A new magnetic field theory and Flood model—part 2

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The new model of a cool interior of the earth prior to the Flood and subsequent melting due to accelerated decay (part 1) is further developed by exploring how it explains pre-Flood, fossilized coral evidence for a faster rotation of the earth before the Flood. Then some additional evidence from the solar system is discussed. Next, this model is compared with a prominent, and in many ways successful, Flood model—Catastrophic Plate Tectonics. Some corollaries are noted and finally some potential weaknesses are discussed.

As proposed and defended in the first paper, a protective, permanently magnetized, cool iron core existed which retained its strength throughout the pre-Flood era. Due to accelerated radioactive decay during the Flood, the mantle was rapidly heated and rapid mantle convection drove a rapid plate tectonic episode that resulted in massive global rain and the oceans completely covering the continents. However, after the Flood the core slowly heated up and melted due to the massive amount of heat generated by accelerated radioactive decay.

Independent evidence to test this model

One way to test this model would be to determine whether or not the earth increased in volume because of the expansion of its materials as they heated up and became less dense. If the earth expanded, it would have slowed down due to the conservation of angular momentum. If Earth's pre-Flood rotational velocity could be determined independently, then it could be compared with what this model predicts it should have been if the earth was cool before the Flood. Interestingly, fossilized corals that grew before the Flood have been interpreted to indicate that there may have been 400 ±15 days per solar year,[1] or an individual day length of about 22 hours. Is this in line with what this model predicts?

To find out how fast the earth would have spun, the follow equation can be used:

$$I_{present} \text{ x } \omega_{present} = I_{initial} \text{ x } \omega_{initial}$$

But to solve for $\omega_{initial}$, the other three components of this equation must be known.

$\omega_{present}$ is simply *365.25 rotations/year*

To calculate the approximate value of $I_{present}$, the earth can be understood as consisting of four different regions (inner core, outer core, inner mantle, and outer mantle), each with its own moment of inertia. These moments of inertia can be determined and then summed as follows:

- $I_{present} = I_{i.core.p} + I_{o.core.p} + I_{i.mantle.p} + I_{o.mantle.p}$

- $I_{i.core.p} = 2/5 \text{ x } R_{i.core.p}{}^2 \text{ x } (V_{i.core.p} \text{ x } \rho_{i.core.p})$
- $R_{i.core.p}$ is the present radius of the inner core: 1,200 km
- $V_{i.core.p}$ is the present volume of the inner core: $4\pi/3$ x $1{,}200^3$ km = 7.24 x 10^9 km^3
- $\rho_{i.core.p}$ is the present density of the inner core: 1.3 x 10^{13} kg/km^3

- $I_{i.core.p}$ = 2/5 x (1,200 km)^2 x (7.24 x 10^9 km^3 x 1.3 x 10^{13} kg/km^3) = <u>5.4 x 10^{28} kg km^2</u>

- $I_{o.core.p} = 2/5 \text{ x } \rho_{o.core.p} \text{ x } 4\pi/3 \text{ x } (R_{o.core.p}{}^5 - R_{i.core.p}{}^5)$
- $R_{o.core.p}$ is the present outer radius of the outer core: 3,600 km
- $R_{i.core.p}$ is the present radius of the inner core: 1,200 km
- $\rho_{o.core.p}$ is the present density of the outer core: 1.1 x 10^{13} kg/km^3
- Incidentally, the present volume of the outer core: $V_{o.core.p}$ = $4\pi/3$ x (3,600 km^3 – 1,200 km^3) = 1.88 x 10^{11} km^3

- $I_{o.core.p}$ = 2/5 x 1.1 x 10^{13} kg/km^3 x $4\pi/3$ x (3,600km^5 – 1,200km^5) = <u>1.1 x 10^{31} kg km^2</u>

- $I_{i.mantle.p} = 2/5 \text{ x } \rho_{i.mantle.p} \text{ x } 4\pi/3 \text{ x } (R_{i.mantle.p}{}^5 - R_{o.core.p}{}^5)$
- $R_{i.mantle.p}$ is the present outer radius of the inner mantle: 5,720 km
- $R_{o.core.p}$ is the present outer radius of the outer core: 3,600 km
- $\rho_{i.mantle.p}$ is the present density of the inner mantle: 4.7 x 10^{12} kg/km^3
- Incidentally, the present volume of the inner mantle: $V_{i.mantle.p}$ = $4\pi/3$ x (5,720 km^3 – 3,600 km^3) = 5.89 x 10^{11} km^3

