The Chaotic Chronology of Catastrophic Plate Tectonics

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Abstract

Developed from computer models, Catastrophic Plate Tectonics was introduced in 1994 as a global tectonic model of the Genesis Flood. Advocates of the model claimed that evidence for Plate Tectonic theory also supported its catastrophic daughter. Examination of the literature identified several inconsistencies in the timing of events between the parent Plate Tectonic theory and its creationist offspring. Various events within catastrophic plate tectonics also appear to be in conflict in their relative timing and potentially in disagreement with the biblical record. Caution should be exercised in applying catastrophic plate tectonic concepts to field situations until these problems are addressed and resolved.

Introduction

Catastrophic Plate Tectonics (CPT) was introduced at the 1994 *International Conference on Creationism* by a multidisciplinary consortium of creationists as a comprehensive geological and geophysical model of the Genesis Flood (Austin et al., 1994). The concept is based on and derived from uniformitarian Plate Tectonic (PT) theory. Support for CPT was based on extensive computer modeling performed by Baumgardner (1986; 1990; 1994). Following its introduction, only one article was published by a member of the CPT group (Snelling, 1995) until Baumgardner (2002a; 2002b; 2002c) participated in a plate tectonics forum sponsored by the Answers in Genesis journal, *TJ*. We are unaware of any other publications either discussing or applying CPT to specific field data.

Shortly after the introduction of CPT in the 1994 publication, Reed et al. (1996) published an assessment of both uniformitarian and catastrophic plate tectonics. Later, the Creation Research Society published the book, *Plate Tectonics: A Different View* (Reed, 2000). The publication provided areas of greater detail about many shortcomings of PT and its creationist derivative, CPT. We believe that skepticism toward PT is a minority position in the uniformitarian Earth sciences and perhaps even within creationism, but we do not equate majority support with truth.

Our interest in CPT led us to carefully read the material presented in the *TJ* forum and research the pertinent portions of PT theory. In doing so, we became aware of a number of serious problems facing the CPT model—that of its inconsistent sequencing of events: (1) internally (Table I); (2) potentially with respect to the biblical account; and (3) with uniformitarian plate tectonics (Table II)[1]. Our analysis was enabled by the simple step of inferring timelines for both PT and CPT from the literature.

We believe that logical inconsistencies contrasting the incompatibility of events between PT and CPT are serious, carrying greater evidential weight than empirical data (Reed, 2002). In order to accurately capture and convey the seriousness of each issue, we quote extensively where a statement regarding CPT has been put forward. We have tried to maintain context in our citations and have searched for disclaimers or new information in more recent publications correcting information in the earlier publications.

Internal Conflicts within Catastrophic Plate Tectonics

Most of the inconsistent sequencing of events that will be discussed in this paper are related to the difficulty that supporters of CPT have with the "Paleozoic" section of the geologic column. This issue can be summarized as follows:

- As the *most* compelling evidence for their theory, CPT proponents present the "Mesozoic" and later age of the sea floors as compared to the continental sedimentary record,
- CPT proponents equate the onset of the Genesis Flood with the initiation of a "runaway subduction event" that led to the destruction of the antediluvian ocean floors and the recrystallization of the present floors; and
- CPT advocates propose the onset of the Flood corresponds (roughly) with the Precambrian/Paleozoic boundary.

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Received 27 August 2002

[1]We are aware that CPT advocates reject the 4.5 billion year absolute timescale; however, the problems are with the *relative* sequence of events.

Table I. Apparent internal inconsistencies within catastrophic plate tectonics.

CPT	Apparent Inconsistencies
The Pangean supercontinent break-up was initiated at onset of Flood.	The uniformitarian Pangean supercontinent did not break-up until the early Jurassic—well after the end of the Paleozoic. The entire Paleozoic and Triassic stratigraphic sections would have been deposited on the continents *before* the pre-Flood oceanic crust would have been subducted.
The break-up of the Pangean supercontinent is marked stratigraphically where metazoans occur in the fossil record.	Metazoans are believed to document the explosion of life near the Precambrian/Cambrian boundary (see Appendix). Pangea broke up at the beginning of the Jurassic Period—approximately 420 million years later—with a completely different set of flora and fauna. Why is the boundary not "marked" by the early Jurassic fossils but rather by metazoans? From a creation standpoint, all life was already created and living on Earth, so why are metazoans the *only* fossils that should be used as pre-Flood/Flood boundary markers?
Termination of runaway subduction during the Flood	Which day during the Flood marks the end of runaway subduction: 40 or 150?
Pre-Flood "Paleozoic" oceanic crust was completely subducted during the Flood.	If this is true, then the Paleozoic and Triassic stratigraphic sections already existed on the continents *before* the Flood (pre-Flood death on a very large scale—similar to the concept of the Creation/Curse/Catastrophe model [Gentet, 2000a; 2000b]). Flood geology would then begin one-third of the way into the Mesozoic Era. When were the Paleozoic and Triassic strata deposited on the continents?
Triassic Flood Basalts	The Triassic strata (including all of the areas covered by massive flood basalts) were deposited after the Paleozoic, but before the break-up of Pangea in the early Jurassic. It is unclear whether these basalts are then pre-Flood or Flood.
Downwarping continents after marine Paleozoic section	If the RSE is Mesozoic, then thick marine Paleozoic continental sediments are pre-Flood, and should have been eroded by cavitation.

