creation Research (ICR) has mapped out the sedimentary rock record of the global Flood across the world's continents using extensive data from petroleum industry wells, rock outcrops, seismic data, and published cross-sections (Clarey 2020). Thus, similar, detailed sedimentary rock data (megasequences) are found across every continent that has been studied, including the continental shelf (Clarey and Werner 2023). These data confirm the reality of a global geological column created by the global Flood (Clarey and Werner 2018). This monumental and unprecedented project has shown that the global Flood and its corresponding Sloss-defined six megasequences (Sloss 1963) are represented by the same stratigraphic order of deposition and extent on every continent that has been evaluated: North America, South America, Africa, Europe, and Asia (Clarey and Werner 2018; Clarey 2020, 2022). It is the extent that seems to be most relevant to the fossil record on each continent as this paper will show.

Megasequences supersede and include multiple geological systems and in many instances can be recognized by their bounding erosional surfaces and sudden changes in rock type which are less dependent on fossil content alone (Clarey and Werner 2018). It is our contention that megasequences are the best method to record the sedimentology of the Flood, while fossils record what flora and fauna were buried within each megasequence. The megasequences differ from the standard evolutionary geological time scale in that they are not based exclusively on changes of fossil content as are the standard Eras, Periods and Epochs. Nevertheless, the fossils help elucidate the megasequence boundaries and assist in recording the progression of the global Flood.

Not only does the overall stratigraphic record of the Flood correspond globally, but the data also show that the Flood occurred in a series of progressive inundations corresponding to each megasequence which also matches well with the Hebrew text of Genesis chapter seven (Johnson and Clarey 2021). These inundations were caused by violent tsunami-like waves over the year-long period of the Genesis Flood. These progressive ebb-and-flow events began their sediment and fossil deposition in the lowest regions of the continental shelf (presumed shallow seafloors on continental margins), then proceeded to the edges of landmasses (lowland coastal regions), and then moved progressively upward onto land until finally the entire global landscape was under water by Day 150 of the Flood (Johnson and Clarey 2021).

During this violent global and catastrophic process, aided by rapid plate tectonic movement (Austin et al. 1994; Baumgardner 1994) the original pre-Flood mega-continent split apart into the global configuration of the various continents we see today. Then in the latter stages of the Flood year, the newly separated continents experienced local continental and mountain range uplift, as the floodwaters continued to recede (Clarey 2020). This final stage of the Flood was characterized by vast amounts of water and sediment draining across and pouring off the continents. Some of this sediment deposition took place in large basins that were forming adjacent to mountain range uplift and also offshore in the oceans, especially on the continental shelf.

Now that an accurate stratigraphic geological model of the global Flood has been developed (Clarey 2020; Clarey and Werner 2023), it is important to begin integrating the fossil record (biostratigraphy) with the stratigraphic data. Thousands of meters of Flood sediments across the globe contain vast amounts of fossils buried within them as a further testament to the Genesis Flood.

The fossil record is one of sudden appearance, stasis, and then often disappearance, or extinction. This is the same pattern we observe in every geological subdivision of the geological column, including the systems and erathems (Fig. 1). Evolutionary geologists like to call

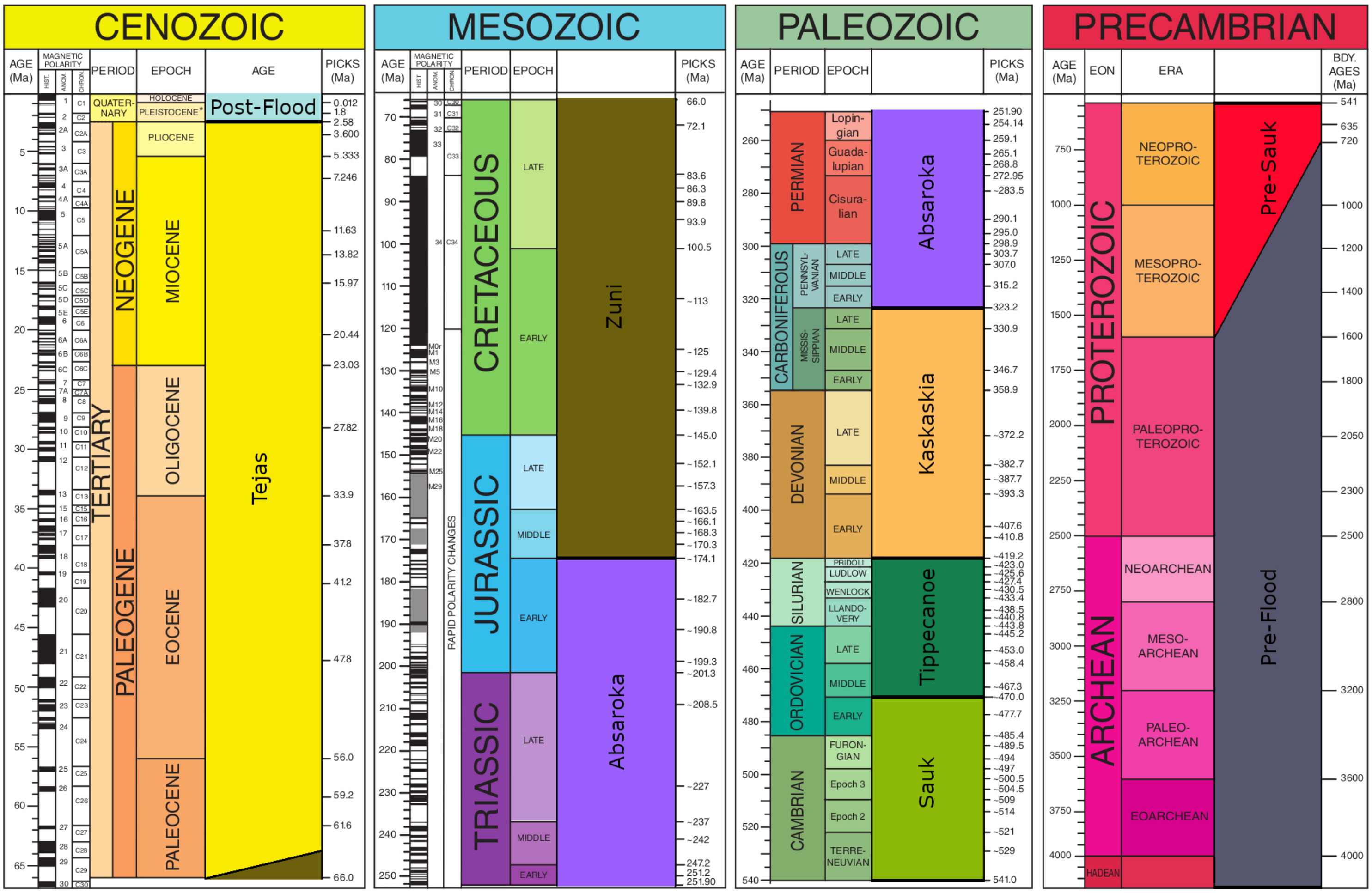


Figure 1. Calibration of the Sloss-based (Sloss 1963) megasequence Flood model with the standard geological column.

the systems periods and the erathems eras since they believe these rock layers represent actual periods and eras of time in the past. Creation geologists view these as merely days or weeks during the year-long Flood. The fossil record is simply the successive order of burial.

Fossils are so important to the geological column that each subdivision of the column was divided on the basis of abrupt fossil changes in the rock layers. As you go up or down the geological column, different fossils appear and disappear. Most geologists think the layers that contain the same organisms were buried at similar moments in the past, or at least close in time.

The biggest change in fossils, where fossils suddenly appear in the rock record in great and diverse numbers, is designated by the Phanerozoic Eonothem, or "visible life eon." This point in the rock record also coincides with a new erathem and a new system called the Paleozoic Erathem and the Cambrian System, respectively. Below this point, the rocks are lumped into the collective and generic Precambrian, which has also been further divided into three eonothems, or eons. Since we are dealing with the fossil record here, we ignored these subdivisions and note that these rocks do indeed contain some fossils, but most are microfossils and/or algal-type fossils like stromatolites. Most of the Precambrian fossils are likely pre-Flood. For all practical purposes, the fossil record starts in the Phanerozoic Eonothem, Paleozoic Erathem, and Cambrian System. This coincides with the onset of the flooding of great portions of the continents via the Sauk Megasequence.

Changes in the Phanerozoic fossils in a vertical sense that are most significant represent boundaries of erathems or eras (Fig. 1). The Paleozoic Erathem contains primarily marine fossils, but toward the top, in the Pennsylvanian System (Upper Carboniferous), we see more land animals and plant fossils suddenly appearing in great numbers in the rocks. The Mesozoic Erathem contains many reptile fossils including the dinosaurs. And the Cenozoic Erathem contains a multitude of mammal fossils of various types. All three erathems contain billions of marine fossils mixed in with the terrestrial fossils. The mixing of land and marine environments is extremely common in the rock record (Clarey 2020).

Smaller changes (often referred to as "extinctions") in the fossils were designated as systems or periods. These are what subdivide the erathems. Each represents a change in the fossils in a vertical sense. Many of the boundaries of these systems and erathems coincide with what the evolutionary community considers extinction events. These so-called extinctions are where the fossils change abruptly and some organisms disappear upward within the rock record.

There are five, and now possibly six, major extinction events within the Phanerozoic Eonothem (Pimiento et al. 2017). Evolutionary scientists have made many attempts to identify the causes for these rapid changes in the fossils and for the disappearance of major groups of fossils. Meteor impacts and rapid climate changes caused by volcanism or other factors have been suggested. However, most of these so-called extinction events remain a mystery to the evolutionary scientists.

Creation scientists do not consider these as true "extinction" events. Instead, these horizons are interpreted as major shifts in the burial pattern of fossils during the Flood. So-called extinctions are merely the level at which certain fossils were no longer being actively buried, so they disappear upward in the geological column. It may be that at these levels the environments that contained these animals and/or plants were already inundated, preventing any further burial in younger rocks.

Figure 2 shows that several of the major extinction events do closely coincide with the six megasequences, one coinciding with the Cretaceous-Paleogene (K-Pg) and one with the Triassic-Jurassic (Tr-J) (Clarey 2020). The other three major extinction horizons fall within the middle or toward the top of the megasequence boundaries.

Recall, megasequences are defined on the basis of major erosional boundaries, often reflected by sudden changes in rock type and/or pre-Flood environment. Therefore, it should be no surprise that some of these changes correspond to rapid shifts in the fossil content also. The fossils deposited are dependent on the pre-Flood environment being inundated, tectonic forces at work, currents, waves and the

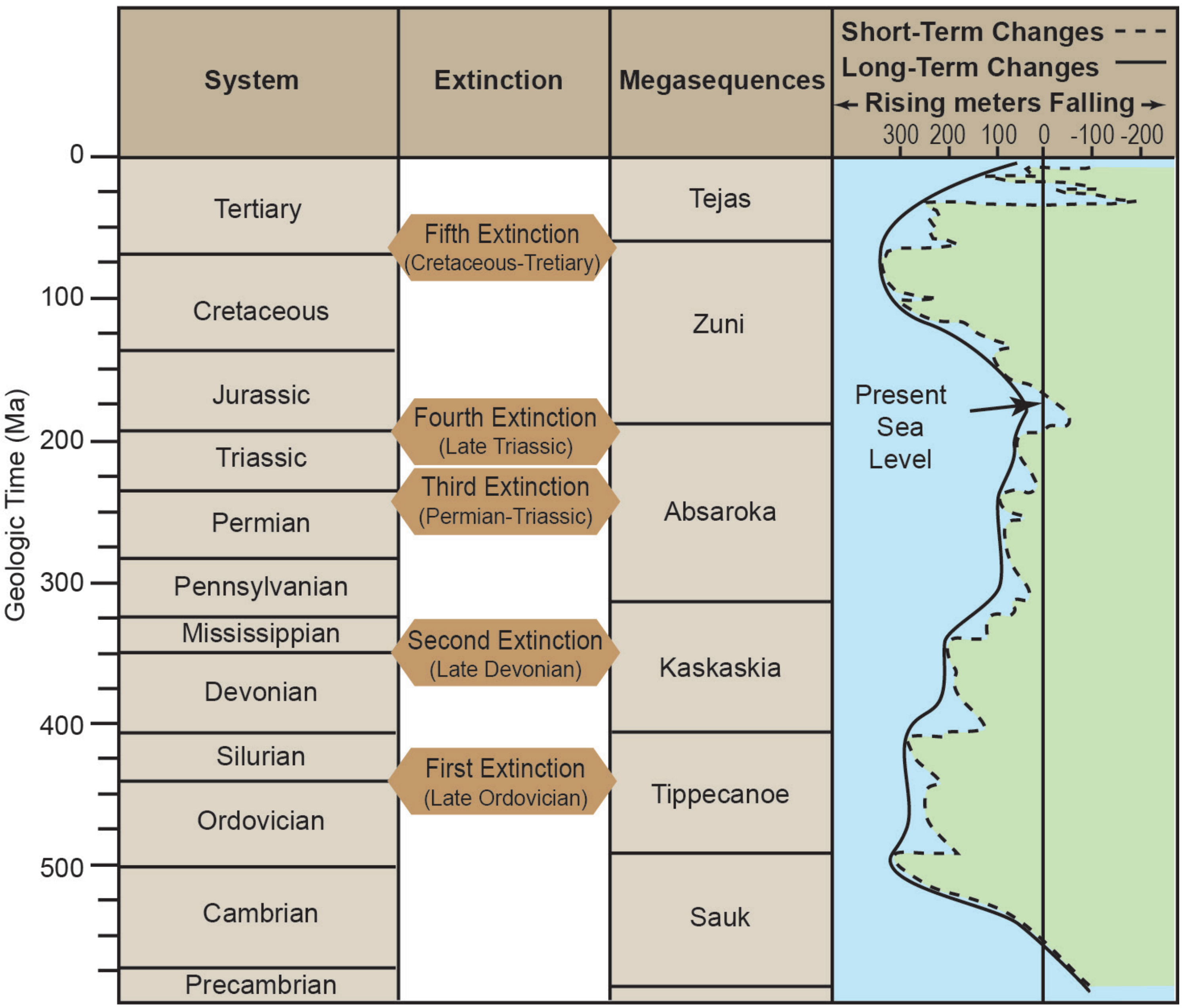


Figure 2. Evolutionary timescale and sea level curve showing the five major extinctions and their relationship to the megasequences (Clarey 2020).

height of relative sea level (Clarey 2020).

Some extinctions may represent the high-water point (high stand) of a megasequence, a smaller sequence high stand, or may represent the end of a megasequence cycle. Figure 2 shows that only the Absaroka Megasequence contains two of the so-called major extinctions. Reasons for this are not immediately clear. It may be because the Absaroka is the megasequence in which great numbers of land animals and land plants suddenly appear in the rock record. The Absaroka seems to represent a pivotal moment in the Flood (Clarey 2020).

However, that is not to say the Flood did not cause extinctions. Many of the presumably unique pre-Flood environments were likely destroyed by the Flood's tectonic activity during the destruction of "the world that then was." This caused a lot of marine animals to go extinct during or shortly after the Flood. For example, animals like trilobites and many of the Paleozoic brachiopods and corals seem to be extinct today. The exact reason for this is unclear.

For this paper, we chose four basic observations to help us interpret the fossil record starting at the initial fossiliferous-rich layer (Cambrian) and then sequentially moving upwards in accordance with each successive megasequence. This allows a systematic and sequential correlation between the biostratigraphic record and the corresponding megasequences. The principles that were used are 1) sudden appearance of taxa, 2) stasis (similar taxa as living or later appearing taxa in the rock record), 3) marine mixing (a predominant feature throughout the rock record), and 4) burial by ecological zonation (sequential feature of the progressive Flood).

METHODS

The global pattern of fossils cannot be denied. Why certain animals and plants are only found in certain rock layers is still largely unresolved. Creation scientists have often speculated and proposed various ideas to try and explain the patterns we observe in the fossil record. Among these ideas are hydrodynamic selectivity and sorting by size, fossil composition, and settling velocity (Whitcomb and Morris 1961). Other factors relate to mobility, and possible factors like ecological zonation have also been considered (Clark 1968; Coffin 1983). One of the goals of the present study was to examine rock data across multiple continents and see which of these factors best explains the fossil record. If we follow the data, they should lead us to the best available solution.

In our study we utilized fossils that are unique and common to various levels of the geological column as proxies as well as common fossils that transition across several geological systems. Less common fossils were not used as they are less representative of the particular geological system and therefore the megasequence. These were then mapped globally using the Paleobiology Database (PBDB) Navigator online software package (https://paleobiodb.org/navigator/). Fossils were placed within the megasequence stratigraphic framework developed previously (Sloss 1963) and calibrated with the standard geological column (Figure 1). Furthermore, we compared each of the fossil occurrences to the mapped extent and thickness for each corresponding megasequence (Clarey and Werner 2023). PBDB age delineated data corresponding to each of the six stratigraphic megasequences was also downloaded in CSV file format and globally mapped using an ICR developed Python program.