- $I_{i.mantle.p}$ = 2/5 x 4.7 x 10^{12} kg/km^3 x $4\pi/3$ x (5,720 km^5 – 3,600 km^5) = <u>4.3 x 10^{31} kg km^2</u>

- $I_{o.mantle.p} = 2/5 \text{ x } \rho_{o.mantle.p} \text{ x } 4\pi/3 \text{ x } (R_{o.mantle.p}{}^5 - R_{i.mantle.p}{}^5)$
- $R_{o.mantle.p}$ is the present outer radius of the outer mantle: 6,380 km

- $R_{i.mantle.p}$ is the present outer radius of the inner mantle: 5,720 km
- $\rho_{o.mantle.p}$ is the present density of the outer mantle: 3.5×10^{12} kg/km^3
- Incidentally, the present volume of the inner mantle: $V_{i.mantle.p} = 4\pi/3 \times (6{,}380 \text{ km}^3 - 5{,}720 \text{ km}^3) = 3.04 \times 10^{11}$ km^3

- $I_{i.mantle.p} = 2/5 \times 3.5 \times 10^{12} \text{ kg/km}^3 \times 4\pi/3 \times (6{,}380 \text{ km}^5 - 5{,}720 \text{ km}^5) = \underline{2.6 \times 10^{31} \text{ kg km}^2}$

So the total present moment of inertia of the earth is about:

- $I_{i.core.p} + I_{o.core.p} + I_{i.mantle.p} + I_{o.mantle.p} = I_{present}$ or $5.4 \times 10^{28} \text{ kg km}^2 + 1.1 \times 10^{31} \text{ kg km}^2 + 4.3 \times 10^{31} \text{ kg km}^2 + 2.6 \times 10^{31} \text{ kg km}^2 = \mathit{8.0 \times 10^{31} \text{ kg km}^2}$

This agrees closely with a value for Earth's present moment of inertia calculated previously.[2] Now the initial, pre-Flood moment of inertia of the earth must be calculated. The following formula will be used:

- $I_{initial} = I_{i.core.i} + I_{o.core.i} + I_{mantle.i}$

As it turns out, the inner core doesn't have much bearing on Earth's moment of inertia, and in any case, this model is consistent with the inner core still being cool, so the pre-Flood moment of inertia of the inner core will be assumed to be the same as now: *5.4 x 10[28] kg km[2]*.

However, this model proposes that the outer core has heated up and thus expanded significantly, so the initial outer core was smaller, with a commensurately smaller moment of inertia.

- $I_{o.core.i} = 2/5 \times \rho_{o.core.i} \times 4\pi/3 \times (R_{o.core.i}^5 - R_{i.core.i}^5)$

The initial inner core radius, $R_{i.core.i}$, is assumed to be the same as the present radius: 1,200 km.

However, to arrive at the initial density and initial outer core radius, it is necessary to first determine the initial volume (the mass will remain constant).

- $V_{o.core.i} = V_{o.core.p} \times (1 + \beta_{o.core} \times (T_i - T_p))$
- $V_{o.core.p}$ is the initial volume of the outer core: 1.88×10^{11} km^3
- $\beta_{o.core}$ is the coefficient of thermal expansion of the outer core: 7.5×10^{-5} km^3/km^3/K
- T_p is the present temperature: 4,500 K
- T_i is the proposed initial temperature: 500 K

- $V_{o.core.i} = 1.88 \times 10^{11} \text{ km}^3 \times (1 + 0.5 \times 10^{-5} \text{ km}^3/\text{km}^3/\text{K} \times (500 \text{ K} - 4{,}500 \text{ K}) = 1.32 \times 10^{11} \text{ km}^3$
- $\rho_{o.core.i} = (\rho_{o.core.p} \times V_{o.core.p}) / V_{o.core.i}$

- $\rho_{o.core.i} = (1.1 \times 10^{13} \text{ kg/km}^3 \times 1.88 \times 10^{11} \text{ km}^3) / 1.32 \times 10^{11} \text{ km}^3 = 1.57 \times 10^{13} \text{ kg/km}^3$

Also, with a different volume, the outer core will have a different initial radius:

- $R_{o.core.i} = ((V_{o.core.i} + 4\pi/3 \times R_{i.core.i}^3)/(4\pi/3))^{1/3} = ((1.32 \times 10^{11} \text{ km}^3 + 4\pi/3 \times 1200^3)/(4\pi/3))^{1/3} = 3{,}213$ km

Now the calculation for the outer core's moment of inertia can be completed:

- $I_{o.core.i} = 2/5 \times 1.57 \times 10^{13} \text{ kg/km}^3 \times 4\pi/3 \times (3{,}213 \text{ km}^5 - 1{,}200 \text{ km}^5) = \mathit{8.95 \times 10^{30} \text{ kg km}^2}$

Similar yet somewhat distinct calculations must be performed for the initial mantle, since this model assumes it was largely undifferentiated. The calculation of the moment of inertia remains the same:

- $I_{mantle.i} = 2/5 \times \rho_{mantle.i} \times 4\pi/3 \times (R_{mantle.i}^5 - R_{o.core.i}^5)$

However, the density must be calculated directly, and then the volume can be backed out, since the mass of the mantle was (very nearly) constant. The initial density of the cold mantle is the average density of the present inner and outer mantles, but with a coefficient of expansion used to factor in its previously smaller size:

- $\rho_{mantle.i} = ((\text{Mass}_{i.mantle.p} + \text{Mass}_{o.mantle.p}) / (V_{i.mantle.p} + V_{o.mantle.p})) / (1 + \beta_{mantle} \times (Ti - Tp))$
- $\rho_{mantle.i} = ((2.76 \times 10^{24} \text{ kg} + 1.06 \times 10^{24} \text{ kg}) / (5.89 \times 10^{11} \text{ km}^3 + 3.04 \times 10^{11} \text{ km}^3)) / (1 + 3 \times 10^{-5} \times (500 \text{ K} - 3{,}000 \text{ K})) = 4.63 \times 10^{12} \text{ kg/km}^3$

To calculate the initial mantle's radius, the volume must first be calculated:

- $V_{mantle.i} = (\text{Mass}_{i.mantle.p} + \text{Mass}_{o.mantle.p}) / \rho_{mantle.i}$
- $V_{mantle.i} = ((2.76 \times 10^{24} \text{ kg} + 1.06 \times 10^{24} \text{ kg})) / 4.63 \times 10^{12} \text{ kg/km}^3 = 8.25 \times 10^{11} \text{ km}^3$

Now to calculate the radius of the initial mantle, from Earth's centre:

- $R_{mantle.i} = ((V_{mantle.i} + 4\pi/3 \times R_{o.core.i}^3)/(4\pi/3))^{1/3}$
- $R_{mantle.i} = ((8.25 \times 10^{11} \text{ km}^3 + 4\pi/3 \times 3{,}213^3)/(4\pi/3))^{1/3} = 6{,}128$ km

Now the calculation for the initial mantle's moment of inertia can be completed:

- $I_{mantle.i} = 2/5 \times 4.63 \times 10^{12} \text{ kg/km}^3 \times 4\pi/3 \times (6{,}128 \text{km}^5 - 3{,}213 \text{km}^5) = \underline{6.44 \times 10^{31} \text{ kg km}^2}$

Finally, the total initial moment of inertia for the earth can be found:

- $I_{initial} = I_{i.core.i} + I_{o.core.i} + I_{mantle.i}$
- $I_{initial} = 5.4 \times 10^{28}$ kg km^2 + 8.95×10^{30} kg km^2 + 6.44×10^{31} kg km^2 = *7.34×10^{31} kg km^2*

And now at last the initial rotational velocity can be computed:

- $I_{present} \times \omega_{present} = I_{initial} \times \omega_{initial}$
- $\omega_{initial} = I_{present} \times \omega_{present} / I_{initial}$
- $\omega_{initial} = 8.0 \times 10^{31}$ kg km^2 x 365.25 days/year / 7.34×10^{31} kg km^2 = 398 days/year

In sum, calculations indicate that as a result of heating, Earth's volume would have increased from about 9.63×10^{11} km^3 to its current volume of 1.09×10^{12} km^3. Its radius would have increased from about 6,128 km to the current size of 6,378 km. In the process, Earth's rotation would have actually slowed down, because its mass would, on average, have been located farther away from its centre. Thus, for angular momentum to be conserved, Earth's rotation would have had to slow down from about 398 days/year to the current 365.25 days/year as a result of this heating. So fossilized pre-Flood corals, which imply a pre-Flood year length of 400 ± 15 days, provide an independent confirmation of this model (see figure 1).