However, these three propositions cannot all be true at the same time. If the Paleozoic is to be included in the Flood and the runaway subduction event began during the Mesozoic, then the timing of the runaway subduction event should be placed at mid-Flood. Otherwise, the Mesozoic age of the seafloors is not correct and is not useful as evidence for CPT (Figure 1), or the Paleozoic stratigraphic record for the continents was not deposited as a part of the Flood. This stratigraphic problem is at the heart of many of the internal conflicts within CPT (Table I).

When Did the Runaway Subduction Episode Occur?

The internal coherence of CPT is further constrained by its presentation as a singular event initiated by a runaway subduction episode (RSE), resulting in a cascading set of consequences purported to provide a physical explanation of the Genesis Flood. We believe that the possibility of multiple runaway subduction episodes appears unlikely, especially in light of biblical statements about the singularity of the Flood. Thus, statements in the available references (Austin et al., 1994; Baumgardner 1986; 1990; 1994; 2002a; 2002b; 2002c) which suggest the RSE occurred at the onset of the Genesis Flood appear to contradict other statements that affirm the inclusion of the Paleozoic in the Flood.

Within CPT, was the RSE the initiating event of the Genesis Flood? The answer appears to be affirmative.

> The Flood was initiated as slabs of oceanic floor broke loose and subducted along thousands of kilometers of pre-Flood continental margins. (Austin et al., 1994, p. 609)

In addition to this unambiguous statement, the initial 40 days of rain (Genesis 7:12) is said to have resulted from atmospheric fallout of water placed there by supersonic steam geysers originating from the newly opened mid-ocean ridges formed by continental dislocation that was caused by runaway subduction.

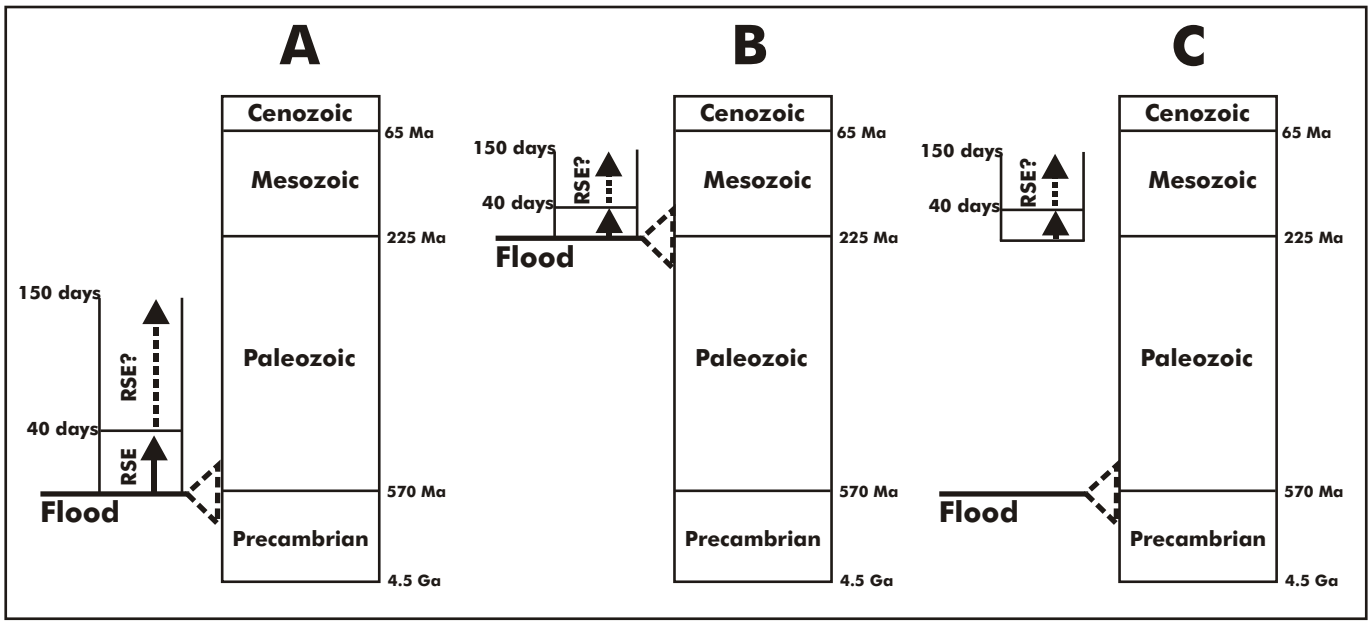

Figure 1. The dilemma of the timing of the catastrophic plate tectonic runaway subduction episode (RSE) is demonstrated by the three possibilities that are implied in the existing literature. In the first (A), both the Flood onset and the RSE (whether 40 or 150 days) are defined near the Precambrian/Cambrian boundary. However, this does not explain the "Mesozoic" age of the seafloor. In the second (B), both the Flood onset and RSE are placed at the beginning of the Mesozoic, implying that the Paleozoic is pre-Flood. In the third (C), The Flood onset is identified near the Precambrian/Cambrian boundary and the RSE at the beginning of the Mesozoic. However, this requires the RSE to be a mid-Flood event.

> The jets also provide a potent source of water for the 40 days and nights of rain described in Genesis 7. (Baumgardner, 2002a, p. 61)

These geysers are also equated with the "windows of heaven," the biblical origin of the rain.