RESULTS

A. Cambrian and Lower Ordovician (Sauk Megasequence) fossils

Evolutionists claim the Cambrian rock layers began to be laid down about 540 million years ago. These sediments contain highly complex multicellular creatures including a plethora of hard-shelled creatures, mostly brachiopods and trilobites. Other examples include clams, snails, sponges, worms, jellyfish, sea lilies, and a host of complex extinct marine invertebrates. This sudden appearance of so many types of fossils has been labeled the Cambrian Explosion. It is also noteworthy that the Cambrian strata contain some of the earliest occurrences in the geological column of preserved soft tissue, in the form of organic fibers from fossilized *Sabellidites* tube worm casings (Moczydlowska et al. 2014).

According to ICR's model of progressive burial by ecological zonation (Clarey 2020), the Cambrian layers were the first to be deposited near the beginning of the global Flood in the sedimentary rock strata known as the Sauk Megasequence (Clarey and Werner 2017). The Sauk also includes the early Ordovician sediments. Globally, the Sauk is most prominent across the interior of North America, Asia and Europe, and to a lesser extent, South America. It is also prominent across northern Africa. Clarey and Werner (2017) have previously found that early megasequences, like the Sauk, show minimal flooding in both areal extent and in volume (Clarey 2020).

Using Trilobita (trilobites), Porifera (sponges), and Brachiopoda (brachiopods) as Cambrian fossil proxies, their combined occurrences match well with the extent of the global Sauk mapped out previously by ICR (Clarey and Werner 2023) (Figure 3). According to a conceptualized sea level curve based on the volume and extent of Phanerozoic sedimentation across four continents (Figure 4), we interpret that these sediments would have been deposited within the first few weeks of the Flood (Johnson and Clarey 2021).

B. Middle Ordovician – Silurian (Tippecanoe Megasequence) fossils

The Middle and Upper Ordovician and the Silurian Systems comprise the Tippecanoe Megasequence which is a continuation of the marine environment deposition begun in the Sauk. Using both the Ordovician and Silurian as filters combined with fossils representing Porifera, Brachiopoda, and Trilobita, the progressive burial of the pre-Flood marine ecosystems continues to match up well with the interpretation of a progressive Flood. In an exegetical analysis of Genesis 7 combined with megasequence geology (Johnson and Clarey 2021), it was determined that this deposition took place about the third to fourth week of the Flood (Figures 5 and 6). Again, Clarey and Werner (2023) found that the Tippecanoe has the least volume of sediment of any megasequence and also has the least surface extent.

C. Devonian – Lower Carboniferous (Kaskaskia Megasequence) fossils

The Devonian and Lower Carboniferous Systems (Mississippian) largely compose the Kaskaskia Megasequence (Figures 1 and 2). This is the final marine-dominated phase of deposition that began in the Sauk and carried through with the Tippecanoe, and now the Kaskaskia. Of course, it should be noted at this point that the entire fossiliferous record of the global Flood contains almost exclusively marine fossils. Using both the Devonian and Carboniferous as filters combined with marine fossils representing Porifera, Brachiopoda, and Trilobita, the ongoing progression of the burial of pre-Flood marine ecosystems continues to match up well with the proposition of a progressive Flood burial continuing into about the fifth week of the

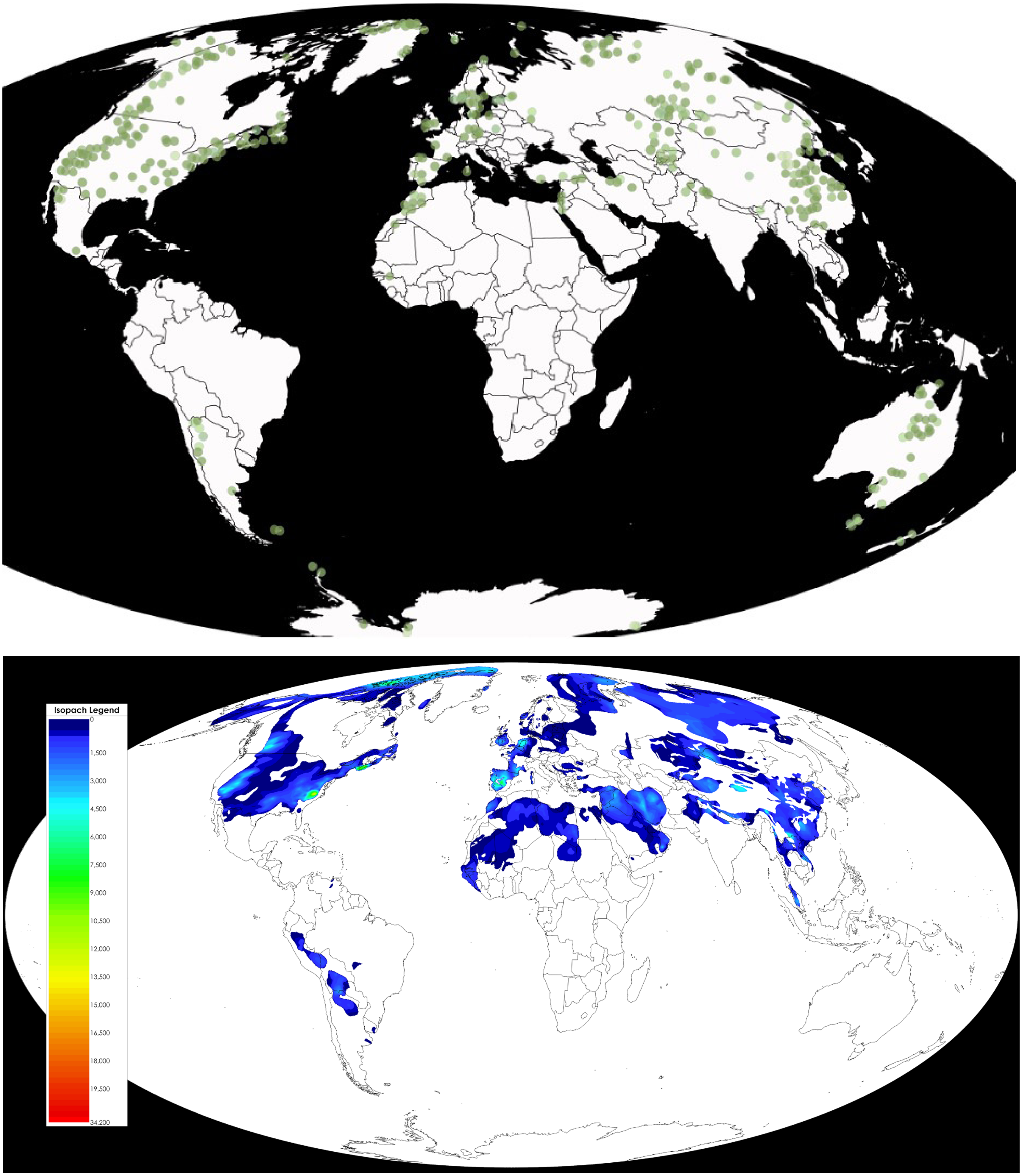


Figure 3. Top: PBDB map using Cambrian, Brachiopoda, Porifera, and Trilobita as filters. Bottom: Sauk Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

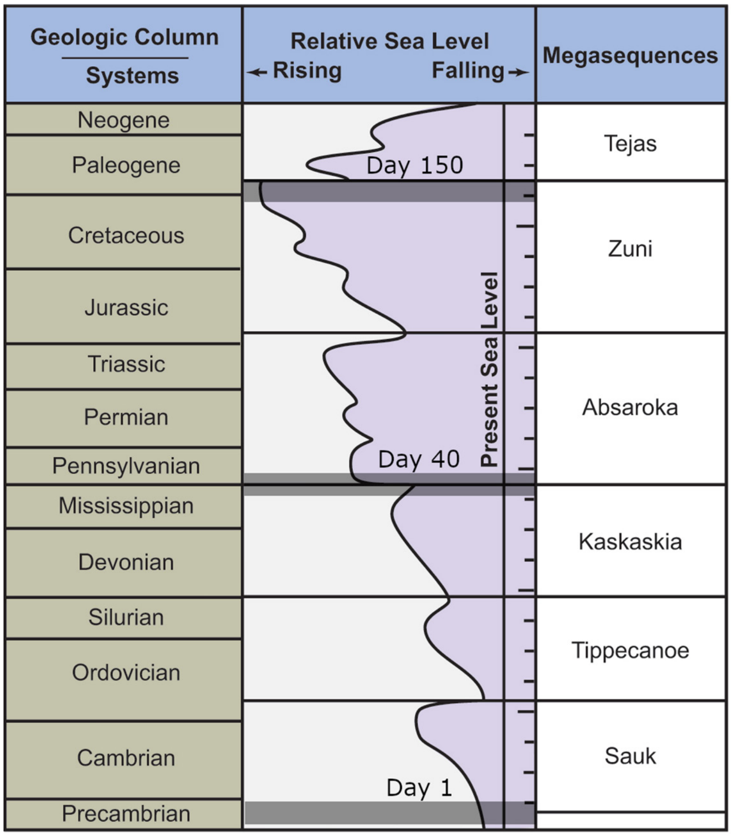


Figure 4. The ICR conceptualized sea level curve based on the volume and extent of Phanerozoic sedimentation across four continents (modified from Johnson and Clarey 2021).

flood as proposed by Johnson and Clarey (2021) (Figures 7 and 8).

Questions about why distinctly different fossil assemblages are found in the Sauk, Tippecanoe and Kaskaskia Megasequences remain, even though all are dominantly marine. Are these distinct fossil differences the result of larger and larger waves bringing in different depths of water-borne animals? And how does catastrophic plate tectonics explain these differences, yet all three megasequences show a similar extent? More research is needed on these issues.

D. Upper Carboniferous (Pennsylvanian) (Lower Absaroka Megasequence) fossils

In addition to the continuation of the burial of marine ecosystems, the Upper Carboniferous marked the burial of massive volumes of land animals and plants from apparent coastal tropical ecosystems, especially in the Pennsylvanian or Upper Carboniferous as the tsunami-like floodwaters rose higher and started to inundate the edges of the supercontinent land masses.

This coincided with the beginning of the formation of an entirely new seafloor through catastrophic plate tectonics (Austin et al. 1994). In fact, the oldest seafloor today is dated as Absaroka. The result of so much new, hot seafloor pushed the ocean water up from below, raising the elevation of tsunami waves, and inundating large portions of the land for the first time (Clarey 2020).

To represent this aspect of the progression of the Flood, we queried the Carboniferous in PBDB with representative filters for land plants, Archosauria, and insects, with *Lepidodendron*, Archosauria, and Insecta as filters, respectively (Figure 9). By choosing terrestrial fossils, we were more likely examining the fossil assemblage from the Upper Carboniferous. Recall, the Kaskaskia (Lower Carboniferous) is dominated by marine fossils. The Lower Carboniferous, as noted above, is represented by the end of the Kaskaskia megasequence while the Upper Carboniferous is represented by the beginning of the Absaroka.

The Lower Absaroka Megasequence fossils and rocks likely represented lowland and coastal environments in the pre-Flood world (Clarey 2020). The uplands were still not being flooded, and this is reflected in the types of fossil animals and plants found in the Absaroka. Nearly all angiosperms are found in higher level rocks that apparently had not been inundated at this point.

It remains a mystery why no undisputed pollen has been found in the earliest megasequences. In the Flood model, flowering plants would have existed on Earth in the pre-Flood and in the earliest moments of the Flood year. And likewise, pollen also, even if the plants themselves were still not flooded.

E. Permian – Lower Jurassic (Absaroka Megasequence) fossils

Permian rock layers contain several of the fossil record's greatest evolutionary enigmas which are found within strata of the Absaroka Megasequence. These rocks are found directly above Carboniferous strata. One enigma is the famous and hotly debated Permian-Triassic (P-Tr) mass extinction event that is exhibited by a dramatic shift in plant fossils and a huge change in marine life in the fossil record and, to a lesser degree, terrestrial creatures. Many evolutionary geologists have suggested causes for this claimed extinction event, but no cause seems to be largely agreed upon.

The other enigma is the sudden appearance at this level in the Flood of a whole host of now extinct strange creatures that defy evolutionary explanation, along with others that are still alive today. However, these evolutionary enigmas dissolve away when we place these plants and animals within a global Flood model of burial by ecological zonation.

Land life that is buried in Permian sedimentary rock units include a diverse array of land plants, arthropods, and an equally diverse appearance of highly specialized and unique Archosauria that are no longer living today. A query of PBDB for Permian Archosauria and Insecta illustrates the continuing inundation of land as the floodwaters progressed to higher elevations (Figure 10).

Again, this increase in water levels and the increasing extent of flooding of the land was caused by runaway subduction (Baumgardner 1994) and the catastrophic plate tectonics process of making new, hot and buoyant seafloor. This is the likely mechanism that continually pushed the tsunami waves higher and higher (Clarey 2020).

Evolutionists have claimed that many Permian creatures lived in a massive arid desert environment simply because they were buried in massively cross-bedded sandstones. But other research has demonstrated that these sandstones were likely deposited under marine conditions (Whitmore et al. 2014). Evolutionary scientists have claimed that many cross-bedded Permian and Pennsylvanian deposits represent ancient wind-blown sand dunes, such as the Coconino Sandstone in Grand Canyon region, despite the fact that they contain features that could only have formed by water, such as the presence of dolomite ooids (Cheung et al. 2009). In recent years, researchers have analyzed these rock layers and sedimentary structures (cross-bedding) using microscopic thin sections, looking at sediment particles within the rocks and comparing these data to present-day sand dunes (Whitmore and Garner 2018). The implication of these studies is that these cross-bedded Permian sandstones were most likely formed as massive catastrophic water deposits.

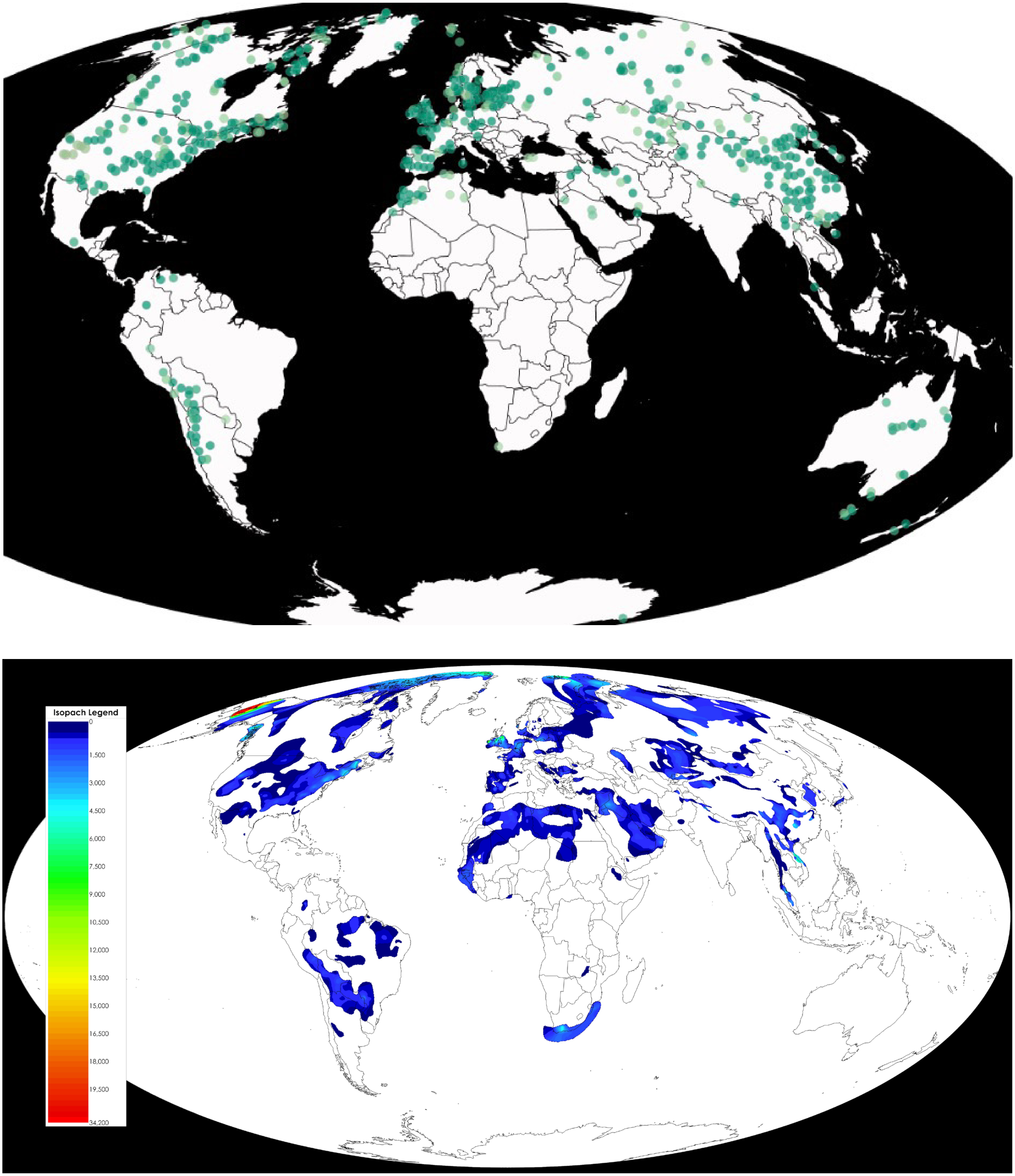


Figure 5. Top: PBDB map using Ordovician, Brachiopoda, Porifera, and Trilobita as filters. Bottom: Tippecanoe Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