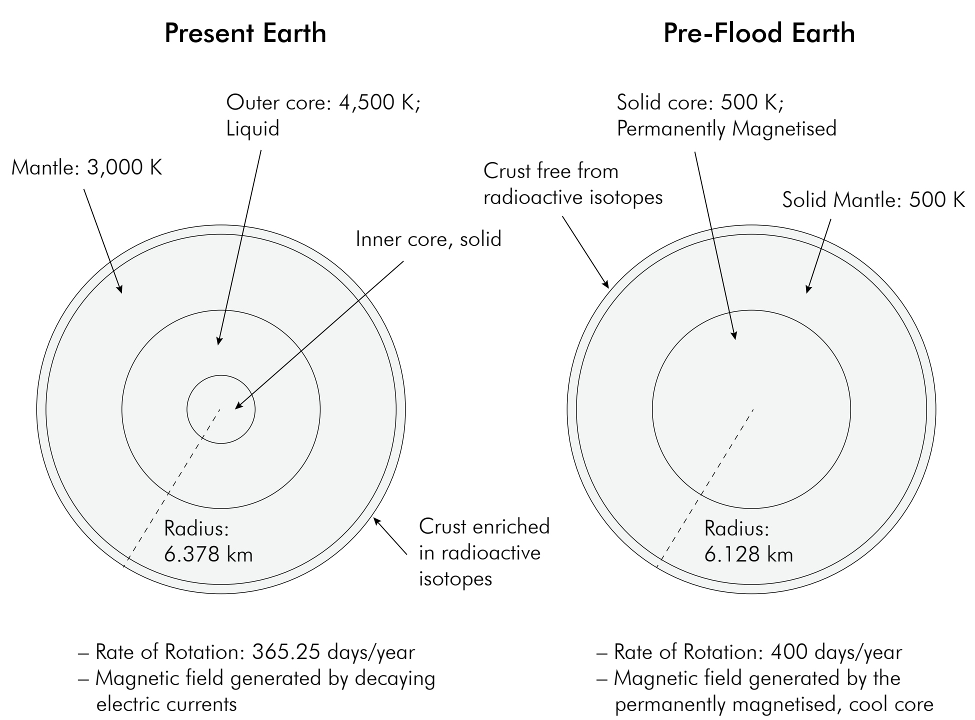

Figure 1. Comparison of present and pre-Flood Earth. This model proposes that prior to the Flood the earth was smaller due to a cooler interior, which allowed it to rotate faster.

Additional phenomena in the solar system that support this model

Earth's moon seems to have experienced a similar episode of accelerated radioactive decay. Although this event did not cause the same crustal movements that it caused on Earth, it may be responsible for the episode of massive volcanism that formed the lunar maria. These maria appear, in many respects, very similar to the large flood basalts that were formed on Earth during the Flood. Indeed, it should not be seen as a coincidence that these lunar maria are composed of minerals with relatively high concentrations of radioactive isotopes such as potassium, uranium, and thorium. Instead it seems reasonable to conclude that it would take something like accelerated radioactive decay to produce such massive volcanic lava flows, which covered about 16% of the moon's surface, in what appears to have been one event. Accelerated decay probably produced a large pocket of molten material on the moon, with the hottest (and least chemically compatible) materials floating to the top and progressively melting the overlying rock until it erupted onto the surface in several enormous explosions, which formed giant craters. And if accelerated decay could have concentrated so much radioactive material and brought it to the surface of the moon, then it seems reasonable to conclude that a similar amount of accelerated decay would have likewise brought radioactive materials up from Earth's mantle to the crust.