> It is this geyser-produced rain which we believe is primarily responsible for the rain from 'the windows of heaven'… which remained a source of water for up to 150 days of the Flood…(Austin et al., 1994, pp. 612–613)

Likewise, the RSE is tied to the beginning of the Flood by the equating of the geysers with the "fountains of the great deep" which Genesis 7 states were a proximal cause of the Flood.

> This geyser activity, which would have jettisoned gases well into the atmosphere, is, we believe, what Scripture refers to as the "fountains of the great deep"… (Austin et al., 1994, p. 612)

These statements appear to place the onset of catastrophic plate tectonics and its runaway subduction episode at the beginning of the Genesis Flood.

Termination at Day 40 or Day 150?

While it appears that there is a clear link between the onset of the Flood and the initiation of runaway subduction, the same cannot be said when identifying RSE termination. One CPT advocate states that the RSE event lasted for 40 days.

> …it seems likely the runaway episode coincides with the 40 days of intense rain. (Baumgardner 2002b, p. 71)

In an earlier article, CPT advocates stated that the cessation of both the geysers and tectonic activity should be placed at the 150th day of the Flood:

> When virtually all the pre-Flood oceanic floor had been replaced with new, less-dense, less-subductable rock, rapid plate motion ceased. The lack of new, hot, mantle material terminated spreading-center-associated geyser activity, so the global rain ceased. This is very possibly the 150-day point in the Genesis chronology…(Austin et al., 1994, p. 614)

It cannot be both; the termination of the event was abrupt.

> When the rock comprising these plates subducts and sinks to the bottom of the mantle and the hot rock at the core-mantle boundary rises to near the Earth's surface, this energy is all converted to other forms and is no longer available to drive the process. The rapid motions in the mantle and in the plates at the surface come to a rather abrupt halt. When this occurs, the steam jets shut down and the high stresses associated with the rapid motions relax. (Baumgardner, 2002a, p. 62)

Therefore, although it seems to be clear that the RSE began at the onset of the Genesis Flood, it is unclear whether it ended abruptly on the 40th day or on the 150th day, and clarification of that aspect of the model by its developers would be helpful.

We attempted to constrain the timing of the termination of the tectonic episode by determining the length of time required for the continents to drift to their present positions at the stated model speed of "meters per second" (Austin et al., 1994, p. 612). If "meters per second" means at least two meters per second and the motion is bilateral then over 40 days, the lateral plate displacement would have been nearly 14,000 kilometers, and over 150 days the displacement would have been over 50,000 kilometers. Unfortunately, given the present minimum width of the Atlantic Ocean (3,000 kilometers), the model assumes lateral motion far beyond what is required or even possible in either scenario, and thus does not predict the present configuration of continents and oceans. Neither does it clearly account for the discrepancy between the estimated and actual distances with either proposed termination day. Thus, the proponents of CPT need to (1) clarify both the beginning and the end of the RSE relative to the Genesis Flood, and (2) reevaluate the lateral velocities of the crust during the subduction event.

The "Mesozoic" Dilemma

It is not just the termination of the RSE that is unclear. In spite of the previous statements that appear to clearly tie the RSE with the beginning of the Flood, Baumgardner (2002a) equates its age with the Mesozoic, since uniformitarian geology dates the ocean crust as all younger than early Mesozoic.

> …none of today's ocean floor basement anywhere on Earth is older than Mesozoic relative to the microfossil record…(Baumgardner, 2002a, p. 59)

This age-date is presented as being crucial, since the evidence of the oceanic lithosphere being younger than the continental record is a key pointer to the historicity of CPT.

> …the issue on which the ultimate validity of the plate tectonics paradigm rests is the age of the ocean floor… relative to the sediment record of the continents. (Baumgardner, 2002b, p. 69)

This creates a great tension for the hypothesis. The relationship between runaway subduction, the beginning of the Flood, and the Paleozoic record on the continents requires one of two possibilities, either (1) the Paleozoic was pre-Flood (Figure 1B), or (2) the RSE started during the mid-Flood (Figure 1C). Baumgardner appears to go in one direction when he states:

> The igneous ocean crust and sediments overlying it today postdate the entire continental Paleozoic sedimentary record. (Baumgardner, 2002b, p. 69)

However, in the same forum, he goes the other direction by saying:

> First, I am convinced the Biblical text requires the beginning of the metazoan fossil record to coincide with the beginning of the Genesis Flood… (Baumgardner, 2002a, p. 59)

If he equates the Paleozoic with the Genesis Flood, it is hard to escape the conclusion that he is correlating the RSE with a mid-Flood time. He implies that when he states:

> I consider… the present ocean basement to be no older than the Mesozoic portion of the continental fossil record. This requires… the entire pre-Flood ocean floor, *as well as any generated when the Paleozoic fossils were being deposited*, to have vanished from the Earth's surface. (Baumgardner, 2002a, p. 59) [emphasis added]

This suggests that the Flood had already begun when the RSE took place, and that it had proceeded to the point where the Paleozoic record had already been deposited. But this contradicts the statements above, which unambiguously places the RSE at the onset of the Genesis Flood. This idea seems to be carried further when he states:

> If one also includes the compelling evidence the present ocean floor was formed progressively and simultaneously with the deposition of Mesozoic and Cenozoic fossils…" (Baumgardner, 2002a, p. 59)

This implies that the Flood subduction event and subsequent resurfacing of the ocean floor occurred during the Mesozoic and Cenozoic. However, not only would this force the Paleozoic to be pre-Flood, but it also implies that the Mesozoic and Cenozoic represent the first 150 days of the Flood, and that the remaining Flood events are not represented in the rock record at all! But then he retraces his path and states that:

> This mechanism accounts for… the ubiquitous evidence in the continental Paleozoic and Mesozoic record for rapid, high-energy, globally-correlated sedimentary processes… (Baumgardner, 2002a, p. 63)

How can the RSE account for the continental Paleozoic stratigraphic section if it did not begin until the Mesozoic?