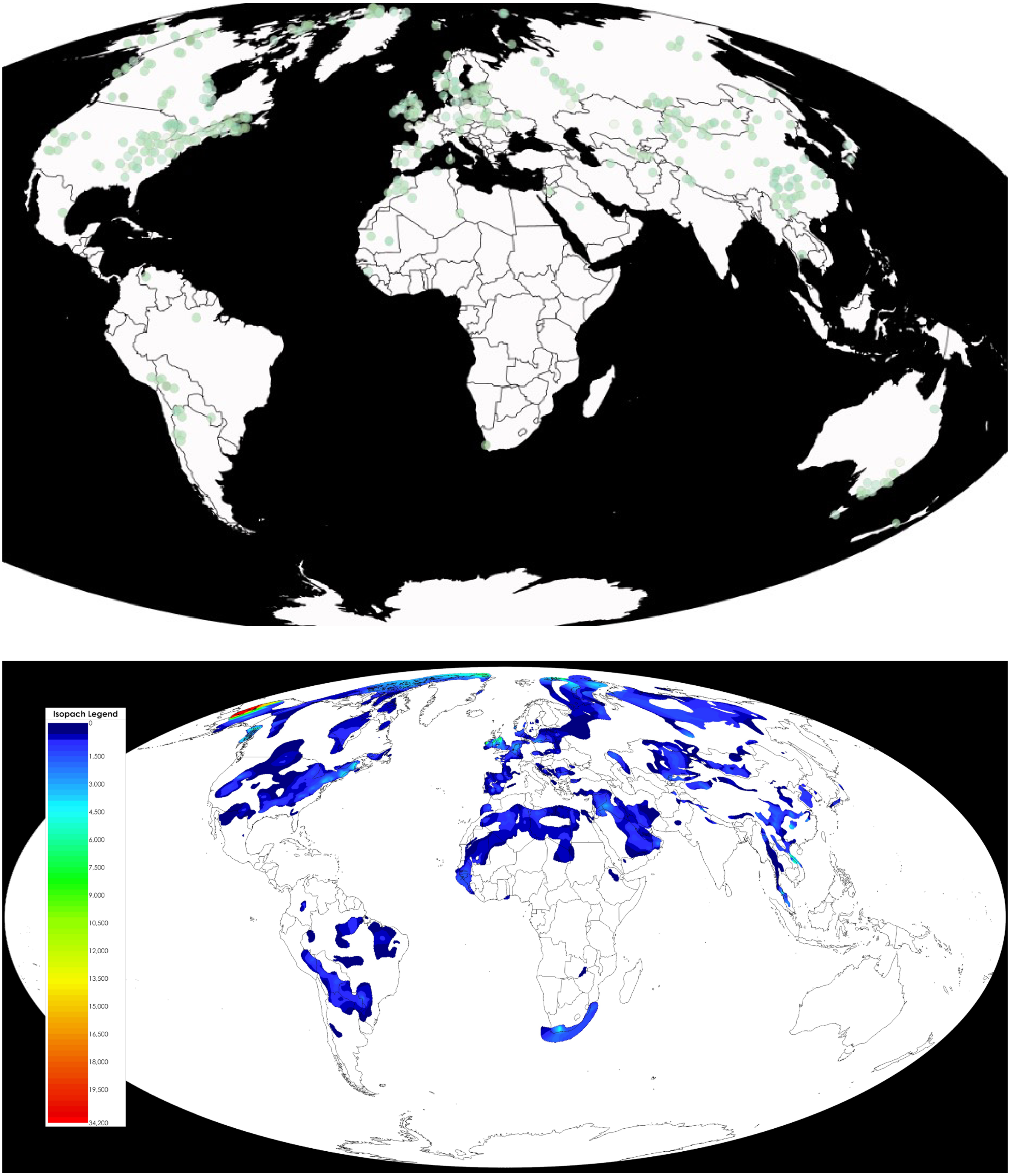


Figure 6. Top: PBDB map using Silurian, Brachiopoda, Porifera, and Trilobita as filters. Bottom: Tippecanoe Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

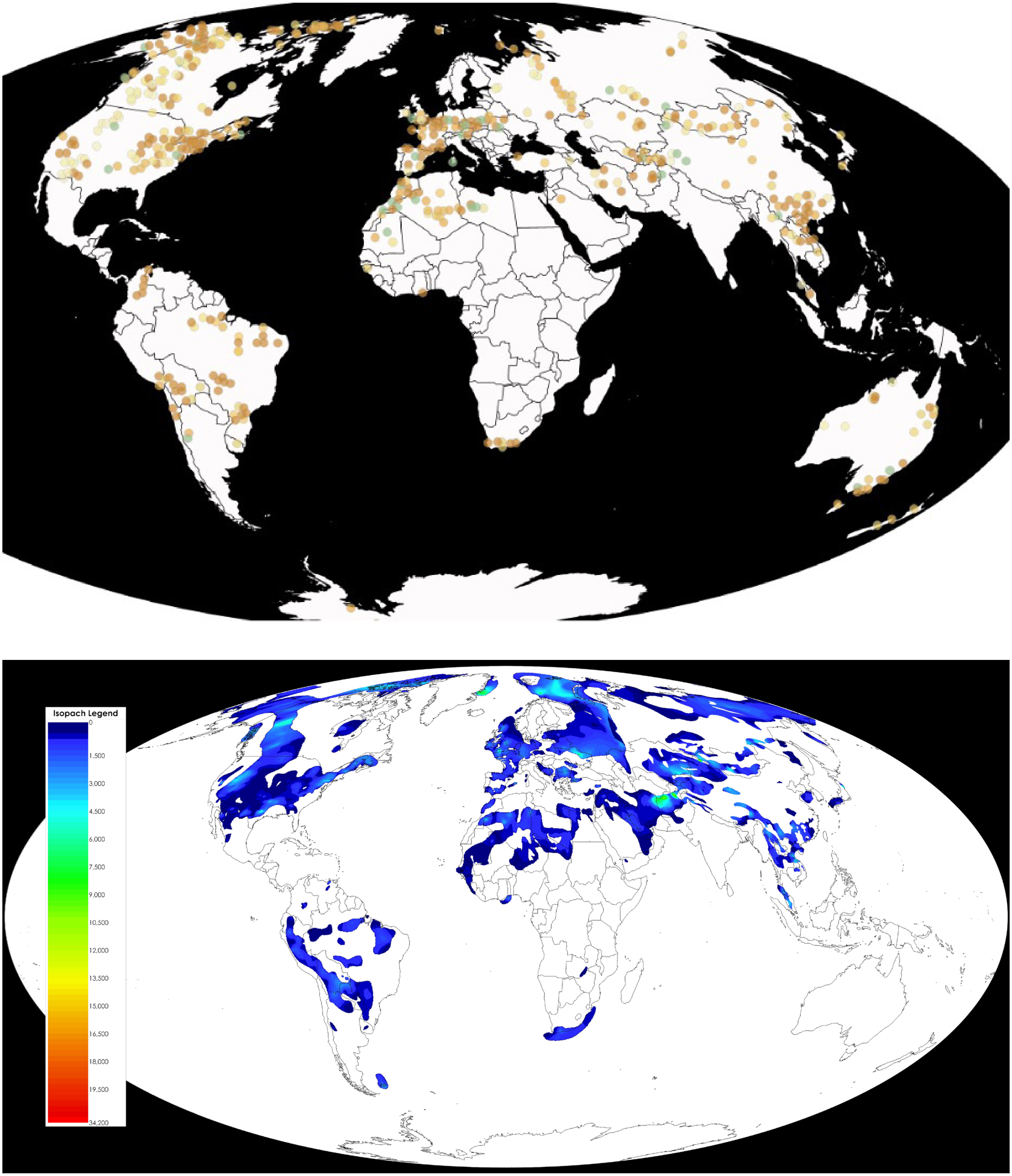


Figure 7. Top: PBDB map using Devonian, Brachiopoda, Porifera, and Trilobita as filters. Bottom: Kaskaskia Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

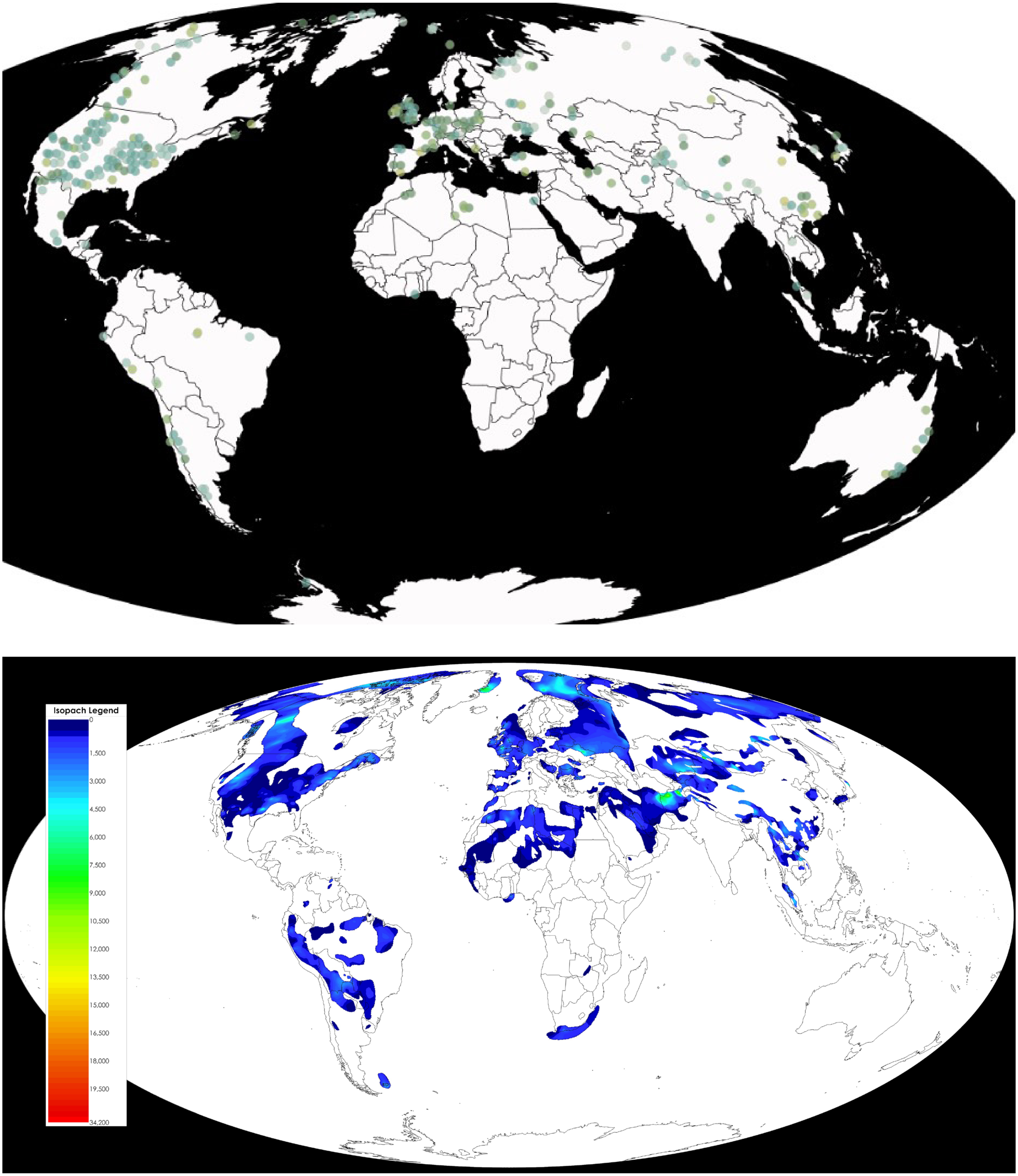


Figure 8. Top: PBDB map using Carboniferous, Brachiopoda, Porifera, and Trilobita as filters. Bottom: Kaskaskia Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

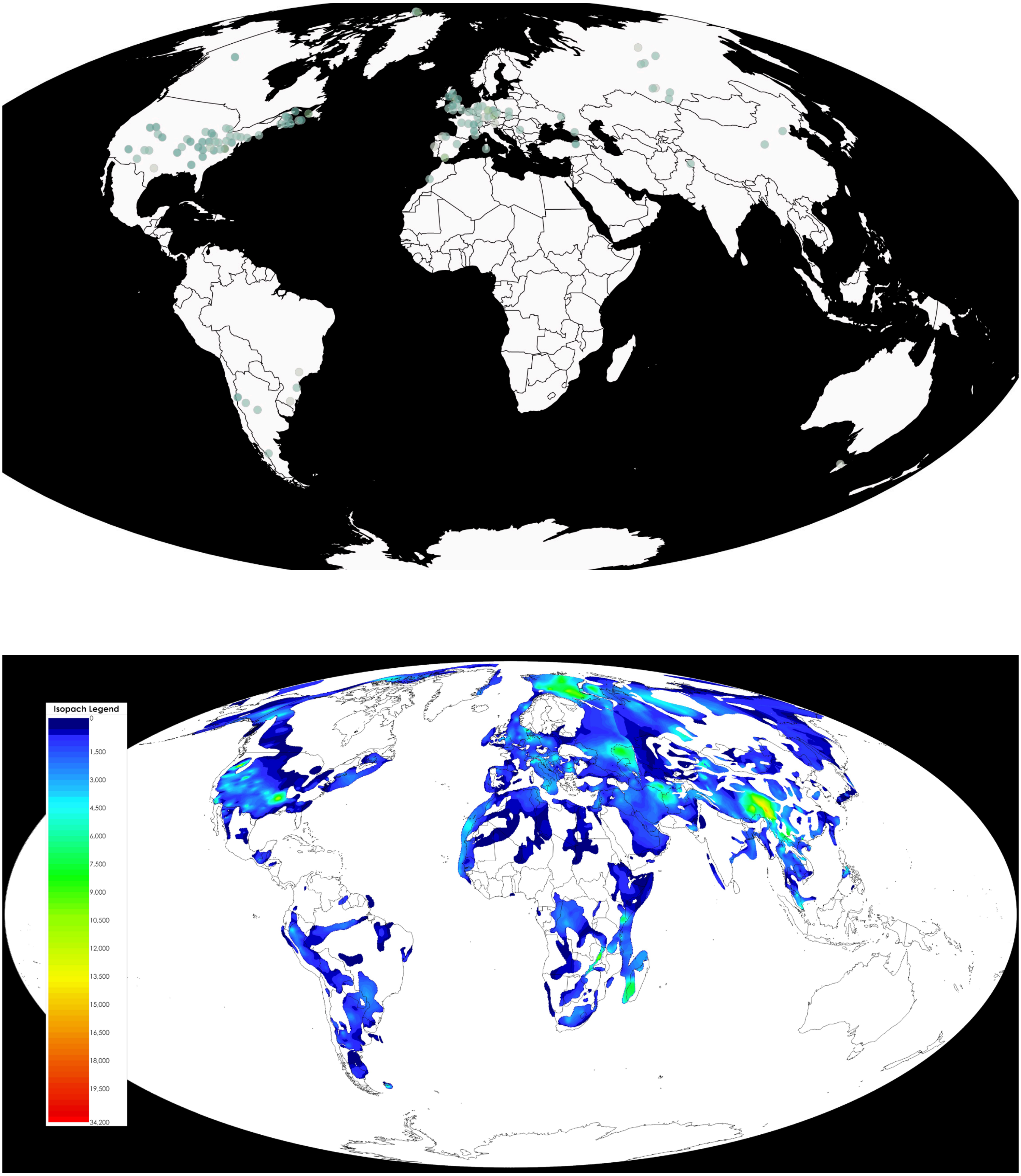


Figure 9. Top: PBDB map for the Carboniferous using *Lepidodendron*, Archosauria, and Insecta as filters. Bottom: Absaroka Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