There is at least some evidence of accelerated radioactive decay in the recent past elsewhere in the solar system; it certainly could help explain phenomena such as the recent formation of the rings of Saturn,[3] the excessive heat radiating out of the gas giant planets,[4] and especially the apparent recent volcanic resurfacing of the entire planet of Venus.[5] Accelerated radioactive decay may even help explain some of the geological features on Mars, including its large volcanoes, and if all Martian volcanism occurred during the relatively short period of time of the Flood year, then the water outgassed by those volcanoes may have had time to extensively erode the surface before dissipating.[6]

Comparison to another prominent model

A recent article summarized the powerful and well-thought-out Catastrophic Plate Tectonics (CPT) model.[7] This model has greatly advanced the state of Flood geology and has many very positive features. Indeed, many aspects of this alternate model have been based on their pioneering work. As good as it is, however, there are a number of issues that need to be considered with their proposed model:

1. The model that these authors propose has no physical solution to the heat problem associated with radioactive decay. This is quite a significant problem. However, this proposed model does have a solution; the earth's pre-Flood temperature was relatively cool throughout until the accelerated decay event began and the heat went primarily to warming the earth to its current temperature.
2. Their model puts the bulk of accelerated decay in Days 2 and/or 3 of creation, prior to the creation of the moon on Day 4. But based on samples recovered by NASA, it seems as though the same amount of decay has taken place on the moon as on Earth (~4.5 billion years at current rates). This is a significant problem for their model, yet it is rarely mentioned. The model proposed herein avoids this problem and assumes that virtually all the decay seen in the solar system is associated with the Flood event.
3. Their model provides no mechanism for the continents to stop and change direction during the Flood event, as is necessary if more than one Wilson (supercontinent) cycle occurred, as the geologic record implies.[8] Many geologists believe that either 3 or 4 different super-continent arrangements have existed in the past. However, the model presented herein proposes that the primary mechanism causing plate tectonics is mantle convection driven by heat from accelerated nuclear decay. This heat would tend to build up more underneath supercontinents until the underlying hot, less-dense magma began pushing the continents rapidly apart, only to form another supercontinent on roughly the opposite side of the globe, in a different configuration. So not only does this model allow for the continents travelling in different directions at different times during the Flood, it also provides a mechanism for Wilson supercontinent cycles.
4. Their model puts the bulk of radioactive decay during Days 2 or 3 of the Creation Week and places these radioactive materials at, or near, the surface, where they would have caused nearly the same large amounts of background radiation that we see today, which would likely have prevented the long lifespans of the pre-Flood patriarchs. These near-surface radioactive materials would also be fatal during a later period of accelerated decay like the Flood. In addition, there again is no way, using known physical laws, to account for the heat that such an event would produce *in the crust* (neither during Creation nor the Flood), which could have melted the crust many times over, and furthermore seems to be inconsistent with the creation of a very good world ideally suited for eternal human life prior to the Fall.
5. Also, these authors are using a model of the earth's magnetic field that begins decaying before Adam and Eve sinned and before the Flood, and would have decayed even in the hypothetical situation where Adam and Eve would not have sinned. A permanently magnetized core that began melting during the Flood and had induced electrical currents to generate magnetic 'reversals', as proposed in this model, avoids this problem altogether (see figure 2[9] and figure 3).
6. Their model requires the earth's mantle to have had a lower viscosity during the Flood than it does now. The simplest explanation for a lower mantle viscosity is a higher mantle temperature. The model herein proposed

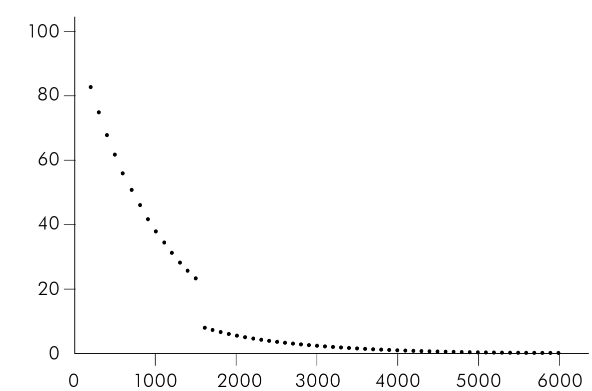

Figure 2. Magnetic field generated by decaying electric currents in the earth's core. Although plausible, this magnetic field model has God creating a 'very good' world which was rapidly losing its protective magnetic field. (Data from Humphreys ref. 9)

