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Corroborating Massive Solar Eruptions Causing Catastrophism on Earth

Corroborating Robert Johnson's Model for Providing Energy to Cause Tectonic Uplift Processes through Thermal Expansion and Phase Change of Rocks

by Douglas B. Ettinger

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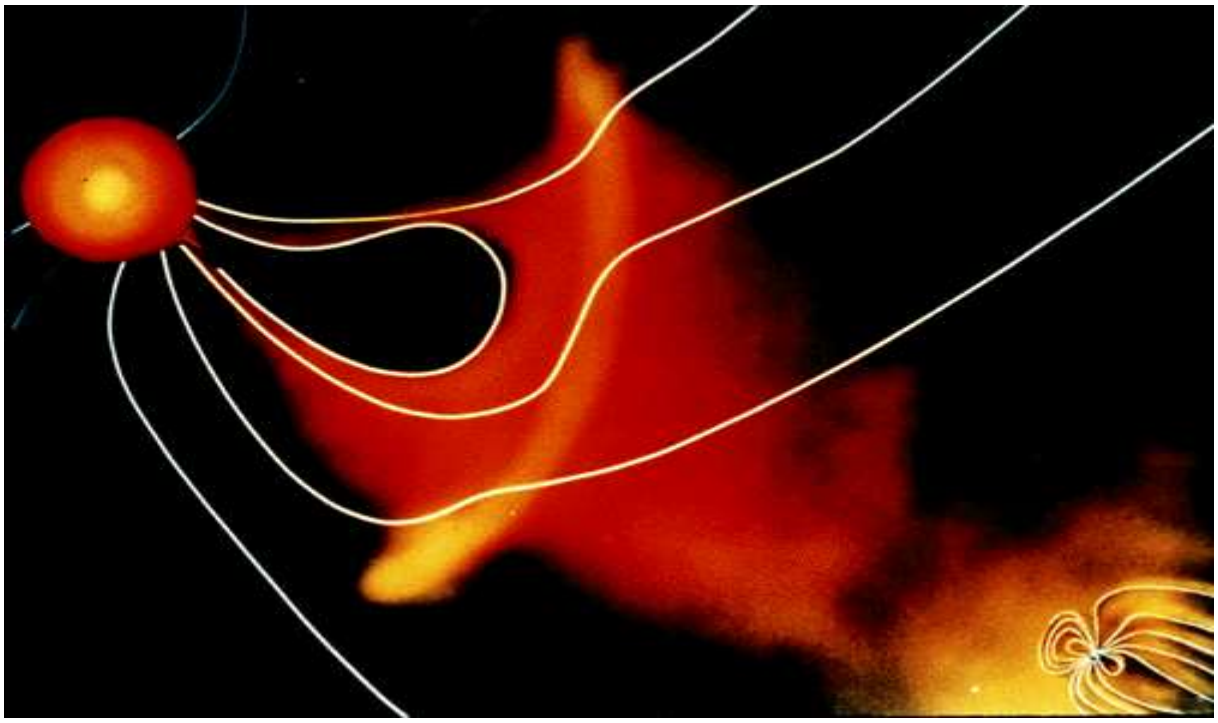
I. Introduction

An article, “Massive Solar Eruptions and Their Contribution to the Causes of Tectonic Uplift.” by Robert Johnson motivated me to write my own short article about this topic. Johnson is an independent researcher who published his article in the *NCGT Journal*, V2, No.1, March 2014. My own papers are involved with this same type of hypothesized catastrophism – “A Brief History of Mankind’s Chaotic Past” and “The Great Deluge: Fact or Fiction” found in my website, www.ettingerjournals.com. One basic difference is that Johnson envisions solar super-massive CMEs occurring in a puzzling random fashion; whereas I believe they can be induced periodically by an orbiting sister star, Nemesis, which is a yet undetectable brown dwarf. Johnson’s very magnetic CMEs reach Earth to create an electrified crust which then causes tectonic uplifts; whereas I envision even more catastrophe with occasional crustal/mantle shell (CMS) displacements.



