The Flood/post-Flood boundary

Michael Oard's recent article[1] on the Flood/post-Flood boundary consists of two parts: the first is a response to my earlier paper[2] on utilizing mammalian biostratigraphy in evaluating post-Flood boundary locations, which found placement of this boundary at or near the Pliocene/Pleistocene boundary untenable; the second is a set of disparate observations placed in support of a high post-Flood boundary placed at variable locations in the 'late Cenozoic'.

Since the impetus for Oard's article was my earlier paper, I will address some of his criticisms of it, and leave the second part of his paper to the side. Oard's core objection is that the biostratigraphic methodologies I employed are flawed, since he believes that biostratigraphy and long-distance correlations are not possible. Oard further asserts such analyses are untrustworthy (even if conducted by a creationist), since the data were derived from 'evolutionary/uniformitarian' sources. The true problem, though, is that Oard's assertions about the paleontological record are based on serious misunderstandings of geological principles and practices.

The ability to correlate rocks on the basis of the fossils contained is not dependent upon evolutionary reasoning. Rather, it is based on sound recognition of similar *patterns of fossils* found in disparate locations. This is true both historically (correlation techniques preceded both uniformitarian and evolutionary concepts) and in modern practice. In my own paleontological training, my Ph.D. work[3] evaluated diversity patterns of mosasaurs (extinct marine squamates) by correlating numerous North American and European strata. Mosasaur taxa follow predictable patterns whether one is looking at fossils from Alabama, the Netherlands, or New Zealand. In nearly all cases where vertical sections of rock produce diagnostic fossils, species of *Clidastes* and *Platecarpus* are found stratigraphically below species of *Mosasaurus* and *Plioplatecarpus*. Biostratigraphic correlation is based on *data*, not evolutionary suppositions.

So, can a creationist trust the fossil occurrence data provided in the Paleobiology Database? Absolutely. The details of a fossil's discovery are empirical data, and correlation is thus based on empirical observations and sound reasoning. Rejecting these data is equivalent to rejecting raw sequence data from GenBank because the biologists entering the data are often evolutionists. We must not conflate correlations (based on empirical field observations and correlations) with either evolution or the numerical ages assigned to geologic units (which rely upon unverifiable assumptions of historical conditions). Oard's argument that the geological column may be rejected whenever convenient[4] is thus both arbitrary and unfounded.

Once correlation is recognized as a valid, empirical methodology, a myriad of additional problems and misunderstandings in Oard's critique become evident. Suffice it to say that each and every argument in his section "Why we cannot trust paleontological data" is flawed, and the quoted section title is self-defeating. After all, Oard *really does believe* that properly identified fossils exist and are found in particular rock strata. He misunderstands that these observations are the basis for the biostratigraphy he adamantly disbelieves.

Likewise, his section "Ross's Assumptions" runs aground on close examination. Oard attempts to avoid the problem of dozens of North American mammal genera and families crossing the Pliocene/Pleistocene boundary by claiming that this boundary is not where he places the end of the Flood, and instead offers the middle Pleistocene (or not; he refuses a single line in the geologic record). This does not help his cause, as *the mammal data are the same* regardless of choosing 'lower' or 'middle' Pleistocene!

Oard also claims (without data) that the North American mammals are unrepresentative of global patterns. In contrast, I predicted that other continents "would likely show similar patterns to those seen here".[5] This is confirmed by reviewing two comprehensive works on both African[6] and Australian[7] mammal fossils. Their biostratigraphic patterns also argue strongly against a high post-Flood boundary anywhere near the Pleistocene.

Oard states that I assumed Cenozoic mammal fossils reflected communities deposited with little or no transport. My paper made no *assumptions* concerning fossil provenance, but the analytical *results* favour near-source deposition. In fact, by assuming long-distance transport for Cenozoic mammal fossils, Oard makes his case for a high post-Flood boundary difficult to the point of absurdity. Now not only must members of post-Flood baramins return to the graveyards of their deceased pre-Flood kin (despite radical changes in climate and geography), they must return to these locations even though their pre-Flood kin *never lived there*.