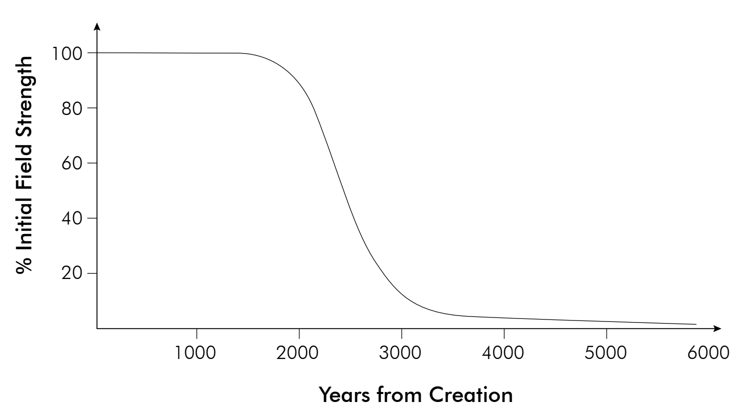

Figure 3. Proposed magnetic field generated by permanently magnetized core. The magnetic field model proposed in conjunction with this model, has Earth's pre-Flood magnetic field remaining strong indefinitely until the core was heated beyond the Curie point of iron by the accelerated decay of radioactive isotopes during the Flood.

accounts for this, since at the beginning of the accelerated decay event, much of the radioactive material now concentrated in the crust existed in the mantle, and thus would have heated it to approximately 50% higher than its current temperature, and thus lowered its viscosity. The two mechanisms in this proposed model for cooling the mantle to its current temperature are (1) cooling at the crust, especially at the ocean basins, where mantle materials were exposed to ocean water directly (likely less significant), and (2) cooling at the core, which was being heated and melted by the mantle, which was convecting and cooling above it (likely more significant). As the mantle cooled, it became more viscous, and seismic events like earthquakes and volcanoes would have tapered off after the Flood.

Notable corollaries to this proposed model

1. This model assumes the pre-Flood existence of sialic continents and an iron core, but it allows for some additional separation of the earth's composition based on density, as lower-density materials could have floated to the mantle/crust boundary and become emplaced primarily at or near the bottom of the continental cratons in the later stages of the Flood. These lighter materials would have contributed to the vertical raising of the continents to help end the Flood, and would also help explain why the continents seem to have been so much lower during much of the Flood; they were, prior to the emplacement of these materials. As these materials separated based on density, some additional heat energy would have been generated, contributing to the increase of temperature within the mantle.
2. This view also provides a source of meteorites for the small number of craters that have the multiple concentric ring structure that seems to be characteristic of actual meteorite impacts; the steam explosions would likely have caused massive chunks of debris to be ejected, only later to crash back into the surface somewhere else. It is interesting to note that, in the evolutionary timescale, their proposed 'Late Heavy Bombardment' causing major crater formation corresponds closely with the (geologically) first fossils on Earth. In the model herein proposed, the formation of these craters should correlate well with the initiation of major sedimentation of the Flood, since they are both due to the same underlying cause—accelerated radioactive decay. Also, the bulk of the radioactive materials found at the moon's surface are found within the 'KREEP' of the lunar maria and are usually associated with the largest craters, indicating that these features were likely formed in a massive volcanic episode driven by accelerated radioactive decay.
3. This model does not require all of the accelerated decay and melting of the mantle, etc. to occur during the relatively short window of the year-long Flood. Instead, much of the work of mantle heating and separation could have occurred months or years before the breakup and rapid movement of the continental plates. It would not have been until such a 'catastrophic plate tectonic' event began that there would be any noticeable effects at the earth's surface (such as massive rain or flooding), which at that time was essentially devoid of all radioactive isotopes (according to this model). Indeed, this is consistent with why most of the igneous rock groups on Earth have conventional radioactive dates younger than meteorites or the moon; most terrestrial igneous rocks didn't begin forming until after a significant amount of decay had already occurred.

A few weaknesses of this model

Although this model does a good job explaining many previously inexplicable phenomena from within a recent creation and global Flood framework, there are a few apparent difficulties with it. For one, it is hard to understand how radioactive elements that were previously embedded deep within the mantle could become concentrated in the crust during the course of the Flood event; wouldn't such segregation take a much longer time than a year?