Artist’s rendering of super-massive CME swirling outward into the solar system (aa. Provided by NASA)

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II. Exceptions to Johnson's Model

Johnson uses a unique brand of problem solving for the Earth tectonic uplifts. He blends the ideas of other geologists along with his own concepts. I can accept, even adopt, his basic ideas with the following exceptions:

a. Resolution of the 'Granite Problem'

The so-called 'granite problem' can only be resolved by the "Earth's Metamorphosis Hypothesis (EMM)" - http://www.ettingerjournals.com/dbe_emm.shtml when the majority of granitic rock was produced by a large icy rogue orb impacting and penetrating Earth's original basaltic crust and mantle. The impactor's volatiles and lighter elements mixed with mafic basaltic materials of Earth's surface that subsequently created a granitic mega-continent. Water for making granite was provided by the Earth's impactor and mixing of already existing Earth-volatiles. Subsequent splitting apart and movement of this mega-continent (see the following illustrations) caused cratons of granitic materials to move both horizontally and vertically through plate tectonics and subduction. Further differentiation and entrapment of the impactor's volatiles inside Earth's mantle led to volcanism, traps, rifts, and geological hot spots (pockets of volatiles released randomly through crustal fissures over long periods of time); and, the Moho layer (volatiles trapped and mixed with mafic rock of the upper mantle at a certain geotherm). Due to subsequent crustal underplating, subduction and plate tectonics, and wasting (isostatic recovery following erosion) per Ollier and Pain (2000), the original granites re-melted to form plutons and mix with sedimentary and metamorphic rocks. These combinations of metamorphic and igneous rocks are called migmatite. These migmatite rocks formed at numerous time spans with larger dormant spans giving the distinct idea that geological uniformitarianism was interrupted many times by catastrophism. As Johnson clearly points out: a) Granite is intimately associated with uplift because it was originally produced with the creation of the continents; b) Granite is never found outside mountain belts and continental crusts because the Earth's original mantle of mafic lava created basaltic rocks which cooled to form both the primordial oceanic crust, but also the current building of oceanic crusts at tectonic rifts. Basalts never were

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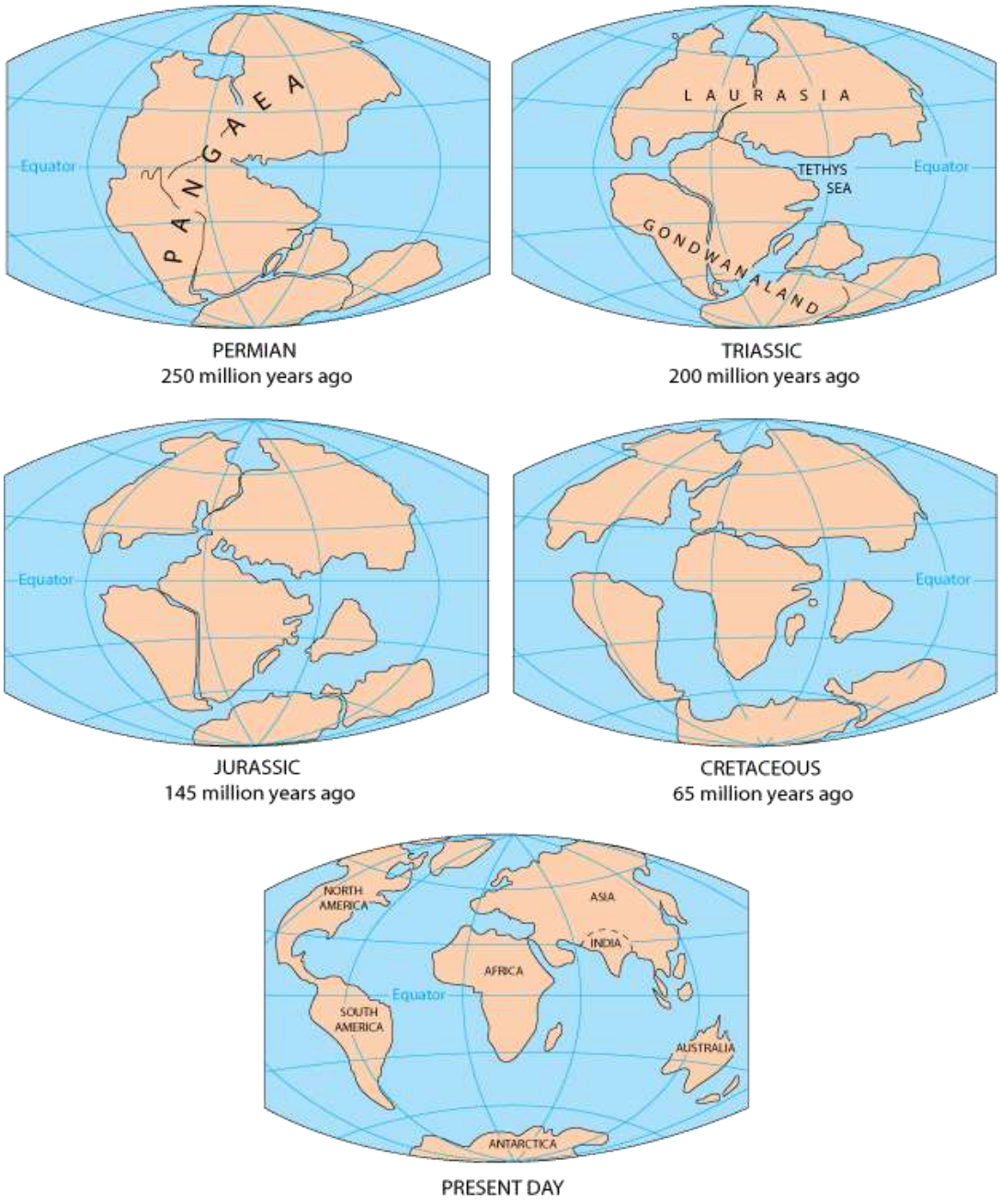
involved with original geomorphic continental crusts; and, c) There certainly has been sufficient time for several wasting and uplift cycles and drifting vectors of the original continents to form sedimentary rocks that sank to great depths to form metamorphic rocks. These transitional rocks coming from the original granitic rock still have their felsic characteristics of being lighter than mafic and having the most silicate compounds.