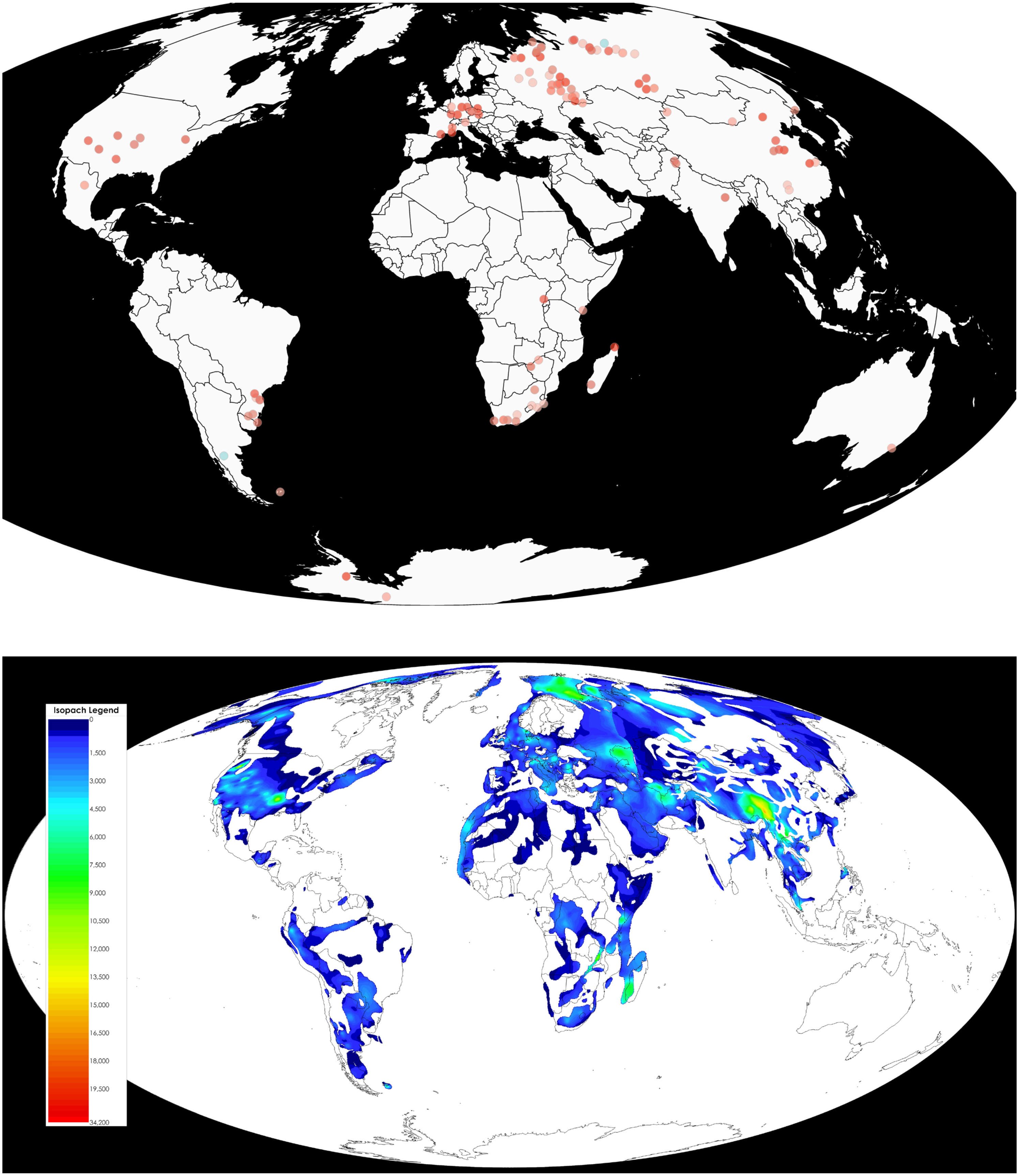


Figure 10. Top: PBDB map for the Permian using Archosauria and Insecta as filters. Bottom: Absaroka Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

Much of the plant life found buried in Permian strata overlaps with the Upper Carboniferous (Pennsylvanian system) strata, such as the swamp-like large plants that grew as tall as 30 meters called *Lepidodendron* and *Sigillaria* (Prothero and Dott 2009; Wicander and Monroe 2016). However, seed ferns and conifers also began to be buried in these Flood sediments since they were likely living slightly more inland from the coastal forests and swamps along the ocean shorelines. The land fossils found in the Permian strata also reflect the inundation of the lowland and coastal wetland environments that comprise this layer globally. These comprise a variety of Archosauria and insects (Figure 10).

The various conifer plant groups were a diverse mix in the Permian rocks. These ecosystems also included large trees like ginkgos and cycads along with seed ferns. Not only are many types of cycads still with us today in rainforests and near coastal regions, but ginkgos too. Although ginkgos appeared suddenly in the fossil record in the Permian, they look exactly like ginkgo trees growing around the world today. Conifers found in Permian strata are very similar in appearance to current living counterparts and were as broadly adapted to diverse ecosystems as many conifers are today.

In the global Flood model of progressively laying down global megasequences, the Permian level falls within the Lower Absaroka Megasequence. This makes perfect sense since the Absaroka also begins with the Upper Carboniferous sediments, which have extensive overlap with the Lower Permian in regard to the types of plants and animals that are entombed within it. Thus, we can clearly see the progressive burial of land-based ecosystems starting at the interior edge of the lycopod coastal forests and swamps found in Carboniferous strata and extending into the higher-elevation, near-coastal tropical rainforests found in Permian strata. As we look higher in the Permian strata, we see fossils representing progressively higher elevations and leading into layers where the Permian terminates the Paleozoic.

F . Triassic – (Middle Absaroka Megasequence) fossils

The Triassic system which is entirely composed of Absaroka sediments is problematic for evolutionists because it represents both a continuance of many life forms found buried in lower strata combined with unexplained sudden appearances and a claimed recovery from an unresolved mass extinction event. In addition, many unique land-based life forms make mysterious sudden appearances in the Triassic without any previous evolutionary ancestry. In addition, this massive enigmatic fossil assemblage was deposited at about the onset of the breakup of a once-existent mega-continent (Pangaea). In fact, the oldest ocean crust found today goes back to the Triassic, supporting this plate tectonic interpretation. However, the evolutionary confusion over this curious quandary of catastrophically buried fossils and tectonic events makes perfect sense when we apply a model of progressive burial by ecological zonation and rapid plate tectonics associated with the global Flood of Genesis.

One of the chief enigmas that evolutionists have at the base of the Triassic is an apparent mass extinction event at the Permian-Triassic (P-Tr) boundary. The mystery lies in the fact that the timing, or the order of buried plants and animals, is very convoluted and drawn out in evolutionary deep-time thinking. Many Permian marine organisms were abundant right up to the P-Tr boundary, but land life showed several smaller extinction events leading up the P-Tr boundary. This is especially true with land plant fossils that allegedly exhibited a more tiered extinction, with many of their fossils extending well into the Triassic.

In other words, why is there a more sudden and extensive marine creature extinction compared to a more staggered land extinction? And why is the timing different between land animals, land plants, and marine creatures regarding the overall event, which according to evolutionists took about 15 million years? Furthermore, why did this event occur in the middle of a global megasequence (Absaroka) and not at one of its boundaries?

As the global Flood progressed, it involved increasingly more tectonic plate activity accompanied by the development of new seafloor. This increasing volume of new seafloor was concurrent with the escalating inundation of land with tsunami waves and marine sediments. As noted earlier, Permian strata leading up to the alleged mass extinction of marine life at the P-Tr actually represented the increasing accumulation and systematic burial of the many offshore ocean ecosystems.

Land life later entombed in Triassic rocks represents the increasing water height and subsequent burial of tropical and semitropical forest biomes farther inward on the Pangaea mega-continent (Clarey 2020). This is why we see such a rich diversity of plant-eating animals that were living in these lush forests, along with a rich diversity of Archosauria that were well adapted to such environments.

In the progressive global Flood model, higher water levels also caused the deposition of increasingly more extensive megasequences. And the Triassic represents the middle part of the deposition of the Absaroka Megasequence when the Flood waters really began to cover major parts of the continents (Clarey and Werner 2023). Recall, the Absaroka began in the Upper Carboniferous, continued through the Permian, and is responsible for the entire deposition of the Triassic.

As mentioned above, Pangaea began its breakup in the Triassic. This is especially visible along the modern North America East Coast and the West Coast of Africa, where these two continents first separated from each other. Global maps of the oceanic crust show Triassic rocks along the continental margins of North America and Africa at the point of separation (Müller et al. 2008).

While the prolonged and disorderly extinctions coupled with plant and animal life that never went extinct across the P-Tr boundary make little sense in light of evolution, they integrate seamlessly with a model of progressive burial over the year-long global Flood of Genesis. As sea level continued to rise due to massively extensive seafloor spreading, higher and higher waves crashed across the continents, burying entire ecosystems in their wake. This better explains the order of burial of the fossil plants and animals observed in the Triassic strata. To illustrate the continuing progression of the Flood onto land and the burial of terrestrial animals, the PBDB was queried using Archosauria, Insecta, and Mammalia as filters for the Triassic (Figure 11).

It is possible the so-called P-Tr extinction is another example of a dramatic shift in environment as the water reached different ecological zones on land. However, marine extinctions at this level are more difficult to explain. Did larger tsunami-like waves bring in distinctly different marine fossils at the same level? Or were waves coming from different directions with different marine fossils?

G. Jurassic (Uppermost Absaroka Megasequence– Lower Zuni Megasequence) fossils

As described previously, one of the chief enigmas that evolutionists have at the beginning of the Triassic is an apparent mass extinction event at the base, known as the Permian-Triassic (P-Tr) boundary. However, these ongoing enigmatic and convoluted so-called extinction events continue to be a recurring problem that is difficult to explain from evolutionary assumptions.

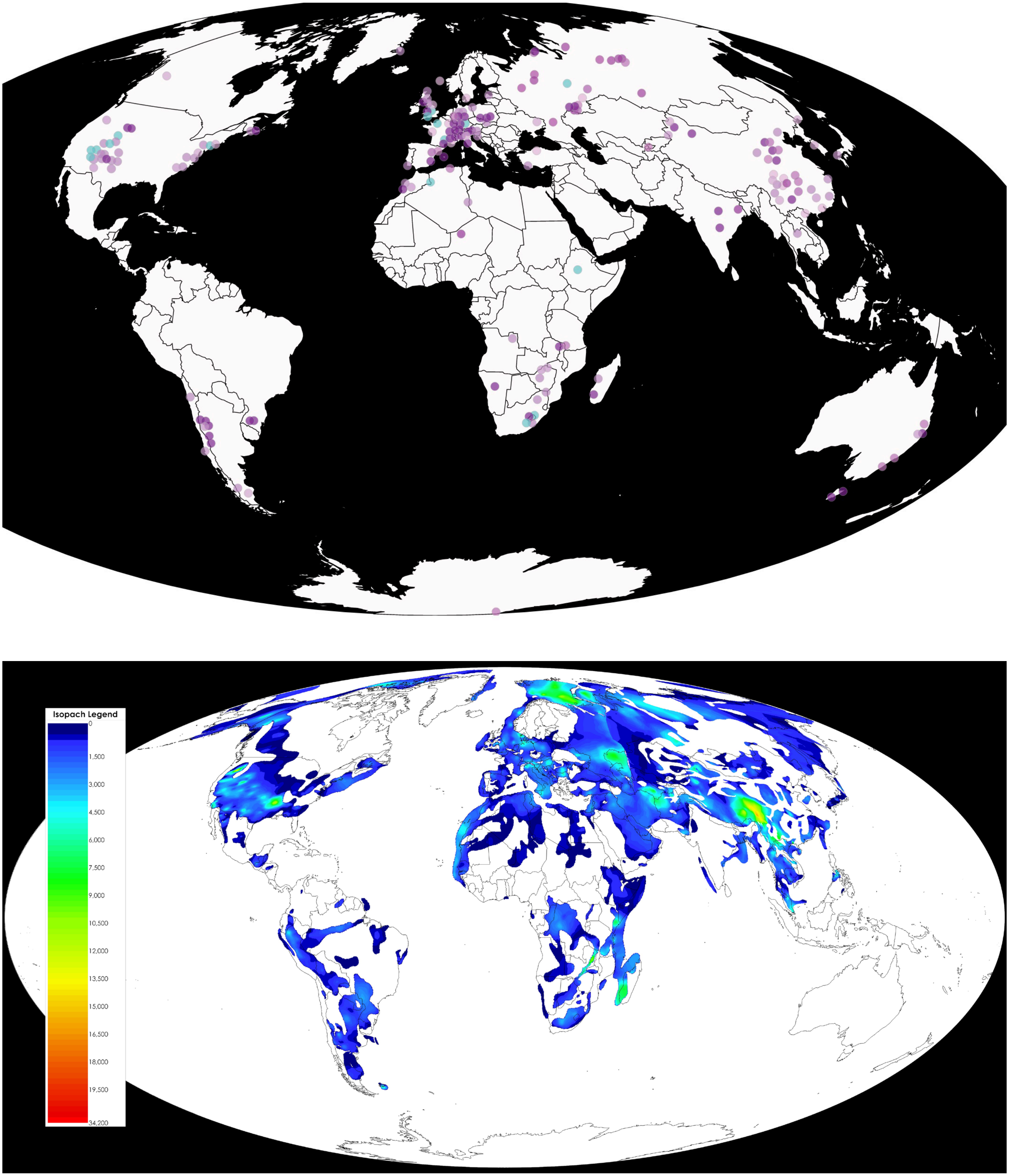


Figure 11. Top: PBDB map for the Triassic using Archosauria, Insecta, and Mammalia as filters. Bottom: Absaroka Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

The next claimed extinction event, called the Triassic-Jurassic (Tr-J) extinction, which is also called the end-Triassic extinction, marks the boundary between the Triassic and Jurassic systems that supposedly occurred 201 million years ago. This extinction event is also contained within the sediments of the upper-Absaroka (Figures 1 and 2). It is also considered to be one of the five major extinction events of the Phanerozoic. In the oceans, it is estimated that about 23 to 34% of marine genera disappeared at this level (Tanner et al. 2004). On land, a large variety of Archosauria dropped from the fossil record, but crocodylomorphs, pterosaurs, and dinosaurs somehow selectively avoided extinction.

There is a great deal of confusion among evolutionists regarding a clear connection between the Tr-J boundary and the terrestrial vertebrates that either disappeared or went on to thrive into the Jurassic. Another confusing aspect for evolutionists is the fact that plants and mammals also seemed to be relatively unaffected and that the dinosaurs and pterosaurs became the dominant land animals for the next 135 million years of the evolutionary timescale.

As mentioned previously, the initial rifting and the breakup of the pre-Flood mega-continent referred to as Pangaea began in the Triassic. This breakup involved a progressive increase in global tectonic activity which caused more extensive plate motion and rapid subduction of the pre-Flood ocean lithosphere along the West Coast of North America and all around the Pacific Ocean. The East Coast of North America had already exhibited significant rifting in the Triassic, breaking away from what is now recognized as Africa. Essentially, the Jurassic witnessed the rapid injection of new, hot, buoyant ocean lithosphere between the separating continents, creating the seafloor of the Atlantic Ocean.

Likewise, subduction of tectonic plates around the edges of the Pacific Ocean was simultaneously pulling open rifts and creating new hot seafloor. The combined action of these rifts (and rifts in other oceans) and production of seafloor continued to push the ocean water up from below, moving the tsunami-like waves higher onto the diminishing dry portions of the continents. All of this facilitated the transport of larger marine reptiles (e.g., *Plesiosaurus*) and deeper-water ocean fish onto the rapidly disappearing continents—mixing them with land creatures living at higher elevations and further inland (greater extent). This activity is reflected in the more extensive nature of the Jurassic rocks found spread across the continents as the water covered even higher elevations than ever before. To illustrate the continuing progression of the Flood onto land and the burial of terrestrial animals, the PBDB was queried using Archosauria, Insecta, and Mammalia as filters for the Jurassic (Figure 12).

Land life entombed in Jurassic rocks represents not only an increase in water height and depositional violence, but the progressive burial of ecosystems farther inland on the pre-Flood Pangaea mega-continental fragments. We interpret that the extensive Jurassic Morrison Formation in North America represents animal and plant life derived from the pre-Flood Dinosaur Peninsula (Clarey 2015b) (Figure 13). In this model, the dinosaurs were able to survive through the early part of the global Flood in western North America simply because their habitat was not yet fully flooded until the deposition of the Zuni Megasequence of which the Middle and Upper Jurassic was merely the start (Clarey 2015b). Other dinosaurs may have been able to evacuate their lower-elevation pre-Flood habitats and flee to higher remnants of land as the floodwaters advanced. These escaping dinosaurs were not buried until later in the Zuni in rocks designated as Cretaceous.

The Lower Jurassic represents the final stage of the Absaroka Megasequence, with the remainder of the Jurassic designated as Zuni (Figure 1). The collective Jurassic layers must have been deposited very rapidly and fast to bury the huge sauropod dinosaurs found within them. Although some dinosaurs remained partially articulated, many were torn apart during burial. The Jurassic system was also the final lead-up to the peak deposition across the continents later in the Cretaceous. Keep in mind also that this was occurring at the same time as the Pangaea mega-continent continued to separate. Within this overall scenario of chaos, the dinosaurs were buried in a definable order as the waters systematically and progressively inundated more and more land.