Several things could be said to partially answer this objection. First, creationists have consistently shown how during the Flood event there were massive geological changes taking place in a very short period of time that are generally assumed to take much longer. Examples of this include 1) catastrophic plate tectonics, 2) the miles-thick layers of sedimentary rock all over the world, and 3) carving a mile-deep canyon (like the Grand Canyon) for hundreds of miles thorough that freshly laid sediment. Just as each of these previously problematic phenomena have been adequately explained within the context of the Flood and its aftermath, there is at least the possibility that there could have been significant mantle separation during the Flood event, even if it is now difficult to conceive exactly how on such a large scale. Also, if the continents did move around extensively during the Flood,[10] forming a number of different supercontinents and breaking up again, then that suggests that the mantle of the earth likely overturned completely multiple times. So it is reasonable to infer that there was a lot of dynamic activity in the mantle during the Flood, which could very well have included the concentration of radioactive elements in the crust, via two well-known mechanisms previously discussed. First, portions of the mantle containing more radioactive materials would have been hotter and less dense, and thus would have tended to rise to the mantle's surface and become incorporated into the crust. Second, chemically incompatible elements (including most radioactive isotopes) would have concentrated in the crust as convection currents repeatedly overturned the mantle materials. So radioactive materials could have been concentrated both because of their lower density and their chemical incompatibility.

Recent radiohalo research also suggests that Flood-related granites can cool very quickly—in about a week, so neither the

Table 1. Representative calculations for a simple one-dimensional core heat flow analysis for the proposed model. This heat flow analysis assumes that *radiative* heat transfer from the overlying mantle is enough to keep the surface of the core at ~5000 K.

		Depth (m):										
Day	Year	0	10	20	30	40	50	60	70	80	90	100
0	0	5000	500	500	500	500	500	500	500	500	500	500
1	0	5000	631.741	500	500	500	500	500	500	500	500	500
2	0	5000	759.625	503.857	500	500	500	500	500	500	500	500
3	0	5000	883.765	511.345	500.113	500	500	500	500	500	500	500
4	0	5000	1004.271	522.247	500.442	500.003	500	500	500	500	500	500
5	0	5000	1121.249	536.359	501.080	500.016	500.000	500	500	500	500	500
6	0	5000	1234.802	553.482	502.113	500.047	500.001	500.000	500	500	500	500
7	0	5000	1345.031	573.428	503.617	500.108	500.002	500.000	500.000	500	500	500
8	0	5000	1452.033	596.017	505.661	500.210	500.005	500.000	500.000	500.000	500	500
9	0	5000	1555.902	621.078	508.306	500.370	500.011	500.000	500.000	500.000	500.000	500
10	0	5000	1656.730	648.446	511.607	500.602	500.022	500.001	500.000	500.000	500.000	500
11	0	5000	1754.607	677.964	515.613	500.925	500.039	500.001	500.000	500.000	500.000	500
12	0	5000	1849.618	709.483	520.366	501.355	500.064	500.002	500.000	500.000	500.000	500.000
13	0	5000	1941.848	742.862	525.903	501.911	500.102	500.004	500.000	500.000	500.000	500.000
14	0	5000	2031.378	777.963	532.254	502.614	500.155	500.007	500.000	500.000	500.000	500.000
15	0	5000	2118.286	814.658	539.448	503.481	500.227	500.011	500.000	500.000	500.000	500.000
16	0	5000	2202.651	852.822	547.505	504.534	500.322	500.018	500.001	500.000	500.000	500.000
17	0	5000	3908.785	892.339	556.443	505.792	500.446	500.027	500.001	500.000	500.000	500.000
18	0	5000	4574.329	980.648	566.277	507.275	500.602	500.039	500.002	500.000	500.000	500.000
19	0.1	5000	4833.950	1085.856	578.408	509.002	500.798	500.055	500.003	500.000	500.000	500.000
20	0.1	5000	4935.226	1195.584	593.264	511.034	501.038	500.077	500.005	500.000	500.000	500.000
21	0.1	5000	4974.732	1305.065	610.897	513.442	501.330	500.105	500.007	500.000	500.000	500.000
22	0.1	5000	4990.143	1412.497	631.219	516.295	501.685	500.141	500.010	500.001	500.000	500.000

Constants used in the calculation:		
2,500	*Convective* heat transfer coefficient (W/m*K)	If the core is solid, the formula used is:
120	*Conductive* heat transfer coefficent (W/m*K)	Tf = Ti + 120 W/mK * 1m² * dT * 86,400 s/day / (10 m * 78,700 kg * 450 J/kgK)
7,870	Core density (kg/m³)	
10	Volume of each element (m³): 1m² x 10m deep	If the core is liquid, the formula used is:
78,700	Mass of each element (kg)	Tf = Ti + 2,500 W/mK * 1m² * dT * 86,400 s/day / (10 m * 78,700 kg * 450 J/kgK)
450	Specific Heat of Iron (J/kg*K)	

emplacement of these radioactively 'enriched' rocks nor their cooling should be a problem.[11] Furthermore, other creationist models such as CPT assume that chemical fractionation of the entire earth took place much more quickly than this model—in just a day or two during the Creation Week; this model posits a chemical fractionation that is at least more consistent with known physical laws. Finally, any model that *does not* place the bulk of radioactive isotopes fairly deep in the earth potentially runs into the problem of accelerated decay of Potassium-40 within creatures living during the Flood, causing massive radiation damage if not death.