Let's take Oard's own example of horse fossils: he argues that since horses were cosmopolitan before the Flood (*nota bene*: this argument *assumes* a high post-Flood boundary by placing pre-Pleistocene horse fossils below the boundary), it is almost certain that post-Flood horses would have walked over deposits containing their pre-Flood ancestors. Thus when fossil horses are found above other horses, all must be well.

This argument misses the trees for the forest, being that it is too broad-viewed and disconnected from specific paleontological data. North America has a certain subset of fossil horses, reflecting particular genera and species. The fossil horses above a high post-Flood boundary are in fact most similar to pre-boundary North American horses, and not most similar to other taxa from Europe, Asia, or Africa. Case in point: fossils of *Equus simplicidens* and *Equus quagga*

are endemic to North America and Africa, respectively, and both cross the Pliocene/Pleistocene boundary on those continents.[8,9] Oard's high post-Flood boundary requires each of these horse species to be taken aboard the Ark (since each are found on both sides of his boundary, and redevelopment of the same species is improbable), and each would entail an incredible return to their Flood-destroyed, most-similar kin's long-transported burial locations on different continents, *and to nowhere else on earth*. This would be repeated in hundreds to thousands of additional cases on every continent! Such data points *away* from a high post-Flood boundary, not towards one.

My final point is this: creationists, like other scientists, must first understand what the data actually are, and the patterns of those data. Only once the patterns are understood can we engage in hypotheses about how the patterns came to be. In his critique, Oard constantly argues backwards: that certain patterns are not possible because they do not fit his favoured hypotheses. These data are no doubt challenging to us all, but a robust young-earth creationism cannot evict empirical data simply because they are challenging.

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8. See Janice, C.M., Scott, M. and Jacobs, L.L. (Eds.), Evolution of Tertiary mammals of North America, Volume 1: terrestrial carnivores, ungulates, and ungulatelike mammals, University of California Press, Berkeley, CA, 1998; or query "*Equus simplicidens*" at www.pbdb.org.
9. See Werdelin *et al*., ref. 6; or query "*Equus quagga*" at www.pbdb.org.

» Michael Oard replies:

I thank Marcus Ross for his stimulating discussion of my article favouring a late Flood/post-Flood boundary, assuming the geological column. I believe open discussion is what is needed to help resolve a number of controversial issues within Flood geology. Although creationists possess the big picture that the Flood laid down the majority of the sedimentary rocks and the fossils, we indeed have much challenging data to explain. We must always seek to understand the real data and be careful of interpretations and assumptions. We also need to make sure that we possess all the data, which, in the case of paleontology, we do not. We are missing data, new finds are made all the time, fossils are readjusted to different ages, new names are given to the same or similar fossils if found in the wrong age, fossils that do not fit the scheme are eliminated by various means, etc.

In the quest to locate the Flood/post-Flood boundary, we need to analyze *all* the data. I have looked at most of the issues, while Ross has chosen to emphasize mainly the paleontological data. Since I am much more familiar with the geological data, I present table 1 as a new summary of thirty-two geological evidences that the Flood/post-Flood boundary is in the 'late Cenozoic', which can vary from the Miocene to the mid Pleistocene, although I find most evidence favours the very late Cenozoic. Several of these evidences have been published in depth in the creationist technical literature.[1–5] Taken together, they seem like insurmountable evidence that the boundary is late in the rock record.

The fossil challenges

I have space to briefly address some of Ross's fossil challenges. Ross thinks that a creationist using the Paleobiological Database will have a major interpretive advantage. However, it doesn't matter if the work is done by a creationist or an atheist. What matters are the assumptions and methods brought to the table.

