Empirical data support for seafloor spreading and catastrophic plate tectonics?

We are grateful for the article by Dr Clarey defending Catastrophic Plate Tectonics (CPT) as an important concept in biblical history.[1] The exchange (and defense) of ideas is critical as we work together as Christians in defining biblical geologic history.

Clarey asks an insightful question at the close of his introduction:

> "Are we to ignore all scientific papers put forth by non-Christians and only accept research by scientists holding our own worldview?"[2]

We believe this is the *most important* question facing young-earth creation science today.[3]

Establishing a worldview

Clarey does not seem to understand the three competing worldviews (i.e. naturalism, naturalistic remodellers, and biblical reconstructionists) in creation science. While young-earth creationists are Bible believers, much of their biblical geologic history is derived from extrabiblical sources built on a foundation of naturalism.

Recently, an effort to unify Scripture and naturalism has been offered by several young-earth creationists through converting/shifting/compressing naturalistic geologic concepts (figure 1). This perspective is being promoted by naturalistic remodellers.[3] The 'conversion' of some of these ideas has developed to become CPT, accelerated radiometric age-dating, and time

compression of the standard geologic timescale.

Other young-earth creationists have called for a reconstruction of all geologic sciences through a biblical worldview (figure 2). This is the perspective of biblical reconstructionists.[3] Clarey laments that for reconstructionists "only a generalized timescale has been developed … and details from the vast majority of site-specific locations are still lacking".[2] He cites only one reference in defense of this statement. This is unfortunate because numerous articles (and a book[4]) have been written by reconstructionists applying the biblical geologic timescale at many different locations across the United States and Australia.[5]

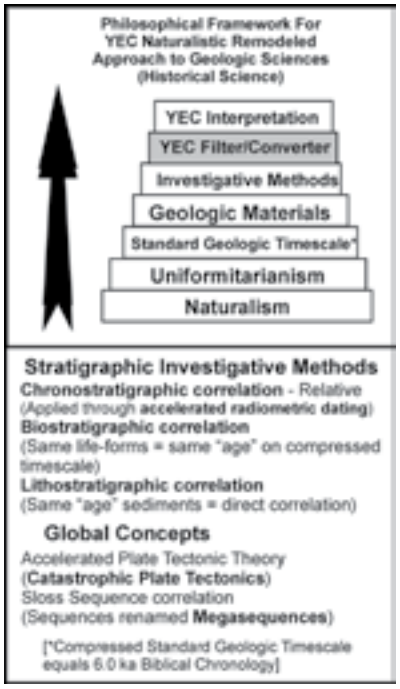

Figure 1. Remodellers accept (either knowingly or not) the philosophic worldview of naturalism in support of a time-compressed standard geologic timescale. The timescale is renamed a geologic column and is viewed not as conveying absolute but relative time within the 6,000-year Earth history. It still follows the Precambrian-to-Holocene time progression. Most importantly, the Remodellers apply a young-earth creationist (YEC) filter to the naturalistic geologic concepts and methods that conforms them to a biblical framework. But this often creates problems that require 'miracles'. The three investigative stratigraphic methods are adjusted but remain consistent with the time-compressed standard geologic timescale. This worldview follows evolutionary progression, but in a time-compressed manner, and would support biostratigraphy defended with naturalistic datasets.

Does the reconstructionist approach require the rejection of all work conducted under naturalism or by remodellers? The answer is no. Young-earth creationists need to retain and use the physical data but remove all naturalistic interpretation.[6,7]

Clarifying the two 'types' of science

Clarey claims there are empirical (i.e. observed and scientifically testable) data supporting seafloor spreading and CPT, including: 1) heat dissipation moving away from oceanic ridges, 2) elevational drop of the oceanic crust moving away from oceanic ridges, 3) matching magnetic reversal bands on both sides of a spreading ridge, 4) the presence of ocean ridges, 5) correlation of liquid petroleum (i.e. oil) from Brazil and West Africa, and 6) tomographic images interpreted as showing subducted oceanic crust in the mantle.[8]

Clarey claims that many of these datasets are independent of radiometric age-dating but do they *require* an interpretation consistent *only* with Plate Tectonic (PT) theory and CPT? A technical monograph written by several young-earth creationists has challenged some of these specific empirical evidences.[9] It should be reviewed.

We assert that *all* of Clarey's 'empirical data' are historical. Historical events occurred in the past and are not subject to experience, repetition, or observation (table 1).[10] It is through Clarey's 'PT/CPT interpretation' that he claims observation and experience but this is history and not science.