The model of a Dinosaur Peninsula shows a hypothetical landmass extending down through the United States from Minnesota to New Mexico. This represented a low-lying land area below the pre-Flood uplands. It would have been full of all kinds of dinosaurs, large and small, as found in the rock layers. As the Flood's waters advanced up over the peninsula, the outer edges and the southern tip likely flooded first, producing the many of the Triassic System rocks and trapping many dinosaurs that could not escape fast enough. As the Flood progressed higher due to increased tectonic activity, the sauropods that had lived at slightly higher elevations and the more mobile theropods that may have escaped to higher ground were buried in the Jurassic layers. This flooding scenario eventually reached its peak in the Cretaceous (Zuni Megasequence).

H. Cretaceous (Zuni Megasequence) fossils

As mentioned previously, the breakup of the pre-Flood mega-continent (called Pangaea) began in the Triassic. Continental separation accelerated in the Jurassic and through the Cretaceous. This is evidenced by the massive amount of seafloor attributed to these systems in the world's oceans. The rapid injection of new, hot, basaltic magma at rifts during the Jurassic and Cretaceous created much new and buoyant ocean lithosphere between the separating continents. This pushed the water level to its highest point, marking the high-water point for the global Flood (Clarey 2020). This most likely occurred during the deposition of the last Cretaceous sediments or possibly the very beginning of the Cenozoic section (Paleocene). This level also marks the end of the fifth megasequence known as the Zuni. Nonetheless, this level represents a massive increase in the overall amount of sediments deposited across the world's continents. In fact, the Zuni is the most extensive of all the six megasequences (Clarey and Werner 2023). In addition, the average thickness of the Zuni nearly doubles globally from previous megasequences. The deposition of the Zuni likely began about Day 100 of the Flood (Middle Jurassic), with the highest water level coming about Day 150 (end of the Cretaceous) (Johnson and Clarey 2021). At this point, the separated continents were completely submerged and all air-breathing land life was exterminated.

The continuing tectonic activity in the Cretaceous accelerated the violence of the Flood by forcing tsunami-like waves higher and farther inland. The violent action thrust larger marine reptiles (e.g., *Mosasaurus*; Figure 5), along with deeper-water ocean fish, onto the separated continents, mixing marine with land creatures that were likely living at higher elevations. Land life buried in Cretaceous rocks represents both an increase in the Flood's water height and depositional violence along with the continuing progressive burial of ecosystems living farther inward. All of this was directly linked to the development of new seafloor that was being created at the time.

The Dinosaur Peninsula model mentioned previously, helps explains the fossil record in the American West from the Triassic through the Jurassic and continuing through the Cretaceous. During the progres-

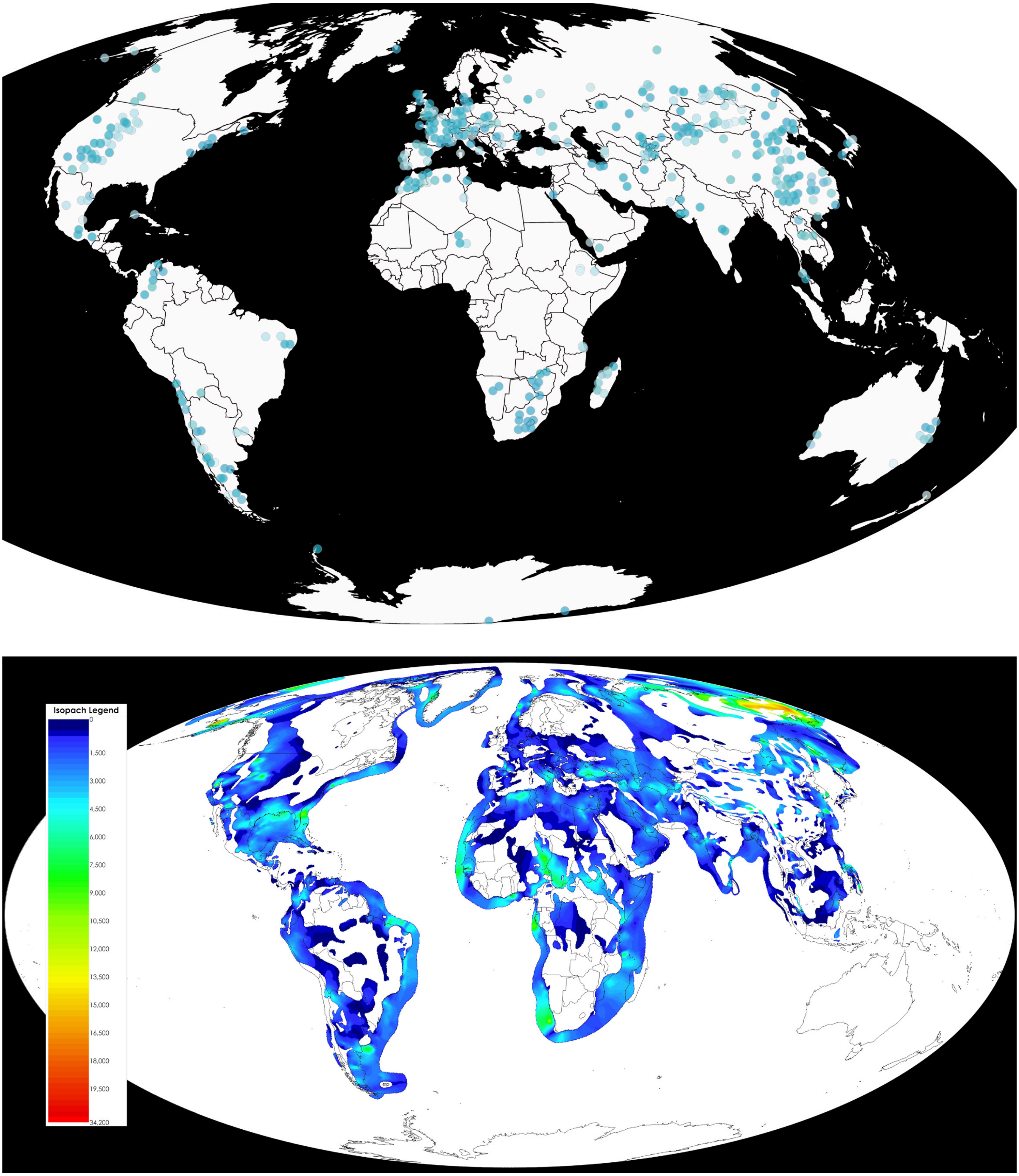


Figure 12. Top: PBDB map for the Jurassic using Archosauria, Insecta, and Mammalia as filters. Bottom: Zuni Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

sive destruction of the Dinosaur Peninsula, the Cretaceous strata inundated the last massive herds of dinosaurs fleeing the rising floodwaters, which included hadrosaurs, ceratopsians, and tyrannosaurs. And like many land animal fossils, Cretaceous dinosaurs are often found mixed with marine creatures and/or are found buried in marine rocks (limestone and chalk) like many of the dinosaurs of the Cretaceous in Europe (Csiki-Sava et al. 2015; Clarey 2015c; Clarey 2020). To illustrate the continuing progression of the Flood onto land and the burial of terrestrial animals, the PBDB was queried using Archosauria, Insecta, and Mammalia as filters for the Cretaceous (Figure 14).

I. Tertiary (Paleogene and Neogene) (Tejas Megasequence) fossils

The Tertiary is the major upper system of the geological column represented by the Tejas Megasequence. We believe it represents the last global Flood layers that were produced from violent runoff as the newly separated continents and their mountain ranges were being uplifted in the final stage of the global Flood (Clarey 2020). The total volume of sediment represented by the Tejas is the second greatest amount by percentage of all the six megasequences – representing 32.5% of the total amount of the Phanerozoic (Cambrian through Tertiary) (Figure 15). Many unique types of mammals, birds, insects, and plants that would likely have been living at higher and more temperate climates make their first appearances in the Tertiary with no evolutionary precursors in lower rock layers. While this unique mix of catastrophically buried fossils is difficult to explain in an evolutionary scenario, the global Flood model of progressive burial by ecological zonation closely fits the data.

Our interpretation still has a bit of difficulty explaining the trackways and footprints found in some layers of the Cenozoic. It is possible some of these layers have been misidentified and should be Pleistocene (post-Flood), but more research is needed on each site. The plethora of geological data gathered by studying the stratigraphic columns around the globe strongly indicate that the K-Pg is the high water point of the Flood, and represents Day 150 of the Flood year (Johnson and Clarey 2021; Clarey and Werner 2023). That would make the Tertiary (Tejas Megasequence) the receding phase of the Flood (Clarey and Werner 2023).

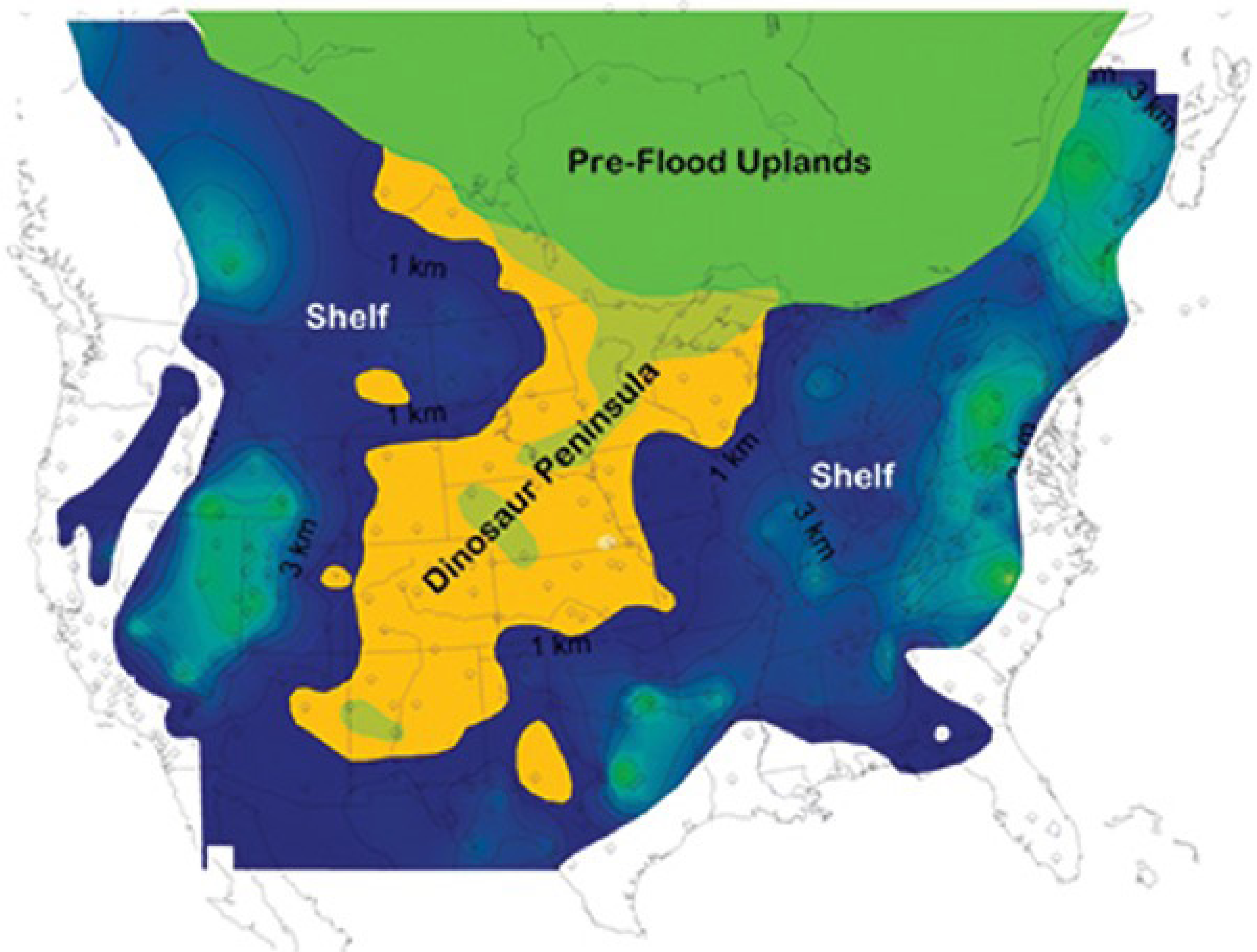
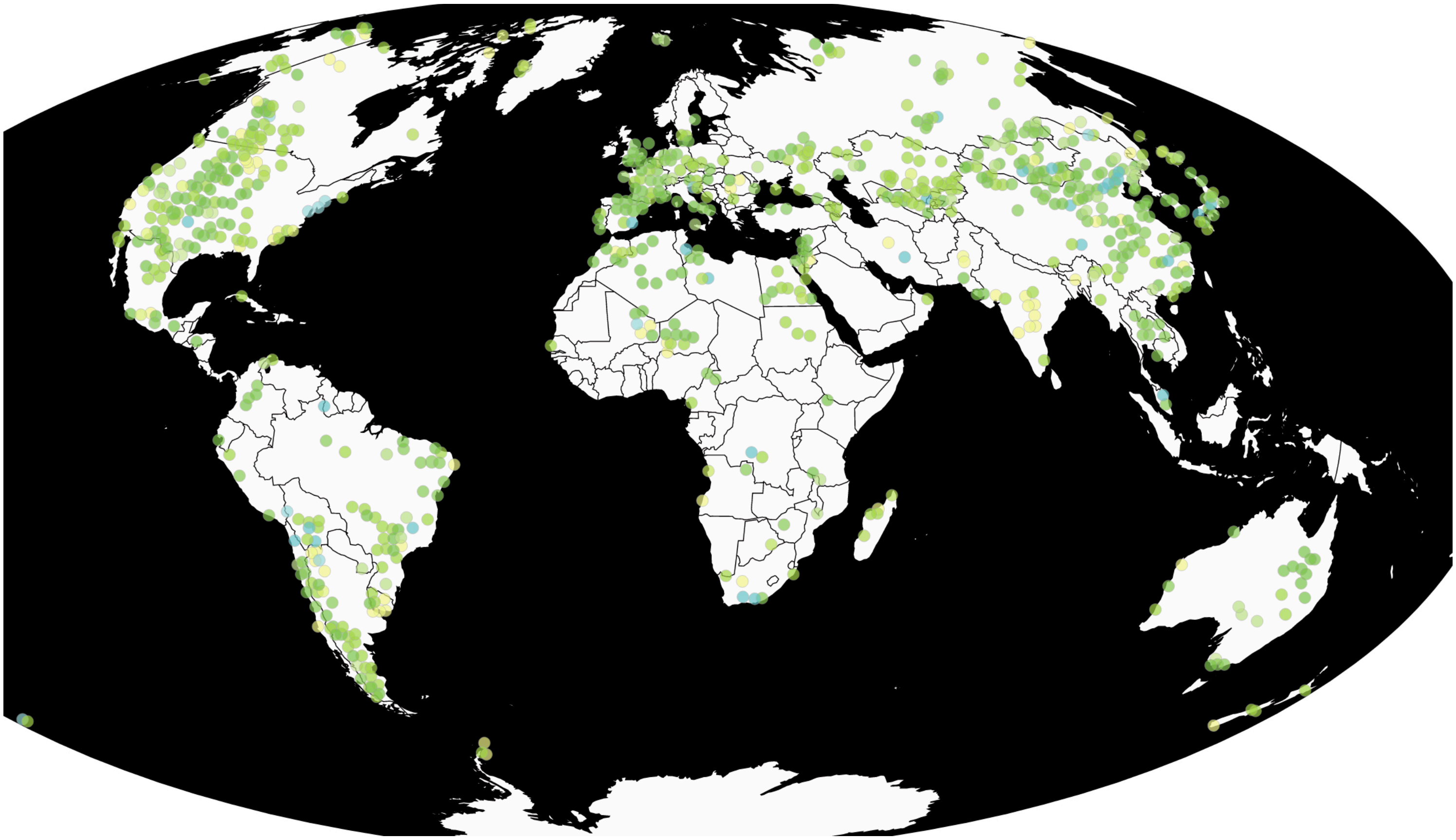


Figure 13. Map of Dinosaur Peninsula (Clarey 2015b). The yellow shows the possible extent of the lowland pre-Flood land mass across the USA known as Dinosaur Peninsula.