Ross next states, "The ability to correlate rocks on the basis of the fossils contained is not dependent upon evolutionary reasoning." This is surprising, since I am constantly reading about the placing of fossils by their 'stage of evolution'. For instance, just recently I read the following:

> "Most biostratigraphic sequences in Patagonia and elsewhere in South America have been based on the evolutionary stage and taxonomic representation of 'ungulates' (archaic endemic herbivores or southern ungulates) and/or marsupials."[6]

Ross goes on to state, "correlation techniques preceded both uniformitarian and evolutionary concepts". This is untrue; uniformitarianism has been an axiom since the late 1700s.[7,8] Moreover, fossil correlation before 1859 was done by 'faunal succession', an evolutionary idea.

Ross then states that disbelieving the Paleobiology Database is like disbelieving the data from GenBank because they were done by evolutionists. The analogy does not apply since it is comparing apples to oranges.

Ross brings up his main empirical point that there is a problem of dozens of North American mammal genera and families crossing the Pliocene/Pleistocene boundary, which I do not believe is the Flood/post-Flood boundary in many cases. However, I cannot fully address the argument because it involves a huge amount of knowledge about fossils that is not available. One example is the pronghorn, found as fossils in the western US (the main Cenozoic fossil area in North America). It is not

Table 1. Summary of evidences for a late Cenozoic Flood/post-Flood boundary and rated as either strong, moderate, or weak, based on whether I think that those who believe in post-Flood catastrophism can explain them.

Evidences	Strength
1. Huge volume of Cenozoic sedimentary rocks	strong
2. Deposition of widespread or thick Cenozoic precipitates	strong
3. Tremendous Cenozoic continental margin rocks	strong
4. Thick, pure Cenozoic coal seams	strong
5. Cenozoic amber	strong
6. Lack of mammals buried in the Flood but millions afterwards	strong
7. Huge Cenozoic vertical tectonics	strong
8. Huge Cenozoic erosion of the continents	strong
9. Widespread Cenozoic planation surfaces	strong
10. Long-distance transportation of hard rocks during the Cenozoic	strong
11. Cenozoic deep valleys	strong
12. Cenozoic water and wind gaps	strong
13. Cenozoic mid- and high-latitude warm-climate fossils	strong
14. Cenozoic volcanic winter	strong
15. Cenozoic accelerated radiometric decay	strong
16. Cenozoic Middle East geology	strong
17. Oil and natural gas formed during the Cenozoic	strong
18. Thin, widespread Cenozoic sedimentary layers	moderate
19. Consolidated Cenozoic sedimentary rocks	moderate
20. Formation of Cenozoic carbonates	moderate
21. Cenozoic mineralized fossils	moderate
22. Large, pure micro-organism layers during the Cenozoic	moderate
23. Cenozoic fossil order and massive, numerous extinctions	moderate
24. Tremendous horizontal plate movement Cenozoic	moderate
25. Cenozoic ophiolites	moderate
26. Cenozoic ultrahigh-pressure minerals	moderate
27. Erosional escarpments formed during the Cenozoic	moderate
28. Cenozoic pediments	moderate
29. Cenozoic submarine canyons	moderate
30. Cenozoic phosphorites and high phosphate sedimentary rocks	weak
31. Cenozoic metamorphic core complexes	weak
32. Cenozoic meteorite or comet impacts	weak

unusual for pronghorns spreading across the Bering Land Bridge during the Ice Age to walk on the strata containing their dead ancestors from the Flood. However, pronghorns likely ranged much wider than the western US during the Ice Age. Furthermore, there is a claim of finding a pronghorn fossil in Japan, very far from where they exist today.[9] There has been some confusion as to whether the specimen is a deer or a pronghorn.

Ross takes issue with my example of horses, saying that we need to consider the species and generic level differences from various areas. However, this gets into the problem of the definition of a species, made especially difficult if we are talking only about fossils. As two of each kind spread away from the Ark, genes for a great variety of horses likely spread all over the earth. I would expect to see a lot of similar horse fossils below and above the Flood/post-Flood boundary and on all continents.

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