Related Problems

Two related problems arise from the confusion over the Paleozoic record. The first involves the mechanism of CPT that allows thick sediments to be deposited on the continents, but not in the oceans. The model posits the

downwarping of the continents caused by downwelling in the mantle caused by subduction of cold oceanic plates underneath the continents.

> Downwelling flow associated with the rapidly sinking lithospheric slabs, mostly below regions of continents, tends to pull the surface down. (Baumgardner, 2002a, p. 62).

The lowering of the continents and the simultaneous raising of the ocean floors supposedly resulted in the continents becoming large sedimentary basins. But how were thick marine Paleozoic sequences deposited on continents, if the RSE and the subsequent downwarping did not take place until the Mesozoic?

The second problem comes from the assertion that continental transgression involved cyclonic currents (Baumgardner and Barnette, 1994) and cavitational erosion of the continental interiors. If that happened in conjunction with the early Mesozoic runaway subduction, then why were the continental interiors not eroded down to basement and the sediment redeposited as Mesozoic section?

Catastrophic Plate Tectonics and the Bible

If the RSE began after deposition of the Paleozoic sequence and the Flood encompasses the Paleozoic section, then catastrophic plate tectonics, as it has been presented, is potentially at odds with the biblical record. That is because it relates the RSE to the onset of the Genesis Flood and the resulting steam geysers to the "fountains" and "windows" of Genesis 7 (Table II). Yet at the same time, the episode can be construed as being a mid-Flood event, based on the relationship between the Paleozoic and Mesozoic sections.

In the recent *TJ* forum, this dilemma is apparently recognized in favor of a mid-Flood timing of the runaway event.

> In terms of the Flood cataclysm, the very oldest basement rocks in today's oceans formed when dinosaurs were first being buried in significant numbers as the floodwaters began encompassing their continental habitats. The extremely important implication is that all of today's ocean plates have formed via seafloor spreading processes at mid-ocean ridges since sometime in the middle of the Flood cataclysm. (Baumgardner, 2002b, p. 69)

However, it is unclear how this squares with the biblical account of the Flood. For example, how can the proposed steam geysers be the "fountains of the great deep" or the "windows of heaven" if they did not start until mid-Flood time? There seems to be a suggestion of some undefined process that preceded the RSE, but no explanation or evidence is offered:

Table II. Connections between the biblical account of the Flood and the events of catastrophic plate tectonics strongly suggest that the runaway subduction event must have occurred at the onset of the Flood. If proponents now advocate a mid-Flood timing of the runaway subduction episode, then they must resolve these connections with Genesis.

Biblical Description of Flood Onset	CPT Connection to Flood Onset
Rainfall (Genesis 7:11,12)	Steam Geysers
Breakup of Fountains (Genesis 7:11)	Runaway Subduction Episode
Marine Transgression (Genesis 7:19)	Lowering of Landmasses

> In regard to pre-Mesozoic plate motions, the lack of pre-Mesozoic seafloor to tell us what these motions may have been leaves everyone, uniformitarian and creationist alike, with precious little to work with beyond a few clues in the continental record and one's own imagination. (Baumgardner, 2002b, p. 71)

But if the runaway subduction was a single unique event, then how could there have been any pre-Mesozoic plate motions?

This line of thought continues:

> The calculation obviously does not capture the earliest portion of the cataclysm that corresponds roughly with the Paleozoic part of the rock record. Explicit modelling of this earlier portion of the catastrophe will be difficult to achieve because the ocean floor from this period is no longer available and clues from the continental rocks are few. (Baumgardner, 2002c, p. 80)

If the "catastrophe" that he is referencing is the Genesis Flood, then runaway subduction during the mid-Flood would not allow the steam geysers to be equated to the "fountains" or the "windows" of Genesis 7, and previous published assertions require modification. Furthermore, advocates of CPT must now explain how the presence of these steam geysers during the late Flood stages correspond to the biblical teaching that the rain had ceased and the fountains of the great deep had been closed.

Finally, we must emphatically disagree with the final assertion in this quote. The "clues" from the continental record for the Paleozoic are much more abundant and clear than any comparative information that we have from the Mesozoic and younger ocean floor. They include millions of wells, miles of seismic lines, outcrops, and many decades of intensive study that have resulted in millions of

pages of description and interpretation of the continental Paleozoic record.

Incompatibility of Uniformitarian and Catastrophic Plate Tectonics

We believe that a major impetus in the development of CPT was the perception by some that the case for uniformitarian plate tectonics was compelling enough to force a biblical version:

> Let me begin by affirming without apology that indeed I am persuaded the basic mechanical reality of plate tectonics has been established beyond any reasonable doubt. (Baumgardner, 2002c, p. 78)

Putting aside the validity of that statement, is it possible for the uniformitarian parent to be successfully morphed into a catastrophist child? We believe that uniformitarian and catastrophic plate tectonics are fundamentally incompatible in (1) the relative timing of their events, and (2) their assumption of how events operate over time (Table III). This second difference between catastrophic plate tectonics and its uniformitarian parent is the philosophical difference between history being composed of discrete events or of ongoing processes. Uniformitarian plate tectonics is an ongoing process integral to the functioning of the Earth. Catastrophic plate tectonics is a one-time event contrary to the regular functioning of the earth. This distinction is true of any comparison between uniformitarian and catastrophist Earth history (Reed, 2001). So, at this very fundamental level, the two versions of plate tectonics are quite different. How do the proposed sequences of their events compare?