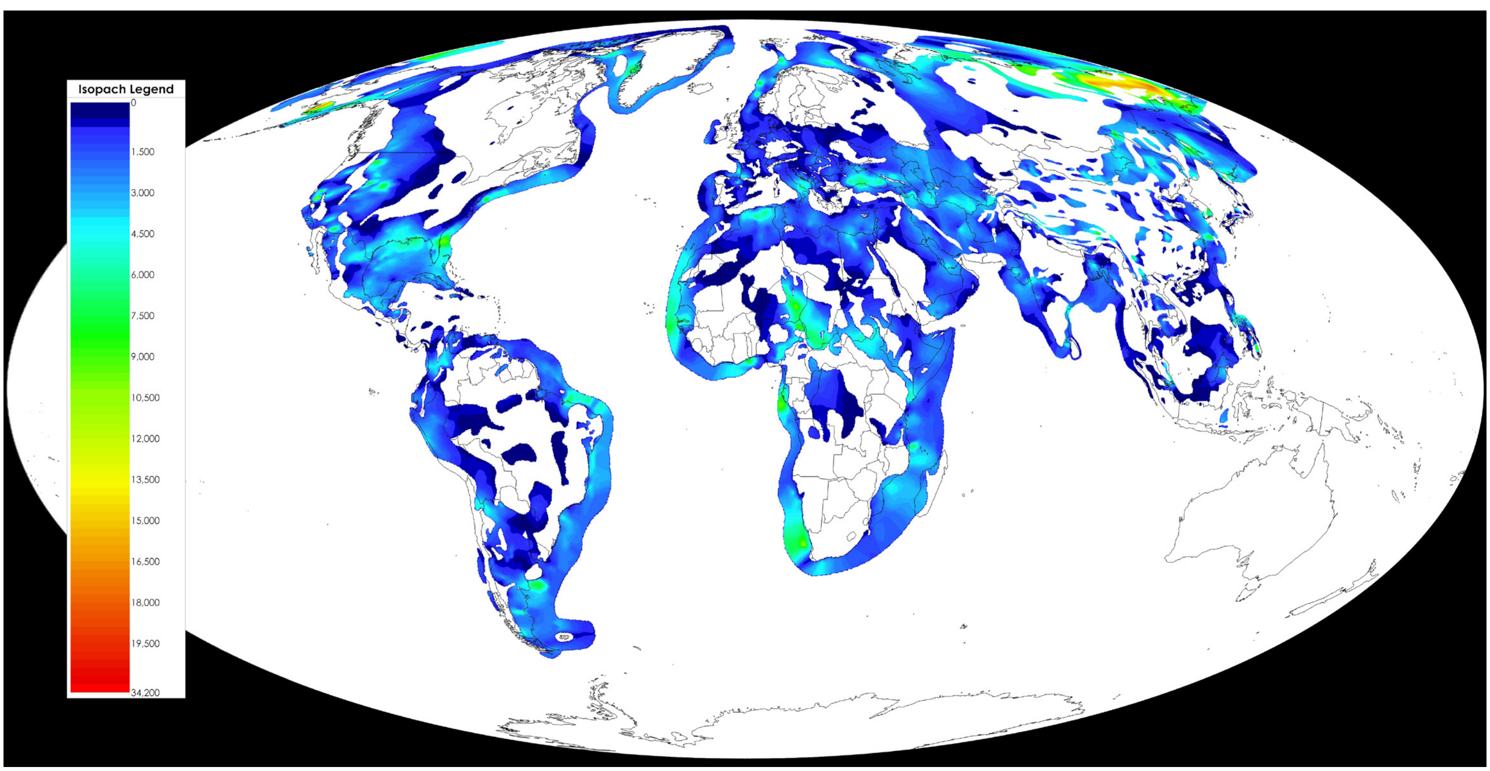


Figure 14. Top: PBDB map for the Cretaceous using Archosauria, Insecta, and Mammalia as filters. Bottom: Zuni Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

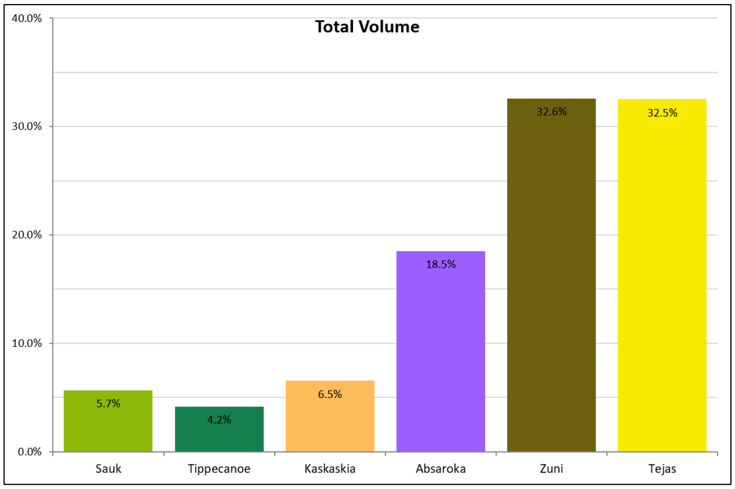


Figure 15. Megasequence sediment volumes by percent of the total geological column.

1. Issues with the Tejas Megasequence – Darwin's "abominable mystery"

About 20 years after Charles Darwin published his famous book on evolution, he penned a letter to his close friend and renowned botanist Joseph Hooker, complaining, "The rapid development as far as we can judge of all the higher plants within recent geological times is an abominable mystery" (Buggs 2017, p. 1). The primary reason for Darwin's claim of an abominable mystery was the sudden and massive appearance of numerous kinds of flowering plants (known as angiosperms), which first began showing up in the Cretaceous and then exploded in the Tertiary. In a recent paper, British botanist and evolutionary expert Richard Buggs showed that Darwin mainly considered the mystery to be abominable because the leading paleobotanists of his time, such as his friend Oswald Heer and his evolutionary critic William Carruthers, saw it as evidence for the work of a Creator (Buggs 2021). This glaring problem deeply bothered Darwin because the fossil record did not support his theory.

Interestingly, Darwin's Tertiary angiosperm enigma is still a conventional paleontological mystery. More recently, a 2016 research paper assessed the current extent of angiosperms in the paleontology databases (Xing et al. 2016). The authors claimed, "The Cenozoic [mostly Tertiary] angiosperm macrofossil record is extraordinarily rich" (p. 1) and "the diversification of angiosperms during the Cenozoic, and the causes of such changes in diversity, remains unclear" (p. 2). In other words, Darwin's mystery is more abominable for evolution today than it has ever been. While Darwin's model of evolution and deep time make little sense of the fossil record, and especially the abominable mystery of angiosperms in the Tertiary, a Flood-based model of progressive burial by ecological zonation fits the data closely. In fact, a PBDB query of the Cenozoic (predominantly Tertiary) shows that angiosperm fossils are pervasive globally (Figure 16).

2. Issues with the Tejas Megasequence – Tertiary coal seams

Another powerful piece of evidence supporting the Tejas as the receding phase of the global Flood involves the presence of huge Tertiary coal beds formed from mostly angiosperm (flowering) plants. This is directly related to Darwin's "abominable mystery." Coal beds are formed by enormous amounts of plant material being ripped up, transported en masse, and then buried rapidly before the material has a chance to decay – exactly the type of catastrophic processes that occurred in the global Flood. Local catastrophes after the Flood are highly unlikely to produce the extent of these coal beds (100 km by 100 km), the volume of these coals, nor possess the energy required to create these massive coal layers, especially as many are stacked one on top of the other.

Compared to the Carboniferous coal beds formed earlier in the Flood that contained tropical coastal vegetation, the larger Tertiary coal layers were formed from plants and trees growing at higher elevations in the pre-Flood world. Like the many other Tertiary fossils, these coal beds had a propensity to collect and form in large basins that formed late in the Flood year at the base of uplifted mountain ranges where the plant material would have been easily trapped and buried.

A spectacular example of Tertiary coal in North America can be found in the Powder River Basin, which extends from the center of eastern Wyoming up into the lower third of Montana (Scott and Luppens 2013). This large region contains some of the largest known reserves of low-sulfur subbituminous (black lignite) coal in the world, making it economically important. In fact, about 42% of United States coal production comes out of the Powder River Basin, and at least six coal seams in this basin exceed 30 meters in thickness, with some more than 60 meters thick (e.g., the Big George coal layer). Other extensive, but thinner, Tertiary coal deposits are located across regions in the midwestern and southern states (Scott and Luppens 2013).

Huge Tertiary coal deposits can also be found in other parts of the world such as South America, which comprise the thickest and most extensive across that continent as well (Weaver and Wood 1994). It has been estimated that these make up about half of all coal in South America with the total tonnage estimated to be greater than any other geological system or combination of systems in that continent.

Extensive Tertiary coals are also found in many offshore Tejas deposits around Asia, including the Arctic Ocean (Clarey et al. 2021; Tomkins and Clarey 2021). Oil-well drilling in the South China Sea off the coast of Borneo has revealed a huge region of bedded Tertiary coals that, according to evolutionists, "is both thick and rapidly deposited" (Lunt 2019, p. 231). The best explanation for these offshore Tejas coal beds is that the intense energy of the receding phase of the Flood transported and buried these land plants offshore in late Flood continental runoff. Evolutionary in situ models for coal swamps fail to explain coals this far offshore and in such an extent as found in the deep water near Asia. And local catastrophes after the Flood also fail to produce sufficient energy to transport this volume of plant material, and so systematically at so many locations simultaneously.

3. Issues with the Tejas Megasequence – Tertiary mammal fossils

The Cenozoic (mostly Tertiary) is often called the Age of Mammals due to the fact that many kinds of mammals make their first fossil appearances in these Tejas sediments. As in lower parts of the rock record, many of the fossils in these layers that have living counterparts look the same, showing no sign of evolution (stasis). Tertiary mammal fossils came from creatures living at higher, more temperate elevations than dinosaurs and thus would have been buried in the uppermost Flood layers. The mammal fossils found in these layers that are extinct likely would have been represented aboard Noah's Ark but have since died off due to habitat loss or human hunting. Some examples of land mammals making their first appearance in Tertiary sediments include rodents, horses, rhinoceroses, elephants, dogs, cats, pigs, cattle, sheep, antelope, and gazelle.

One particular group of mammals that illustrate the global concordance of Tertiary strata are primates (specifically monkeys), whose fossils have been found across multiple continents (Figure 17). Monkey fossils of the same type have been found in the same Tertiary rock layers of the completely separate continents of South America

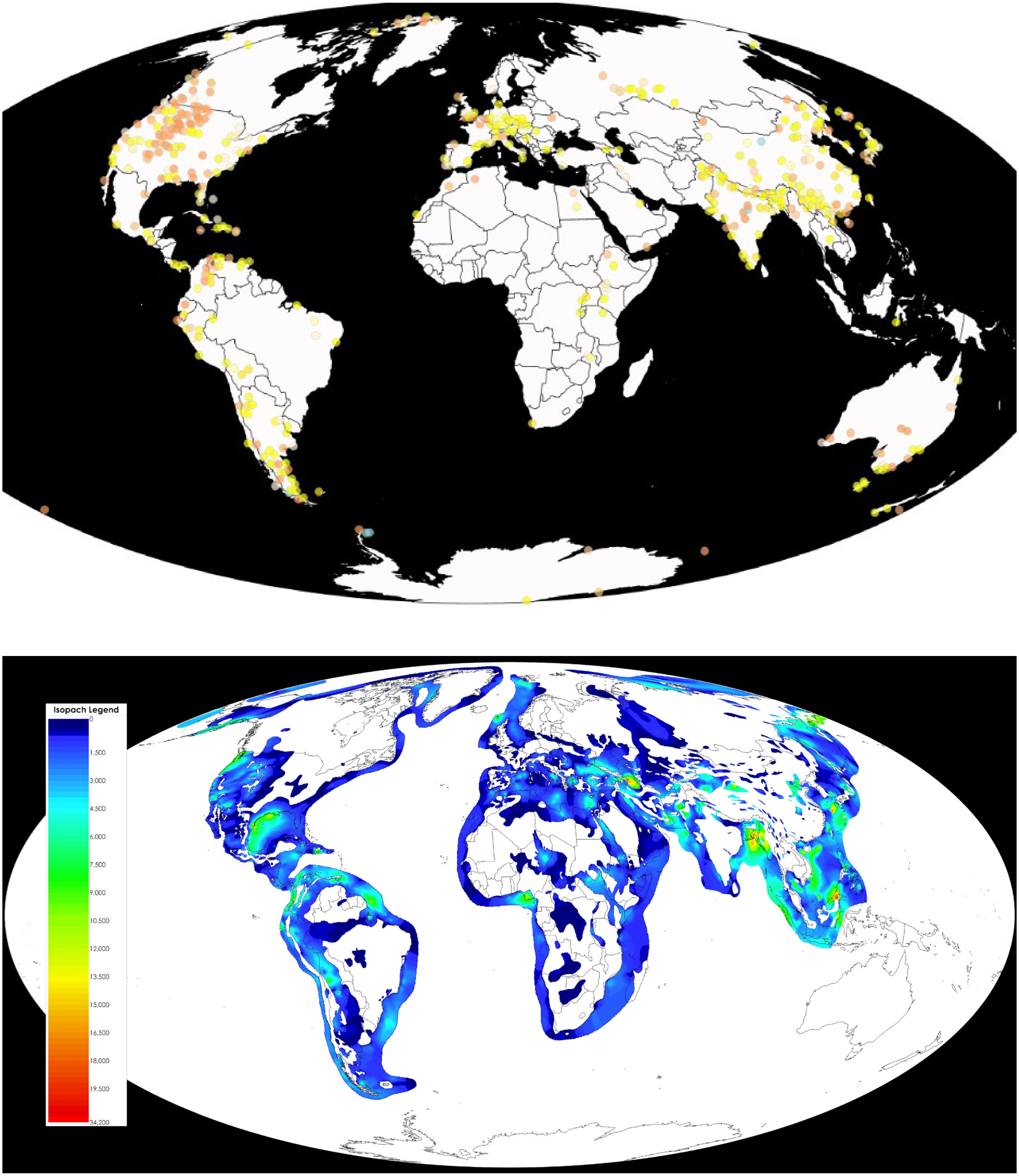


Figure 16. Top: PBDB map for the Cenozoic (mostly Tertiary) using Angiospermae as a filter. Bottom: Tejas Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

and Africa (Takai et al. 2000; Stevens et al. 2013; Rasmussen et al. 2019). To explain this, evolutionists have actually proposed the absurd idea that monkeys rafted back and forth between continents on the open ocean. While intercontinental monkey fossil data give no credence to the idea of evolution, they do show that late Flood runoff destroyed similar ecosystems on the newly separated continents as monkeys, and other higher-elevation creatures, were buried late in the Flood.

4. Issues with the Tejas Megasequence – Tertiary whale fossils

Whale fossils (Cetacea) in the Tertiary are abundant (Tomkins and Clarey 2019), but they are generally not deposited in the interior continental regions, but instead are buried on the coastal margins. Figures 18 and 19 show the PBDB distribution of Cetacea and Mammalia, respectively. The Mammalia map includes Cetacea, but the latter represents only 4% of the total. While Cetacea fossils are buried on the coastal margins of nearly every major landmass, they are also found across the entire continent of Europe. This is not surprising since ICR's Column Project has shown that Tertiary marine sediments cover most of Europe (Clarey 2020). Interestingly, evolutionary researchers have recently described a massive global extinction event that involved many marine mammals which occurred near the top of the Pliocene (uppermost Neogene, the upper part of the Tertiary), just below the Quaternary boundary (Pimiento et al. 2017).

Some creationists have suggested that both the marine and land mammals of the Tertiary were somehow fossilized in local post-Flood catastrophes (Whitmore and Garner 2008; Ross 2012) but the pervasive global distribution of whale and other mammal fossils strongly contradicts this claim. In addition, the fact that many continental Tejas deposits contain much greater amounts of fossilized animal and plant diversity than currently is alive and exists at these locations (Whitmore and Wise 2008) adds even more weight to the creationist proposition that these are late Flood receding phase deposits.

5. Issues with the Tejas Megasequence – Flood runoff better explains the Tejas

Paleontological evidence indicates that many of the diverse plants and mammals inhabiting higher and temperate pre-Flood elevations were buried in the late runoff phase of the global Flood, including the Tertiary coals found globally. The megasequence representing this late Flood deposition is known as the Tejas and corresponds to the majority of the Cenozoic Erathem (prior to the Pleistocene) in the geological column. During this megasequence, animals living at the highest pre-Flood elevations were wiped off and the surface was eroded down to the crust, transporting organisms great distances in all directions (Clarey 2020). This may seem preposterous, but consider a *Plateosaurus* dinosaur bone was found in Triassic strata 110 km offshore Norway in the North Sea, 2.25 km below the seafloor (Hurum et al. 2006). Although this is a Triassic example, it shows that long-distance transport occurred commonly during the Flood year. Also, the Lower Tejas (Paleocene) Whopper Sand in the deep water of the Gulf of Mexico was poured into the Gulf at the onset of the Tejas. It is between 300-575 meters thick and is found at distances of 350-400 km offshore (Berman and Rosenfeld 2007). The best explanation for this sand body is high-energy return flow at the beginning of the receding phase. And more recently, similar lemur-like fossils have been discovered in Lower Tejas strata in both Wyoming and on Ellesmere Island in northernmost Canada (Miller et al. 2023). These mammal fossils all probably existed together in central Canada on pre-Flood high ground while alive (Clarey 2020). As the Flood reached its peak on Day 150, it wiped off these animals living on the highest hills and spread their remains both north and south to Ellesmere Island and Wyoming, respectively. These examples illustrate long-distance transport was likely during the Tejas megasequence.