Partial history of continental drift indicates the source of an original mega-continent (a. Continental drift vector map by Vecteezy)

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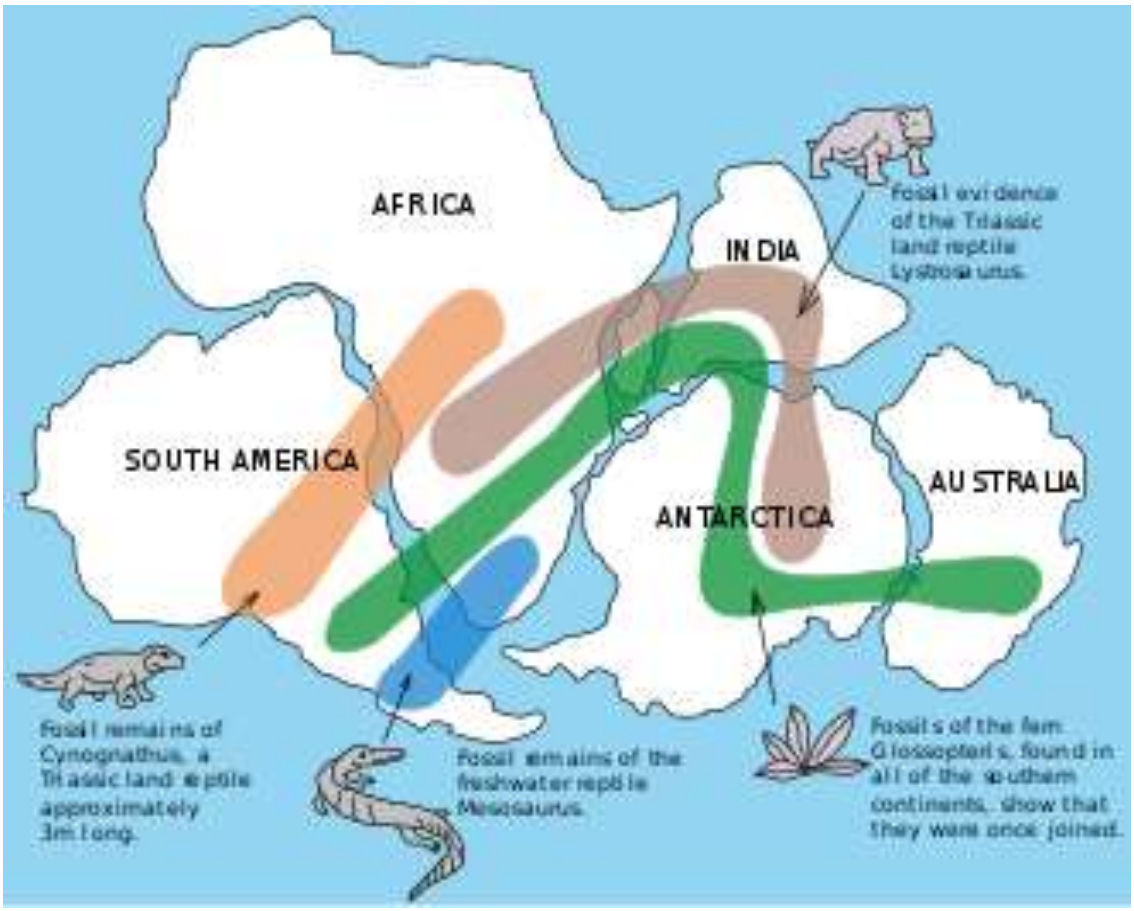