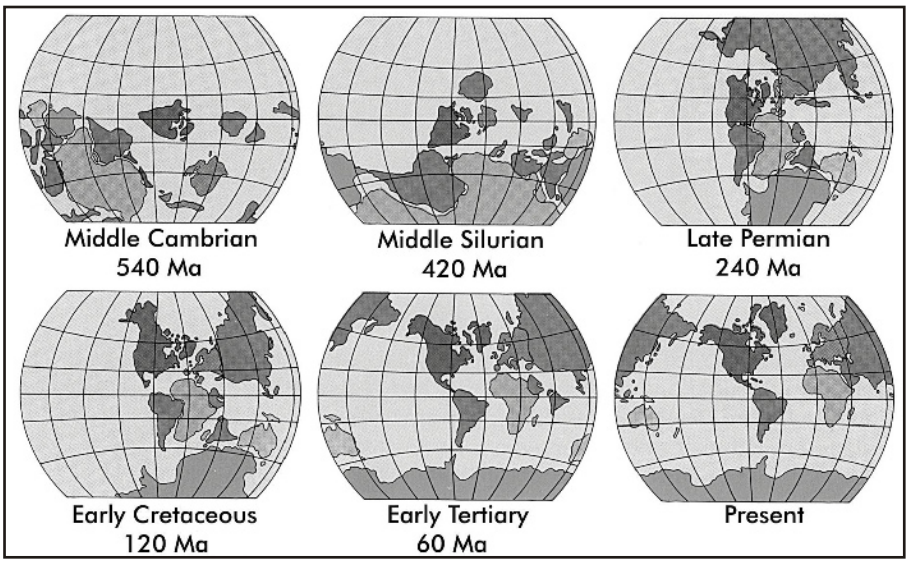

Figure 2. Generalized paleogeographic map showing the convergence of the continents during different uniformitarian periods to form the Pangean supercontinent during the Permian (at the end of the Paleozoic), and its subsequent breakup in the early Jurassic. Advocates of Catastrophic Plate Tectonics begin the Flood with the break-up of the Pangean supercontinent (based on PT), but this would mean that all of the Paleozoic Era and Triassic Period would have been deposited *before* the Flood began. Modified from Carlson (1993).

The Dance of the Continents

Advocates of the CPT model have proposed that a pre-Flood supercontinent similar to "Pangea" (Figure 2) broke apart during the Flood (Baumgardner, 2002a). Evidence in support of this proposal is believed to come from paleontological (i.e., the rise of the metazoans) and crustal (i.e., the absence of any Paleozoic oceanic crust) uniformitarian evidence (Austin, 1994; Austin et al., 1994; Baumgardner, 2002a; 2002b). A different dataset supports the uniformitarian breakup of the Pangean supercontinent during the early Jurassic Period approximately 180 million years ago (Osborne and Tarling, 1996, p. 98).

Unlike CPT, uniformitarians have proposed multiple episodes of the formation and breakup of supercontinents long before their Pangean supercontinent ever came into existence (Figure 3). If uniformitarian PT theory is so compelling, the one-time event associated with the Genesis Flood does not account for much uniformitarian evidence. The advocates of CPT should explain how parts of the uniformitarian data are compelling and yet the remainder is so easily discarded.

In addition to the post-Mesozoic plate motions mimicked by CPT, uniformitarian Earth history is replete with openings and closings of various oceans, including some no longer in existence. Structural and lithological parts of the continental basement are believed a result of Precambrian subduction and collision (e.g., Anderson, 1990; Hoffman, 1989). Thus, a severe problem for CPT is the appearance of arbitrary data selection.

"Slow" or "Fast" Breakup of the Pre-Flood Supercontinent

Incorporating PT data (e.g., seafloor ages), Baumgardner (2002a) has proposed that the pre-Flood Pangean supercontinent broke apart with the onset of the Flood. But unlike the slow multi-million year drift of the continents

Table III. A list of inconsistencies between Plate Tectonics and Catastrophic Plate Tectonics.

Concept	Plate Tectonics	Catastrophic Plate Tectonics
Timing of Plate Motion	Plates have been moving since the formation of a semi-molten crust—4.5 billion years ago (Ga).	Plate motion initiated with the onset of the Flood beginning with the break-up of the Pangean supercontinent.
Duration of Plate Motion	Landmasses have been moving since the first crust was formed, and motion continues today.	Plate motion was first initiated at the Flood onset and it terminated during the Flood. No large-scale plate motions are believed to be occurring today.
Dating Plate Motion	Plates have been moving across the planet since the beginning of Earth history—4.5 Ga.	CPT began with metazoan life—equal to the uniformitarian Precambrian/Cambrian boundary approximately 570 million years ago.
Supercontinents	Multiple supercontinents have formed and broken apart on Earth since its origin. Pangea was only the most recent.	Only one "Pangean" supercontinent has existed on Earth. It was broken up at the onset of the Flood.
Mountain Building Periods (i.e., Orogenies)	Episodes of orogenesis have occurred since the formation of the first semi-solid crust and extend into the present.	Mountain building occurred at two distinct times during the Flood. Only very limited orogenic activity has occurred since.
Ice Ages	Multiple events have occurred throughout Earth history.	Only one has occurred(?) and it was post-Flood. The ice age events before the "metazoans" remain unaddressed.
Flood Basalts	Episodes of flood basalt outpourings span the uniformitarian timescale. The Triassic was a period that witnessed multiple flood basalt events globally.	Flood basalts on top of basement rock could be associated with the Creation Week. However, it is unclear how the other periods of flood basalt outpourings coincide with the Biblical record. Additionally, it is not clear if the Paleozoic and "Triassic" flood basalts were deposited before the Flood.