As noted above, the Tejas megasequence alone accounts for 32.5% of the total volume of the Phanerozoic sedimentary rock record (Clarey and Werner 2023). How could local catastrophes after the Flood produce this volume of sediment, averaging 1.94 km in thickness across five continents today, and totaling 191,255,830 km^3 of sediment across much of the land mass of the world (Clarey and Werner 2023)? And how could local catastrophes after the Flood produce the same relative order of fossils in the Tertiary sediments across all continents? Global distributions of sedimentary layers and the similar order of fossil types on each continent demand a global explanation. The global Flood remains the best reason for the Tertiary. Thus, the end of the global Flood is most likely defined as the upper margin of the Neogene system (just before the Quaternary at the top of the Cenozoic). It is thus called the N-Q Flood Boundary (Clarey 2020).

DISCUSSION

The global Flood began with the deposition of the Sauk Megasequence and minimal continental flooding and initially only involved the burial of marine ecosystems. This trend continued through the deposition of the Tippecanoe. Some coastal inundation began in the Kaskaskia with the fossil appearances of tropical vegetation, Archosauria, and insects. Of course, marine mixing as a basic Flood paradigm was continuous throughout all of the megasequences, remaining a hallmark of fossil deposition throughout the Flood. We illustrate this by the use of Brachiopoda as marine reference taxa and demonstrate the patterns of Brachiopod global deposition mapped out by the six megasequences over the course of the whole Flood (Figure 20).

The floodwaters continued their progressive inundation and burial of higher elevations of land ecosystems through the Kaskaskia and Absaroka. The end of the Kaskaskia and the beginning of the Absaroka would possibly have occurred about Day 40 in the Flood-year progression (Johnson and Clarey 2021). The floodwaters continued to rise through the Absaroka and Zuni and peaked in height by the end of the Zuni – corresponding to the end of the Cretaceous System (Clarey 2020; Clarey and Werner 2023). At the end of the Zuni, the floodwaters covered all the highest hills by at least seven meters (15 cubits) during the deposition of Cretaceous System and possibly the onset of the Paleocene (the top of the Zuni). The Cretaceous System also included the final phases of continental separation and continual seafloor formation, but not the end of catastrophic plate motion.

Afterward, during the deposition of the Tejas (Tertiary system) the oldest seafloor began to cool and sink and sections of the newly separated continents and mountain ranges were rapidly uplifted, causing the floodwaters to rapidly change direction and recede. This recession carved canyons out of the soft sediments (e.g., Grand Canyon) (Clarey 2018) and buried massive amounts of plants and animals in large basins that had formed at the base of the mountains (e.g., Rocky Mountains in North America and Andes in South America) (Clarey et al. 2021; Tomkins and Clarey 2021). In addition, the continental runoff also formed massive Tejas sediments offshore such as the Whopper Sand in the Gulf of Mexico (Clarey 2015a). While evolutionists have extreme difficulty in explaining Cenozoic geology and paleontology, the progressive global Flood model offers a close fit to the data.

It is our contention that the N-Q boundary in the rock record marks the approximate end of the Flood. This not only matches the global megasequence data, and much of the paleontology, but also negates the awkward proposition of rapid whale evolution and other unten-

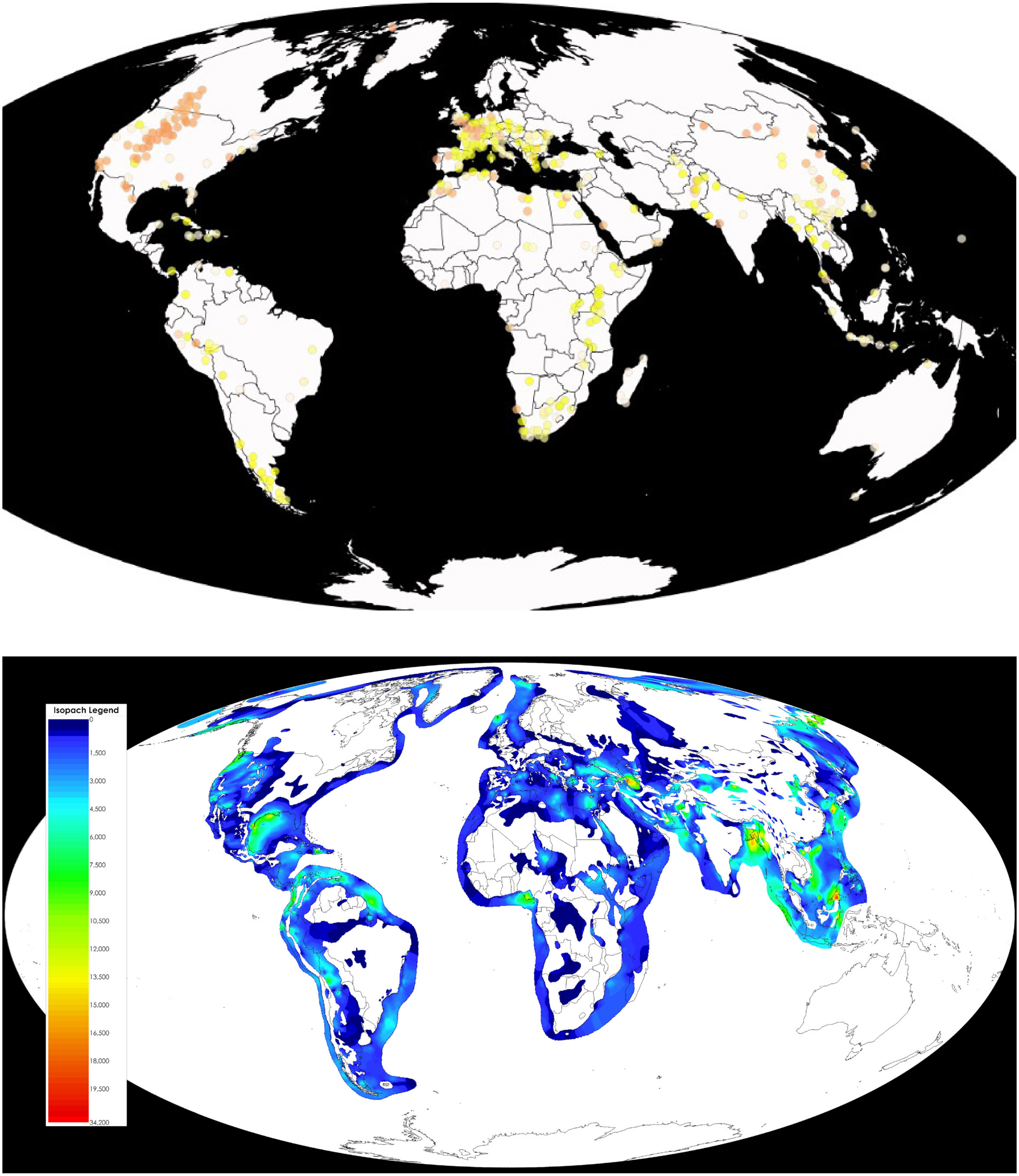


Figure 17. Top: PBDB map for the Cenozoic using Primate as a filter. Bottom: Tejas Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

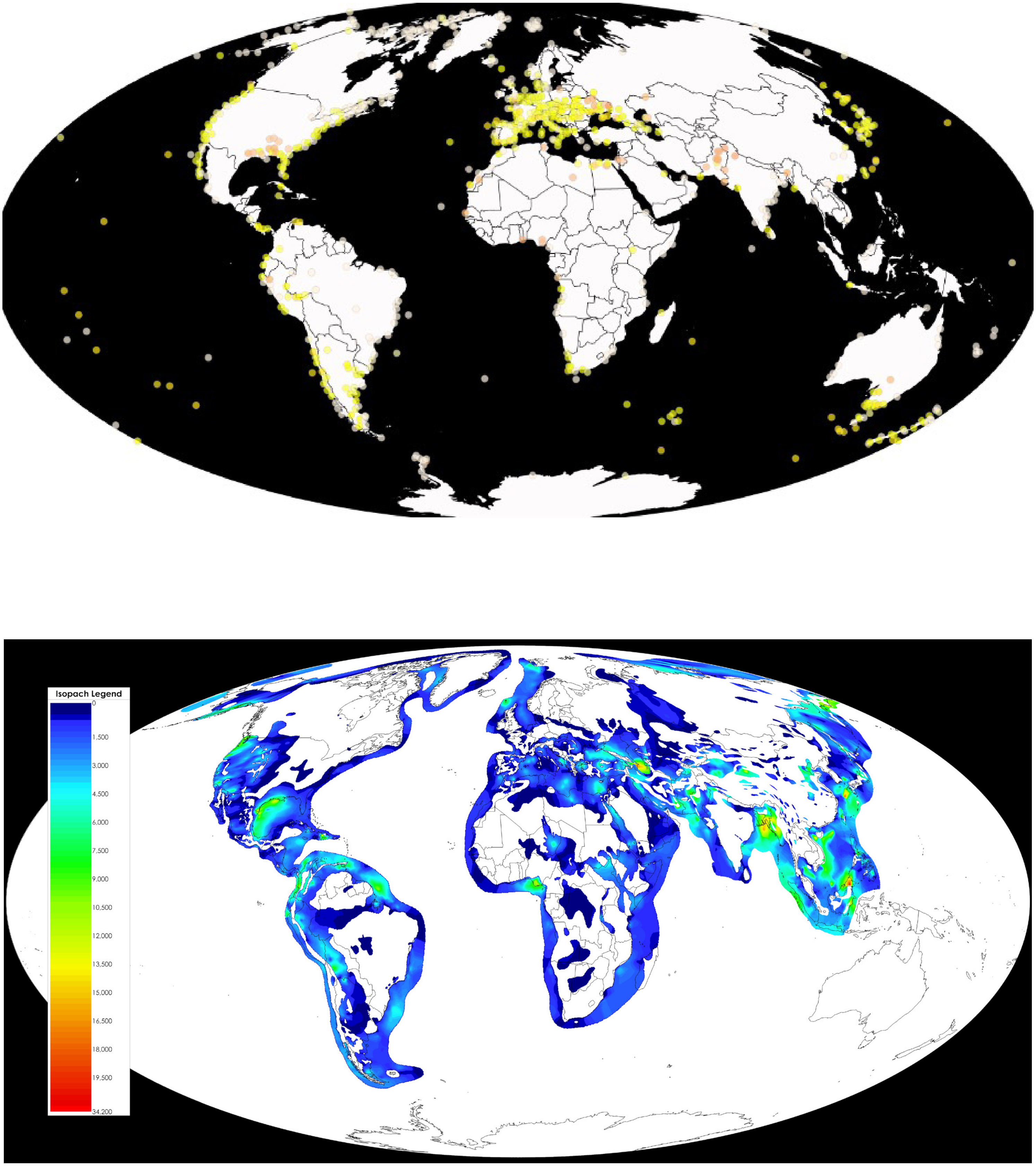


Figure 18. PBDB map for the Cenozoic (mostly Tertiary) using Cetacea as a filter. Bottom: Tejas Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

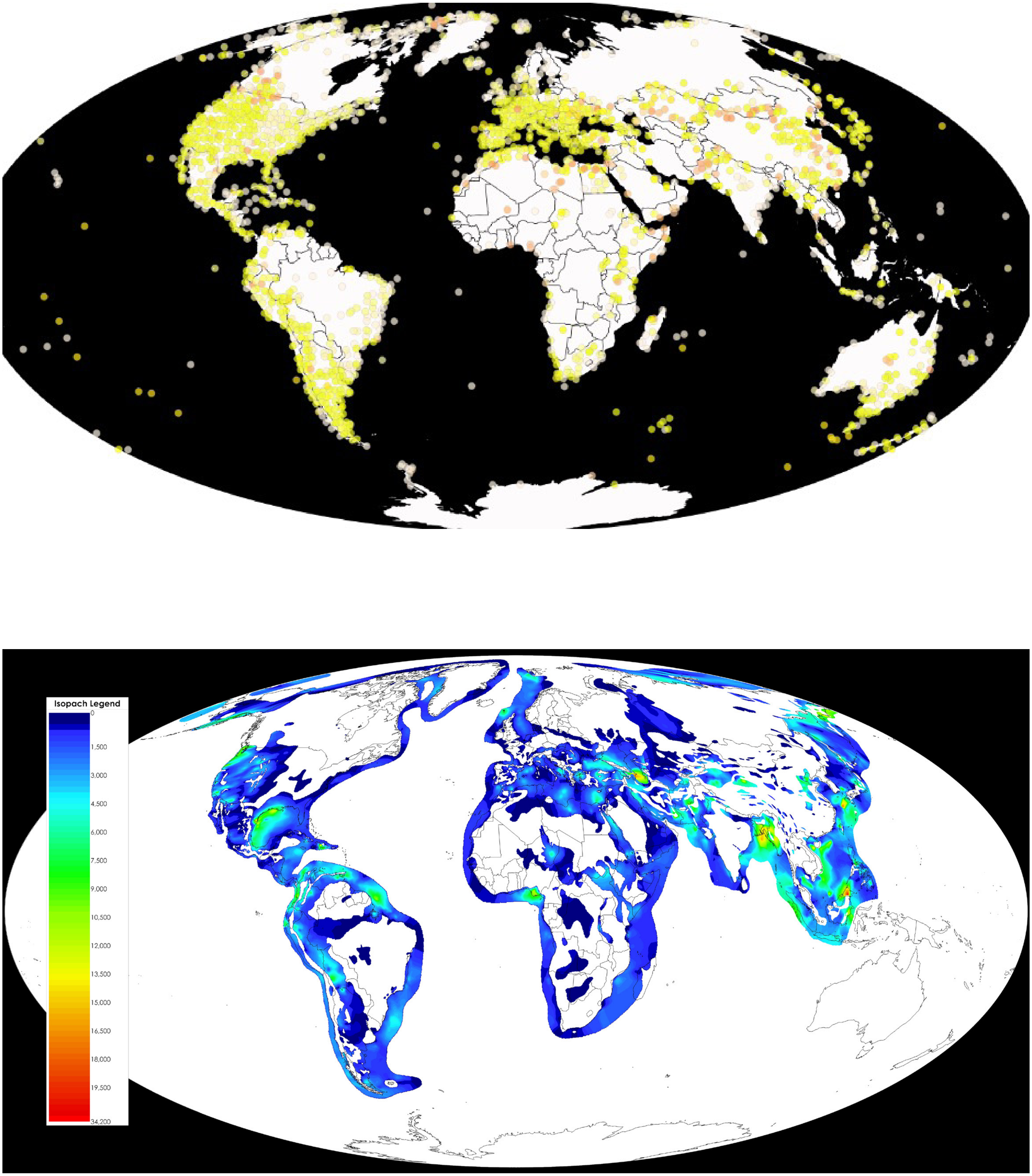


Figure 19. PBDB map for the Cenozoic (mostly Tertiary) using Mammalia as filter. Of these PBDB hits, Cetacea (Figure 18) represent only 4%. Bottom: Tejas Megasequence thickness map (except Australia and Antarctica). Thickness scale in meters.

able early-Flood boundary ideas. Because some creation scientists have prematurely placed the post-Flood boundary at the end of the earlier Cretaceous System they have to explain the sudden appearance of whale fossils beyond this boundary. In so doing, they have claimed that these large marine mammals evolved rapidly from ancestors that walked out of the Ark (Wise 2009). But did whales really evolve from land-dwelling Ark ancestors? Whale evolution would have required numerous and exceptionally rapid changes in anatomy and physiology – all in only the space of about 200 years or less.

A better explanation for the diversity of land mammals buried in the interior sediments of the continents during the Tejas, and the burial of marine creatures along with whales on the coastal margins, is that this action was part of the late Flood runoff. This can be documented by the discoveries of large, likely bloated, and buoyant carcasses of dead marine mammals like whales in Tejas bone beds globally. These would have been some of the last marine creatures to have been buried in the Flood.

CONCLUSION

Megasequences are defined on the basis of major erosional boundaries, often reflected by sudden changes in rock type and/or pre-Flood environment. Some of these changes correspond to rapid shifts in the fossil content as noted above and even apparent extinctions. The fossils deposited in each megasequence are dependent on the pre-Flood environment being inundated, tectonic forces at work, currents, waves and the height of relative sea level (Clarey 2020).