Figure 2. This is the worldview of reconstructionists. It completely abandons naturalism, the standard geologic timescale, and all of its inherent evolutionary assumptions. The biblical account of Earth history forms the biblical geologic timescale. It is used to define time and the geologic energy expectations of the rock record. The three investigative stratigraphic methods used in naturalism and modified by remodellers would have limited application in this worldview. God created the entire world in six days with all living creatures living in their respective antediluvian environments. The Flood changed it all. Flood-deposited fossils on one side of the earth would correlate to Flood fossils everywhere. The timing may vary in terms of early, middle, or possibly late Flood, but they would have been deposited during the Flood. This is the reality of reconstructionist Flood-dominated biostratigraphy. Post-Flood correlation of plant and animal fossils could prove fruitful in documenting post-Flood animal/plant/man dispersion/migration. However, that work remains to be conducted.

Catastrophic plate tectonics—an old idea with plenty of problems

> Clarey cites three recent articles: "Several recent articles have been published in the creation literature that have been critical of plate tectonics (PT), and specifically catastrophic plate tectonics (CPT)."[2]

Searching this subject in existing creationist technical literature[5] would have changed his perspective. Many articles and a book questioning ideas regarding PT/CPT began appearing

in the creationist technical literature in 1996.[11]

The assignment of 'miracles' in developing a biblical geologic history

Clarey mischaracterizes one of our questions regarding the application of miracles in following CPT:

> "Their claims that the rapid horizontal movement of the plates across the earth requires a miracle, that accelerated nuclear decay requires another miracle, and that *global deposits require another miracle*, are no different than calling on miracles to initiate the Flood as they themselves have done."[12]

We never invoked a miracle for the global deposition of Flood-derived sediments – that would be a physical manifestation of the Flood. We did question the remodellers' claim of global chronostratigraphic correlation since its defense resides in naturalism. We remain perplexed why so many miracles are deemed necessary by remodellers in their defense of CPT.

The misapplication of figure 2

Clarey surprised us with his uncited figure 2 and caption stating:

> "There is a fairly well-defined general agreement of absolute-radiometric ages and stratigraphic ages."[13]

We have previously discussed this figure with Dr Russ Humphreys.[14,15] The figure was originally used by John Woodmorappe[16] to *discredit* the use of radiometric age-dating by naturalists and to *discourage* its use by young-earth creationists. Its continued use by remodellers to support accelerated radiometric age-dating is inappropriate.

Missed opportunity

Clarey makes an important statement:

> "Creation scientists cannot pick and choose the empirical data sets they want to use but should include all appropriate data sets in any Flood explanation."[17]

We ask that Clarey apply this to the three objectionable articles he cites but does not address at the beginning of his article.[18–20] These articles use data to raise objections to PT and CPT. We encourage Clarey to publish details of his objections for the three articles so that we can understand the 'appropriate datasets'.

Conclusion

The schism[3] we identified in creation science is not about the acceptance or rejection of CPT or biostratigraphy, as Clarey's article might suggest. It is developing between opposing worldviews.

We continue to ask remodellers who advocate CPT and other naturalistic concepts (e.g. accelerated nuclear age-dating, biostratigraphy, and the use of the time-compressed standard geologic timescale) to publish and defend their ideas as we have done with ours. We sincerely hope all of

Table 1. These are Clarey's six empirical evidences supporting CPT. Each claim is examined based on observation/experience (science), processes that occurred in the past (history), and interpretation. All evidence for CPT is based in history and interpretation. This is a common problem for naturalists and remodellers working in the historical geological sciences; their 'interpretation' drives purported 'science', which is in fact history. Concepts like CPT and PT theory will eventually be replaced by newer concepts as new data overwhelms the old.[21] As such, CPT/PT as geologic concepts, are not essential to development of biblical geologic history.

Empirical Evidence in Support for Catastrophic Plate Tectonics	Empirical Science (Relying on experience or observation)	Historical (Process occurred in past and was not observed or experienced)	Interpretation
1. Heat dissipates moving away from oceanic ridges	Heat gradient measurable - origin and cause not observed	The creation of heat at the oceanic ridges occurred in the past - process unknown	CPT did it
2. Elevational drop of the oceanic crust moving away from oceanic ridges	Elevation measurable - origin and cause not observed	Raised elevation occurred in the past - process unknown	CPT did it
3. Matching magnetic reversal bands on both sides of a spreading ridge	Magnetic reversals can be measured - origin and cause not observed	The formation of the magnetic reversal bands occurred in past - process unknown	CPT did it
4. The presence of ocean ridges	Ocean ridges occur - origin and cause not observed	Ridges also occur on Iceland - but formed in past - process unknown	CPT did it
5. Correlation of liquid petroleum (i.e., oil) from Brazil and West Africa	Petroleum deposits occur - origin and cause not observed	Source rocks and petroleum deposits formed in past - process unknown	CPT did it
6. Tomographic images show hot/cold areas in the mantle	Hot/cold areas in mantle - origin and cause not observed	Hot/cold areas in mantle were formed in past - process unknown	CPT did it

us can work collectively to develop a technically sound and biblically defensible geologic history. To God be all the glory.