proposed by uniformitarians, runaway separation was measured in meters per second (Austin et al., 1994; Baumgardner, 1994; 2002a). However, the complete PT dataset does not support this catastrophic interpretation.

Continental drift was originally deduced from matching geomorphology, geology, and fauna on opposing continents. But the faunal "matches" have led advocates of uniformitarian plate tectonics advocates to propose a Pangean breakup lasting almost one hundred million years (Osborne and Tarling, 1996, pp. 98–99). The differences in "age" (derived from the conceptual global stratigraphic column) between the fauna are then believed to accurately reflect the time when the continents separated. Although we are aware that CPT advocates do not accept the absolute timescale, they should explain how the uniformitarian paleontological evidence that supports a "slow" breakup also supports a "fast" CPT breakup.

Advocates of CPT have stated that they view the breakup of the pre-Flood supercontinent as having started with the beginning of the metazoan fossil record (Austin, 1994; Austin et al., 1994; Baumgardner, 2002a). If this is true, and if faunal distribution assumptions are consistently followed, then the formerly joined continents should not "match" paleontologically from the beginning of the Flood, which supposedly corresponds to the beginning of the metazoan fossil record (see Appendix). This is not the case. Uniformitarian plate tectonics cite "matching" fauna well before the Pangean breakup in the early Jurassic (Osborne and Tarling, 1996)! According to CPT, most of the separation between the continents should already have occurred by this time in Earth history, unless the RSE is a mid-Flood event or the Flood did not start until the Jurassic. Once again the appearance of a selective use of data requires explanation.