We examined the fossil record in light of these megasequences, using these basic observations found globally: 1) sudden appearance of taxa, 2) stasis (similar taxa as living or later appearing taxa in the rock record), 3) marine mixing (a predominant feature throughout the rock record), and 4) burial by ecological zonation (sequential feature of the progressive Flood). Tracking some of the unique fossils within each megasequence has confirmed the model of a progressive Flood. As the water rose higher during the Flood year, it continually inundated different ecological zones. Apparent extinctions result when a complete ecosystem has been completely buried by the Flood waters and a new ecological zone with different types of fossils is then reached. This results in a systematic and global fossil and rock

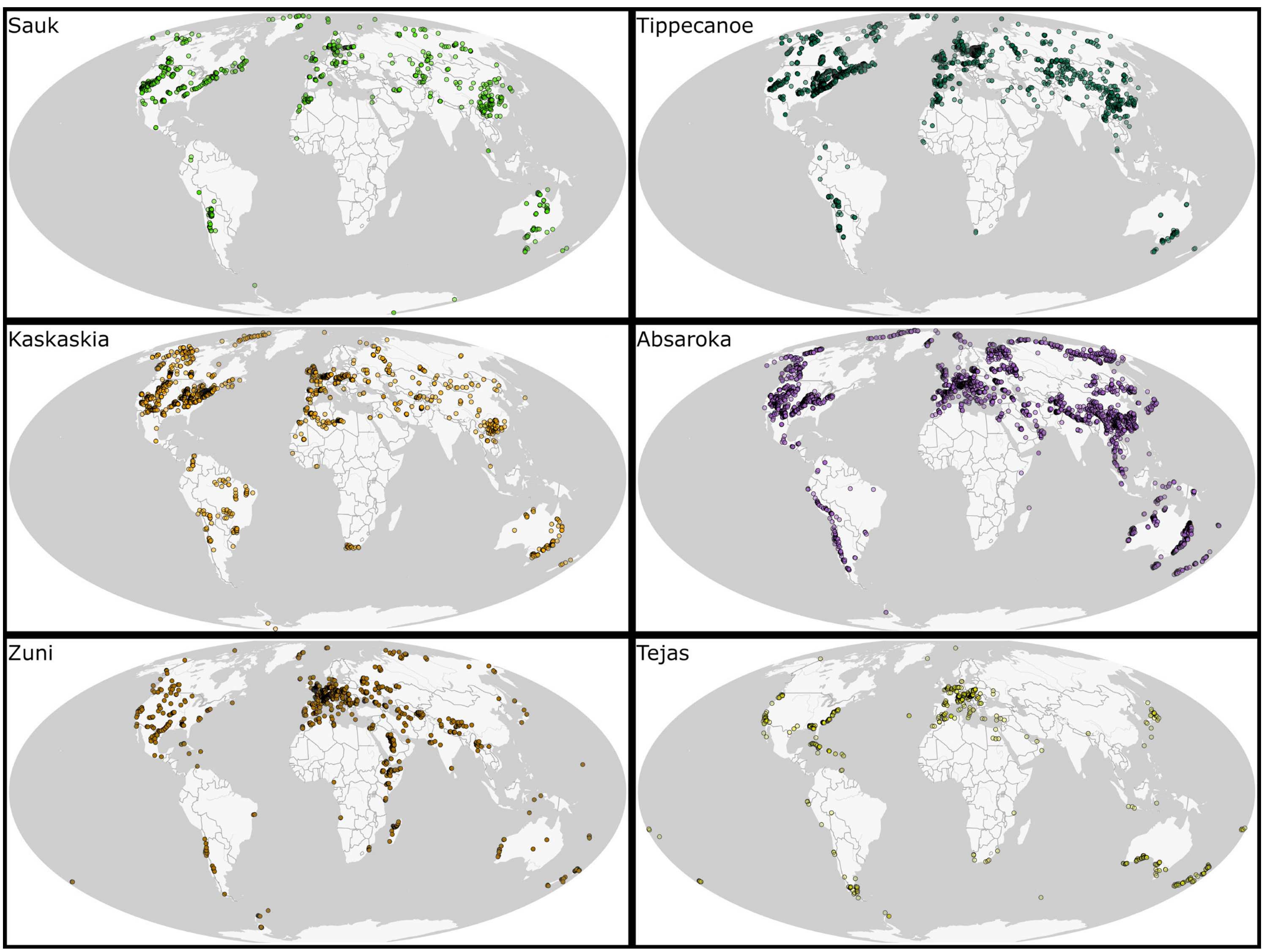


Figure 20. Brachiopoda as marine reference taxa and its global fossil distribution mapped out by megasequence over the course of the whole flood. The data were generated by age delineated PBDB CSV files globally mapped using an in-house Python program.

record that correlates from continent to continent. Two of the megasequences line up approximately with two of the so-called major extinction events. The other three major extinctions may be a consequence of high-water stands and/or smaller sequence boundaries within the six megasequences.

We conclude that the merger of the fossils and the stratigraphic record allows a better interpretation of the progression of the Flood. Each megasequence can be defined by its unique fossil content which reflects distinct ecological zones as the water rose higher and higher during the Flood year.

REFERENCES

Austin, S.A., J.R. Baumgardner, D.R. Humphreys, A.A. Snelling, L. Vardiman, and K.P. Wise. 1994. Catastrophic plate tectonics: A global Flood model of Earth history. In R.E. Walsh (editor), *Proceedings of the Third International Conference on Creationism*, pp. 609–621. Pittsburgh, Pennsylvania: Creation Science Fellowship.

Baumgardner, J. 1994. Runaway subduction as the driving mechanism for the Genesis Flood. In R.E. Walsh (editor), *Proceedings of the Third International Conference on Creationism*, pp. 63–75. Pittsburgh, Pennsylvania: Creation Science Fellowship.

Berman, A.E., and J.H. Rosenfeld. 2007. A new depositional model for the deep-water Gulf of Mexico Wilcox equivalent Whopper Sand: Changing the paradigm. In L. Kennan, J. Pindell, and N. C. Rosen (editors), *The Paleogene of the Gulf of Mexico and Caribbean Basins: Processes, Events, and Petroleum Systems*, pp. 284–297. Houston, Texas: Proceedings of the 27th Annual Gulf Coast Section of the Society of Economic Paleontologists and Mineralogists Foundation Bob F. Perkins Research Conference.

Buggs, R.J.A. 2017. The deepening of Darwin's abominable mystery. *Nature Ecology & Evolution* 1, 0169 doi: 10.1038/s41559-017-0169.

Buggs, R.J.A. 2021. The origin of Darwin's "abominable mystery." *American Journal of Botany* 108, no. 1:22–36. doi: 10.1002/ajb2.1592.

Cheung, S., R. Strom, J.H. Whitmore, and P.A. Garner. 2009. Occurrence of dolomite beds, clasts, ooids and unidentified microfossils in the Coconino Sandstone, northern Arizona. *Geological Society of America Abstracts with Programs* 41, no. 7:119.

Clarey, T. 2015a. The Whopper Sand. *Acts & Facts* 44, no. 3:14.

Clarey, T.L. 2015b. Dinosaur fossils in late-Flood rocks. *Acts & Facts* 44, no. 2:16.

Clarey, T.L. 2015c. The Hell Creek Formation: The last gasp of the pre-Flood dinosaurs. *Creation Research Society Quarterly* 51:286–298.

Clarey, T. 2018. Grand Canyon carved by Flood runoff. *Acts & Facts* 47, no. 12:10-13.

Clarey, T.L. 2020. *Carved in Stone: Geological Evidence of the Worldwide Flood*. Dallas, Texas: Institute for Creation Research.

Clarey, T.L. 2022. Asia data confirm progressive global Flood. *Acts & Facts* 51, no. 4:18-19.

Clarey, T.L., and D.J. Werner. 2017. The sedimentary record demonstrates minimal flooding of the continents during Sauk deposition. *Answers Research Journal* 10:271–283.

Clarey, T.L., and D.J. Werner. 2018. Global stratigraphy and the fossil record validate a Flood origin for the geologic column. In J.H. Whitmore (editor), *Proceedings of the Eighth International Conference on Creationism*, pp. 327–350. Pittsburgh, Pennsylvania: Creation Science Fellowship.

Clarey, T.L., and D.J. Werner. 2023. A progressive global Flood model confirmed by rock data across five continents. In *Proceedings of the Ninth International Conference on Creationism*.

Clarey, T.L., D.J. Werner, and J.P. Tomkins. 2021. Globally extensive Cenozoic coals indicate high post-Flood boundary. *Journal of Creation* 36, no. 1:7–9.

Clark, H.W. 1968. *Fossils, Flood, and Fire*. Escondido, California: Outdoor Pictures.

Coffin, H.G. 1983. *Origin by Design*. Hagerstown, Maryland: Review and Herald Publishing Association.

Csiki-Sava, Z., E. Buffetaut, A. Ősi, X. Pereda-Suberbiola, and S.L. Brusatte. 2015. Island life in the Cretaceous – faunal composition, biogeography, evolution, and extinction of land-living vertebrates on the Late Cretaceous European archipelago. *ZooKeys* 469:1–161. doi: 10.3897/zookeys.469.8439.

Hurum, J.H., M. Bergan, R. Müller, J.P. Nystuen, and N. Klein. 2006. A Late Triassic dinosaur bone, offshore Norway. *Norwegian Journal of Geolog*y 86:117–123.

Johnson, J.J.S., and T.L. Clarey. 2021. God floods Earth, yet preserves Ark-borne humans and animals: Exegetical and geological notes on Genesis chapter 7. *Creation Research Society Quarterly* 57:248–262.

Lunt, P. 2019. A new view of integrating stratigraphic and tectonic analysis in South China Sea and north Borneo basins. *Journal of Asian Earth Sciences* 177:220–239. doi: 10.1016/j.jseaes.2019.03.009.

Miller, K., K. Tietjen, and K.C. Beard. 2023. Basal Primatomorpha colonized Ellesmere Island (Arctic Canada) during the hyperthermal conditions of the early Eocene climatic optimum. *PLoS ONE* 18, no. 1:e0280114. doi: 10.1371/journal.pone.0280114.

Moczydlowska, M., F. Estall, and F. Foucher. 2014. Microstructure and biogeochemistry of the organically preserved Ediacaran metazoan *Sabellidites*. *Journal of Paleontology* 88, no. 2:224–229. doi: 10.1666/13-003.

Müller, R.D, M. Sdrolias, C. Gaina, and W.R. Roest. 2008. Age, spreading rates, and spreading asymmetry of the world's ocean crust. *Geochemistry, Geophysics, Geosystems* 9, no. 4:Q04006. doi: 10.1029/2007GC001743.

Pimiento, C., J.N. Griffin, C.F. Clements, D. Silvestro, S. Varela, M.D. Uhen and C. Jaramillo. 2017. The Pliocene marine megafauna extinction and its impact on functional diversity. *Nature Ecology and Evolution* 1, no. 8:1100–1106. doi: 10.1038/s41559-017-0223-6.

Prothero, D.R., and R.H. Dott. 2009. *Evolution of the Earth*, 8th ed. New York: McGraw-Hill Higher Education.

Rasmussen, D.T., A.R. Friscia, M. Gutierrez, J. Kappelman, E.R. Miller, S. Muteti, D. Reynoso, J.B. Rossie, T.L. Spell, N.J. Tabor, E. Gierlowski-Kordesch, B.F. Jacobs, B. Kyongo, M. Macharwas, and F. Muchem. 2019. Primitive Old World monkey from the earliest Miocene of Kenya and the evolution of cercopithecoid bilophodonty. *Proceedings of the National Academy of Sciences USA* 116, no. 13:6051–6056. doi: 10.1073/pnas.1815423116.

Ross, M.R. 2012. Evaluating potential post-Flood boundaries with biostratigraphy – the Pliocene/Pleistocene boundary. *Journal of Creation* 26, no. 2:82–87.

Scott, D.C., and J.A. Luppens. 2013. *Assessment of Coal Geology, Resources, and Reserve Base in the Powder River Basin, Wyoming and Montana*. United States Geological Survey Fact Sheet:2012–3143.

Sloss, L.L. 1963. Sequences in the cratonic interior of North America. *Geological Society of America Bulletin* 74, no. 2:93–114.

Stevens, N.J., E.R. Seiffert, P.M. O'Connor, E.M. Roberts, M.D. Schmitz, C. Krause, E. Gorscak, S. Ngasala, T.L. Hieronymus, and J. Temu. 2013. Palaeontological evidence for an Oligocene divergence between Old World monkeys and apes. *Nature* 497, no. 7451:611–614. doi: 10.1038/nature12161.

Takai, M., F. Anaya, N. Shigehara, and T. Setoguchi. 2000. New fossil materials of the earliest new world monkey, *Branisella boliviana*, and the problem of platyrrhine origins. *American Journal of Physical Anthropology* 111, no. 2:263–281. doi: 10.1002/(SICI)1096-8644(200002)111:2<263::AID-AJPA10>3.0.CO;2-6.

Tanner, L.H., S.G. Lucas, and M.G. Chapman. 2004. Assessing the record and causes of Late Triassic extinctions. *Earth-Science Reviews* 65:103–139. doi: 10.1016/S0012-8252(03)00082-5.

Tomkins, J.P., and T. Clarey. 2019. Whale fossils confirm post-Flood boundary. *Acts & Facts* 48, no. 12:9.

Tomkins, J.P., and T.L. Clarey. 2021. South American paleontology supports a Neogene- Quaternary (N-Q) Flood boundary. *Journal of Creation* 36, no. 1:17–20.

Weaver, J.N., and G.H. Wood. 1994. *Coal Map of South America*. Coal Investigations Map C-145, U.S. Department of the Interior, United States Geological Survey.

Whitcomb, J.C., and H.M. Morris. 1961. *The Genesis Flood: The Biblical Record and Its Scientific Implications*. Nutley, New Jersey: Presbyterian and Reformed Publishing Company.

Whitmore, J.H., and P. Garner. 2008. Using suites of criteria to recognize pre-Flood, Flood, and post-Flood strata in the rock record with application to Wyoming (USA). In A.A. Snelling (editor), *Proceedings of the Sixth International Conference on Creationism*, pp. 425–448. Pittsburgh, Pennsylvania: Creation Science Fellowship; Dallas, Texas: Institute for Creation Research.

Whitmore, J.H., and P. Garner. 2018. The Coconino Sandstone (Permian, Arizona, USA): Implications for the origin of ancient cross-bedded sandstones. In J.H. Whitmore (editor), *Proceedings of the Eighth International Conference on Creationism*, pp. 581–627. Pittsburgh, Pennsylvania: Creation Science Fellowship.

Whitmore, J.H., R. Strom, S. Cheung, and P.A. Garner. 2014. The petrology of the Coconino Sandstone (Permian), Arizona, USA. *Answers Research Journal* 7:499–532.

Whitmore, J.H., and K.P. Wise. 2008. Rapid and early post-Flood mammalian diversification evidences in the Green River Formation. In A.A. Snelling (editor), *Proceedings of the Sixth International Conference on Creationism*, pp. 449–457. Pittsburgh, Pennsylvania: Creation Science Fellowship; Dallas, Texas: Institute for Creation Research.

Wicander, R., and J.S. Monroe. 2016. *Historical Geology: Evolution of Earth and Life Through Time*, 8th ed. Boston, Massachusetts: Cengage Learning.

Wise, K.P. 2009. Mammal kinds: How many were on the Ark? In T.C. Wood and P.A. Garner (editors), *Genesis Kinds: Creationism and the Origin of Species*. CORE Issues in Creation 5. Eugene, Oregon: Wipf and Stock.

Xing, Y., M.A. Gandolfo, R.E. Onstein, D.J. Cantrill, B.F. Jacobs, G.J. Jordan, D.E. Lee, S. Popova, R. Srivastava, T. Su, S.V. Vikulin, A. Yabe, H.P. Linder, and M. Von Balthazar. 2016. Testing the biases in the rich Cenozoic angiosperm macrofossil record. *International Journal of Plant Sciences* 177, no. 4:10.1086/685388. doi: 10.1086/685388.

THE AUTHORS

Jeffrey P. Tomkins earned a B.S. in Agriculture Education from Washington State University (1985), a M.S. in plant science from the University of Idaho (1990), and a Ph.D. in genetics from Clemson University (1996). After completing post-doctoral research in genomics, he became a faculty member in the Department of Genetics and Biochemistry at Clemson and the director of the Clemson University Genomics Institute. In 2009, he joined the Institute for Creation Research as a research scientist and was appointed Director of Research in 2020. He has authored 66 secular journal papers, 42 creation science journal papers, and 6 books.

Timothy L. Clarey earned a Ph.D. and B.S. (summa cum laude) from Western Michigan University, and a M.S. from University of Wyoming all in geology. He worked for nearly a decade as an exploration geologist for Chevron and 17 years as a full0time public college professor. His publications include numerous articles on the geology of the Rocky Mountain region. He has written and/or co-authored five books, including Guide to Dinosaurs (ICR), Dinosaurs: Marvels of God's Design (Master Books) and Carved in Stone: Geological Evidence of the Worldwide Flood (ICR) in 2020. Tim has worked as Research Scientist for ICR since 2013.