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4. Froede, C.R. Jr, *Geology by Design: Interpreting Rocks and Their Catastrophic Record*, Master Books, Green Forest, AR, 2007.
5. An excellent young-earth creationist literature resource, provided as a free ministry of Core Academy of Science, can be found at: www.coresci.org/celd/. The search term 'Catastrophic Plate Tectonics' (CPT) turns up nearly two dozen articles, most questioning various aspects of CPT. This website would be an excellent place to pursue further study.
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» Timothy L. Clarey replies:

Although I appreciate the comments on my Catastrophic Plate Tectonics (CPT) article,[1] I respectfully disagree with most of the conclusions of the author. This disagreement is not a battle of worldviews, as claimed, but one of data selection and selective data filtering on their part as much as anyone. There are only two worldviews, acceptance of God's Word as truth and everything else (including secular humanism). I think nearly all young-earth creationists would agree God's Word is true, the Flood was global, the earth is young (~6,000 years old), and creation occurred in a literal six-day week as described in the Bible. Since we are in agreement on the absolute truth of God's Word, this is not really a battle of worldviews. We all start with the Bible, contrary to the claim in their comment above.

Unfortunately, the comments made by the author follows the same format as most critiques of CPT, filtering out the vast majority of the data in support of plate movement and avoiding the major data sets that support CPT; instead, concentrating on relatively minor unresolved issues, and/or offering little in a viable alternative to explain the observable data.[2]

I especially take issue with what I see as a rather flippant assertion that the data sets discussed in my original paper are historical and not empirical.[1] The author's judgment that my data sets are faulty and untrustworthy surely can only have been arrived at by filtering my data through his own bias. All six types of data sets presented in my original paper are repeatable, observable, and empirical and not merely historical as this author contends. Anyone can go out and take temperature measurements of the ocean crust across the ridges and get the same pattern in support of seafloor spreading as presented in the geologic literature. Anyone can collect oil samples from offshore Brazil and West Africa and get the same chemical matches across the Atlantic Ocean. Anyone can map the ocean bathymetry and get the same results showing the presence of elevated ridge systems in every ocean. Anyone can tow a magnetometer across the ocean ridges and get a consistent and identically symmetrical reversal pattern on each side of the ridge. And anyone can collect seismic data across the ocean trenches and observe subducted ocean lithosphere extending downward into the mantle to a depth of about 700 km. These data sets are all independent of time constraints, repeatable, observable, and give consistent results again and again. How is this merely history?

The rapid plate movement rates in the past may be historical, but the present-day patterns observed in the rocks and reflecting this past movement are empirical, especially since the Flood event was not that long ago. The Flood was a historical event that happened once in the past, but much empirical evidence exists that confirms it was reality.

The so-called trump card in all this disagreement is the mantle tomography data, which plainly shows subduction of ocean lithosphere. Examination of the data shows uninterrupted and continuous ocean lithosphere at the surface, bending and extending downward into the upper mantle.[2] Similar mantle tomography data have been collected across nearly every subduction/trench system in the world. The results are always the same. How does the above author explain all of these data? By crafting a weakly

documented claim that these data are 'interpreted' images. But in reality, there is little leeway in the velocity models that produce these images. Like any seismic data, geophone receivers are spread out, a source of energy produces elastic waves that reflect and refract off differences in density and velocity in the internal earth, and the return signals are recorded and processed by computer. A well-constrained velocity model produces the images we see in the literature.[2,3]

How are tomographic results tested empirically? Firstly by repetition and secondly by plotting earthquake foci beneath the ocean trenches (the Benioff Zone). Foci clearly plot along and within the subducting slab, confirming the correct depth and angle of the lithosphere in the mantle.[2,3] A similar process is done nearly every day in the search for oil and gas. Oil wells verify that these seismic images are correctly constrained spatially and in depth. Seismic data, and tomography, is tested empirically. There is very little difference in the results even if the velocity model differs from try-to-try or place-to-place. All reasonable velocity solutions give the same result. Ocean lithosphere is clearly observed to have been subducted at trenches all over the earth.

In his comment above, the author never adequately addressed the mantle tomography nor many other data sets that fully support CPT, including providing an explanation for the unique magma chemistry observed above subduction zones and the earthquake epicentre patterns that delineate the plate boundaries.[1] These data are still best explained by seafloor spreading and plate movement as discussed previously.[1,2] As I've asked before, where is the alternative model that explains all these data?[2] Simply claiming data is not empirical is avoidance of the real issue.

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