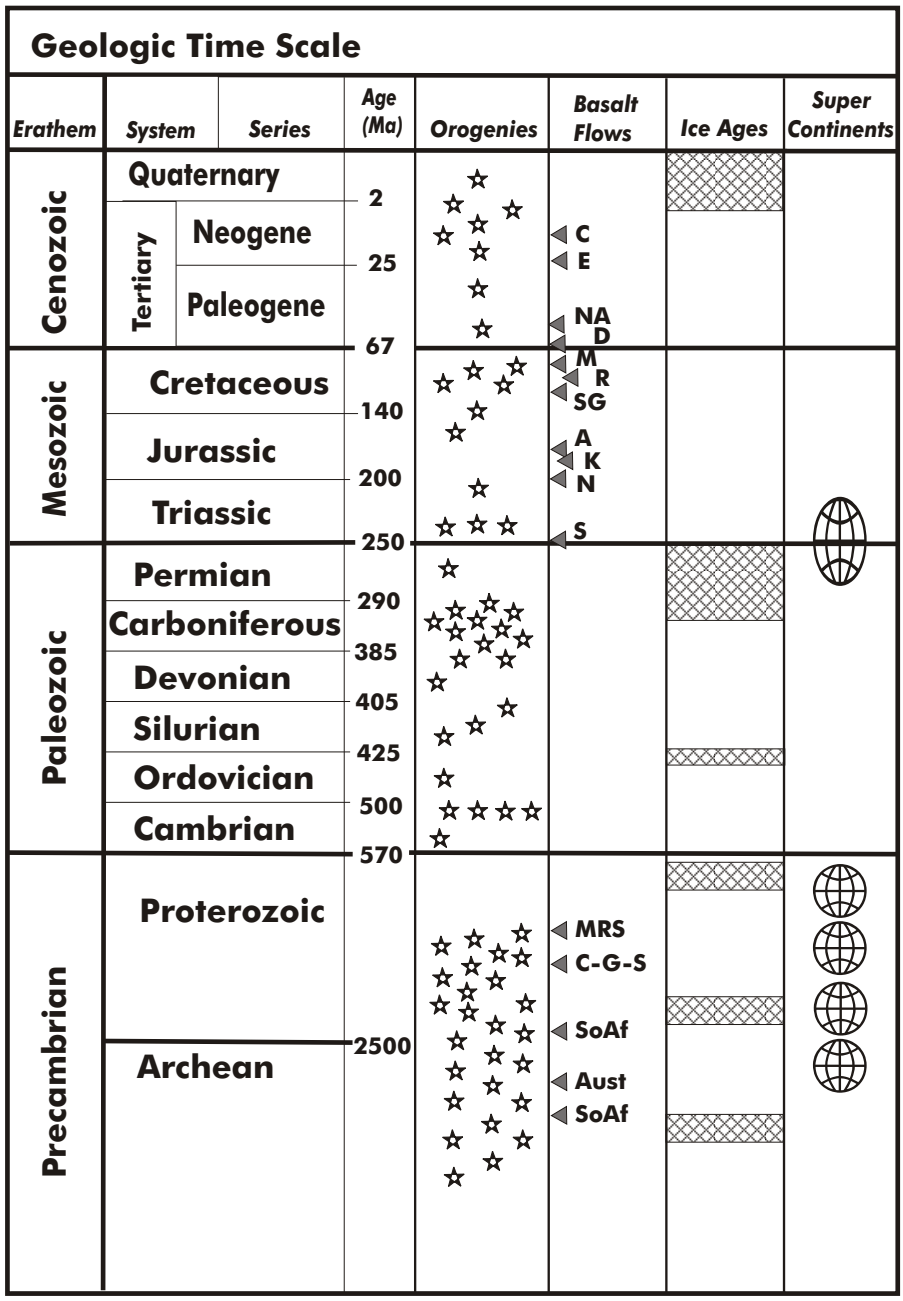

Figure 3. Catastrophic plate tectonics would predict discrete stratigraphic horizons that would capture intense geologic activity: (1) at the onset of the runaway subduction episode, and (2) at the point of continental rebound. However, the timing of orogenies, basalt flows, ice ages, and the formation and breakup of various supercontinents within the uniformitarian column do not demonstrate these discrete events. C = Columbia River Basalt Group, E = Ethiopia, NA = North Atlantic, D = Deccan, M= Madagascar, R = Rajmahal, SG = Serra Geral (Parana), A = Antarctica, K = Karoo, N = Newark, S = Siberian, SoAf = South Africa, Aust = Australia, C-G-S = Canada-Greenland-Scandinavia. Data from Haq and Van Eysinga (1987), and Windley (1995). Various internet sites were also accessed for information: http://www.museum.state.il.us/exhibits/ice_ages/when_ice_ages.html, http://volcano.und.nodak.edu/vwdocs/volc_images/europe_west_asia/india/deccan.html, http://www.geolsoc.org.uk/template.cfm?name=fbasalts

Precambrian Ice Ages

Uniformitarians have informed us that Earth has experienced multiple ice ages throughout its 4.5 Ga history (Figure 3). Geologic materials from several of these supposed events have been used as evidence that currently separated continents were once joined. Multiple ice ages are believed to have occurred on Earth during the Precambrian (before the metazoans). If this evidence is compelling for plate tectonics, then it should be accommodated or explained by CPT, and yet this has been ignored. This also gives the appearance of arbitrary use of uniformitarian data. At this point we must state that we support Oard's theory that these data reflect Flood forces and deposits and not glacial episodes (Oard, 1990; 1997). With that aside, we are somewhat surprised that these Precambrian deposits are not recognized as Flood deposits within CPT.

Once again, adherence to the uniformitarian column appears to place CPT advocates in a corner. CPT must either adjust its boundaries or propose significant pre-Flood catastrophes (e.g., Gentet, 2000a, 2000b), or include significant and multiple pre-Flood ice ages.

Orogenies

CPT implies that continental mountain building would occur at specific times during the Flood. The first would have been associated with the RSE, which would have resulted in island arc/volcanic chain mountain building and mid-oceanic ridge formation. The second orogenic episode would have been initiated at the termination of the RSE, caused by the isostatic rebound of the continents. However, the uniformitarian sequence of mountain building does not offer much support for two distinct phases of mountain building. Instead, uniformitarians note numerous orogenies extending throughout the

geologic column (Figure 3). Other features of the rock record, such as the formation of Large Igneous Provinces by basalt flows present similar difficulties to the proponents of catastrophic plate tectonics (Figure 3).

We believe that a fruitful line of research for CPT advocates would be to review the PT datasets related to the various orogenies and provide their perspective on how creationists can use this same information to derive interpretations completely in defense of Flood geology.

Discussion

The available literature about CPT allows significant confusion over the sequence and timing of its events. There are internal conflicts, possible conflicts with the biblical record, and conflicts with the uniformitarian parent supposedly providing much support for it (Tables I, II, and III). It is not enough to only identify these issues. Their causes and solutions must also be investigated; the burden of that effort falling, of course, predominantly on the model's proponents. However, we would like to share some simple observations that may help those researchers repair these problems.

What are the presuppositions that force these issues? The most basic is certainly the acceptance of the faulty assumption of the validity of the uniformitarian stratigraphic column. If the definition of Paleozoic and Mesozoic rocks is valid on a global scale (the relative ages defined by the uniformitarian geologic column), then catastrophic plate tectonics is caught between its assertions that (1) the Flood encompasses Paleozoic rocks and (2) the timing of the runaway subduction event must correspond to the Mesozoic age of the seafloor. The theory cannot let go of the Mesozoic solution without erasing its own, self-proclaimed most-basic-line-of-evidence. It cannot decouple from the Paleozoic without creating logical inconsistencies within the model and between the model and the Bible. And yet, both cannot be true.

We encourage the supporters of CPT to explore the possibility that the column is not a valid representation of the rock record. In doing so, they would be free of uniformitarian constraints and could explore a new relationship among rock units. It is true that they would also lose a valuable piece of their supposed evidence—the relative age inequity between the oceanic and continental crusts. However, we suggest that they strongly consider the distinctions between empirical and nonempirical stratigraphy discussed by Klevberg (2000).