Another difficultly with this model is that there may be some conflicts between it and some archaeomagnetic data that has been collected. In particular, some data collected by secular scientists does not seem to indicate a substantially stronger magnetic field in the early post-Flood era, according to data cited by Humphreys.[12] However, again a few things could be said. First of all, since this archaeomagnetic data was dated by ^{14}C dating, these dates need to be corrected to conform them to actual physical conditions after the Flood, as indicated by Humphreys. The magnetic field model proposed herein suggests that ^{14}C levels rose after the Flood much more slowly than Humphreys assumed, which in turn suggests that the artifacts analyzed are significantly younger than he assumed. Also, there are known phenomena that reduce the magnetization of magnetic materials such as those studied to obtain the estimated historical magnetic field strength. These phenomena are fairly common in nature, including radiation (such as from accelerated decay), intense jarring (such as from earthquakes), and being in the presence of alternating magnetic fields (such as Earth's magnetic field reversals). Indeed, the oldest portions of the seafloor seem to have lost their residual magnetic striping, probably due to a number of these factors that were significant, especially during the

Flood. So just because certain archeological artifacts appear to indicate a weaker field than could otherwise be expected by this model, it does not mean that they are the final authority on the question. Further research and modelling are needed.

Finally, one must wonder how long it would take to heat and melt Earth's enormous core; could that much heat transfer have taken place since the Flood? If thermal conduction was the only mode of heat transfer, then the answer would be 'no'. However, it is likely that heat transfer via radiation and convection also played significant roles. Specifically, new research has concluded that at the high temperatures and pressures characteristic of the lower mantle, certain mantle materials undergo a phase change from high-spin to low-spin state. The latter is much more transparent to infrared radiation, which would increase its radiative thermal conductivity.[13] So, during and after the Flood, the surface of the outer core would be subject to rapid and continual radiant heating. Also, once the outermost portion of the core melted, then this heat could readily have been transferred deeper into the core via convection, driven by electromagnetically induced fluid currents or other mechanisms. I have performed crude preliminary computer modeling, taking these two factors into consideration, and it suggests that the core may have melted at a rate of 2 km/year or more after the Flood; roughly what would be needed to heat the outer core to its current temperatures (see table 1). If Potassium-40 or other radioactive isotopes were incorporated into the outer core during the accelerated decay episode of the Flood, that could also be a source of heat to help heat and melt the core more quickly. More research in this area would also be helpful.

Conclusion

Corals fossilized by the Flood, which record ~400 day-long years, are consistent with this model of a pre-Flood, cool Earth interior which was dramatically heated during the Flood, thereby expanding the earth and slowing its rotation. Also, before the Flood the earth's magnetic field was much stronger, and yet its strength was also constant, before the Flood (not freely decaying and thus not due to decaying electric currents in the core). The most likely source of such a field is an enormous permanent magnet—the entire iron core of the earth. But for the core to be able to hold a permanent magnetization, it would have had to have been solid and cool—below its Curie temperature. If the core was that cool, then likely the entire Earth was also that cool. During the Flood, rapid radioactive decay unleashed enormous amounts of heat energy, heating the mantle quickly and driving rapid mantle convection while beginning the process of melting the solid iron core. As this melting process continued, the magnetic field weakened in a sigmoid fashion—initially only slowly, then rapidly and then slowing again. This allowed progressively more cosmic radiation to hit the earth and helped in shortening human lifespans after the Flood, as recorded in the Bible.

Although this model needs further testing and research, it is an attempt to improve on the current state of the Creation model. This model answers many of the objections to existing Flood models made by unbelieving skeptics who claim that the Bible is unreliable or scientifically inaccurate, or that a global flood is impossible, or that a biblical worldview is incapable of providing any testable scientific hypotheses. However, even a good model is like heaven and earth, which pass away, whereas God's Word remains forever (Matthew 24:35).

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