However, we believe that logical and biblical consistency is more important to the model than some "key" piece of empirical evidence, and we firmly believe that the shifting of presuppositional baselines can illuminate empirical data in new ways and lead to fruitful reinterpretations. In a similar manner, we would discourage reliance on radiometric ages or fossil assemblages to provide relative dates. We are convinced that radiometric dating is too flawed to be useful (Woodmorappe, 1999), and that conditions found inferred from the Genesis Flood invalidate the assumptions of the stratigraphic significance of the fossils in the uniformitarian sense. It is clear that in any creationist model of Earth history, part of the difficulty will be the differentiation between real data and uniformitarian interpretation.

We encourage the development of various models to explain Earth's brief and catastrophic history. However, creationists must also subject themselves to the critical process in order to ensure that models correspond to biblical propositions and sound science. We believe that researchers developing models should consider the distinctions between evidence and uniformitarian interpretation. This distinction is not always clear in the uniformitarian literature. Those who propose models should be ready to engage in vigorous debate about their ideas in order to advance creation science and natural history.

There are major discrepancies between the parent plate tectonics theory and its derivative. Catastrophic plate tectonics cannot claim unequivocal support from uniformitarian data and still remain consistent with the biblical record. As we have demonstrated, claiming support from select pieces, but failing to accommodate all the uniformitarian data results in confusion, especially when advocates of CPT have not explained which specific plate tectonic data are germane to their theory and why. How much uniformitarian Earth history may young-Earth creationists accept? The concept is philosophically bankrupt (Reed, 2001), and outside of the excellent descriptive datasets (Reed and Froede, 1997); creationists should beware its use in forensic speculation.

Reed (2002) set up a hierarchy of evidence to use when evaluating creationist models of Earth history. As opposed to the philosophical positivism of naturalists, Christians should recognize the primacy of Scripture and accept its primacy in Earth history research. While this approach is not meant to eliminate the scientific contribution to natural history, it is meant to eliminate its undeserved, monopolistic primacy. The dearth of data in the Bible does not detract from the force of its truth. In addition to consistency with the Bible and its derivative worldview, creationist models must meet logical demands of formal consistency. Finally, empirical evidence plays its role in fleshing out such models. The problems described above touch on both the model's consistency with the Bible and its logical consistency. Thus, to strengthen their hypothesis, proponents of CPT must first ensure that the sequence and timing of tectonic events intersects the biblical record without distortion to the latter. Secondly, they must derive

a self-consistent timeline for their model that will remove all questions regarding logical consistency. Finally, they must reevaluate their selective dependence on empirical data from uniformitarian plate tectonics.

We believe that the cause of many of the sequential issues within CPT are directly related to overconfidence in uniformitarian constructs, chiefly the geologic column (Reed and Froede, in press) and equivocal evidence for plate tectonics (Reed, 2000; Oard 2002a; 2002b; 2002c). We encourage the proponents of catastrophic plate tectonics to reevaluate their model absent these bounding conditions and formulate a more consistent approach.

Conclusion

We cannot think of a better summary of mission statement for creationists than that provided by Dr. Baumgardner in the recent forum:

> To make progress in reconstructing truthfully the Earth's past… we simply cannot afford… to be careless in how we approach this task. We cannot indulge in building straw man illusions. We cannot pick and choose what data we address and what data we ignore. Rather, we must do our best to bring all the data to bear on any candidate model we construct. (Baumgardner, 2002b, p. 72)

We encourage all advocates of CPT to reexamine their assumptions and resolve these issues. If they can successfully do so and maintain their essential framework, then their model will have passed important tests of consistency.

Appendix: The Metazoan Fossil Record

The "first appearance" of metazoan fossils within the evolutionary uniformitarian model is presently under question. Their place within the young-Earth creationist framework also remains unresolved (Froede, 1999a), but because this relates to the CPT model, a brief review is warranted. Baumgardner (2002, p. 59) has stated that metazoans mark the pre-Flood/Flood boundary:

> First, I am convinced the Biblical text requires the beginning of the metazoan fossil record to coincide with the beginning of the Genesis Flood, and most of the subsequent fossil record to be a product of that year-long event.

The danger of hanging the pre-Flood/Flood boundary on uniformitarian paleontology is the confusion it creates when no fossils are found at various locales, or their possible ambiguity as they relate to the strata (e.g., Austin, 2000; Froede, 2000). We will not dwell on this point further, but direct the interested reader to previous discussions related to this concept (Froede, 1997; 1998; 1999a; 1999b).

Within the uniformitarian model, metazoans are found in rocks believed to be around one billion years old. However, they are most often accepted by uniformitarians as occurring in late Precambrian to early Cambrian rocks (i.e., 620 to 550 Ma). One can immediately note the wide range of time available to define the "beginnings" of life (based on fossils!) and the pre-Flood/Flood boundary. We believe that the use of such "markers" is both arbitrary and capricious. For example, how does one "date" the rocks where no fossils are found or great unconformities exist based on corresponding fossils? To mark the onset of CPT using the "first" evidence of metazoans in the rock record is not a tenable idea.

Secondarily, metazoans do not mark the boundary of the breakup of the uniformitarian Pangean supercontinent. Rather, they mark the convergence of several of the continents into the Pangean supercontinent (Figure 3). Baumgardner cannot invoke "metazoans" as biostratigraphic markers for continental separation and remain consistent with the PT dataset. Advocates of CPT have not explained at what time the Pangean supercontinent formed within the biblical framework (i.e., at creation, during the antediluvian period, etc.).

Consistency between the early Jurassic breakup of Pangea and the onset of metazoans in the rock record does not equate in the uniformitarian framework, and some explanation should be made by CPT advocates to help allow an understanding of these differences.

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