Evidence of fossil locations reveals how a mega-continent split apart (b. Continental drift by National Geographic)

b. Resolving Constraints of Tectonic Uplift Models

Other factors besides thermal and phase changes of the underlying crust are more important in achieving a line of uplift that extends the distance of the Andes Mountains. As Johnson points out, some concentrated crustal heating may be responsible for thermal expansion and phase changes causing partial tectonic uplifts; but, it is difficult to conceive of a mechanism for uplifting the Andes Mountain Range (Johnson's example) along the entire length of the western shoreline of South America. Heat energy from the mantle interior would eventually wane; and, energy of radionuclides is not sufficient. Tidal acceleration forces are not strong enough or sudden enough to produce a sudden uplift along the entire length of the western edge of the North and South American continents.

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Synchronism of mountain building over large regions of the world during the Pleistocene era is brought into question. What is needed are other strong forces to produce global uplift of these proportions almost simultaneously. Also, these strong forces also need to address the building of the "Ring of Fire" on the other side of the Pacific Ocean that includes island formations, strings of volcanoes, and oceanic trenches. The uplift occurred over a relatively short period of geological time and this process was preceded by a large span of time with no significant uplift. The only possible explanation is a predicted celestial disturbance that triggered a coherent crustal displacement or shift of 20 to 30 degrees of latitude. This displacement was caused by a combination of gravitational, electrical, and especially magnetic affects that jerks the entire shell of the crustal/mantle unit about the liquid outer core of the Earth within a fraction of a day. The combined kinetic vector forces of the spinning Earth and the southerly latitudinal motion cause the continental plates to dramatically push at their weakest points against their bordering oceanic crustal plates.

III. Adding More Vertical Forces for Uplift

Additional, developing vertical forces are caused by the re-alignment of the geoid, making the plates to both either move upward or downward depending on their distance from the newly formed highest equatorial regions. The oblateness of the Earth is rotated because the equator is changed with respect to the spin axis. Due to centripetal forces the vertical adjustments can be as much as (30°/90°) x (6 miles on radius) = 2 miles which is predicted from the present oblateness. This amount of vertical movement can cause sizable graben or horsts or raised plateaus to develop and can cause certain shorelines to disappear and cause the drainage of inland lakes.

The sudden southerly motion of the North and South American plates while still spinning eastward can understandably cause both vertical and horizontal disturbances along most of the western edges of these plates. This motion can also go over the heavier Nazca and Pacific oceanic plates while subducting under the lighter Asian and North American (Alaskan) plates. Of course, additional serious events occur as the crustal/mantle shell (CMS) rotates on the other side of the Earth in the eastern hemisphere. Calamities such as the

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East Antarctica ice sheet sliding into the ocean (the cause of the Great Flood), the disappearance of numerous land-bridges between Southeast Asia and Australia, and the permanent re-location of Siberia from temperate grasslands to a tundra region north of the Arctic Circle.

The crustal displacement can be visualized by thinking of the mantle shell rotating for 20° to 30° about an axis centrally located through the plane of the prior equator and perpendicular to the spin axis. After the electrical and magnetic field forces dissipate the mantle and outer core electrically re-couple to retain the same spin axis and tilt. One piece of evidence for this occurrence are the existing geomagnetic poles drifting from their prior positions, the prior polar locations, toward the new polar locations of the existing spin axis.

IV. Using the Johnson and CMS Displacement Models Together

My hypothesis uses a close encounter of a highly electrified and magnetic planet (from a brown dwarf star system). The resulting high energy plasma discharged at the Earth's prior polar region and the interaction of the two planets' magnetic fields is reason for the crustal/mantle shell (CMS) displacement. However, Robert Johnson has given a much superior mechanism for achieving the CMS displacement which he calls the 'Gold scenario' – named after astronomer Thomas Gold (1962). In this scenario, the Sun is triggered to emit a high density solar wind which is received by the polar regions of Earth that highly energizes the telluric currents both in the crust and oceans. (see illustration of existing telluric currents) The spinning electrified crust and mantle create a much stronger dipole magnet about the spin axis. Secondly, the Sun emits one or more supermassive corona mass ejections (CMEs) on the order of 10^{33} to 10^{38} ergs. Some of these super-CMEs are directed and highly focused toward Earth while retaining much of their developed magnetic fields. This postulated event, larger than about 10,000 times the largest event observed in the present era, washes over the Earth's magnetosphere. The EM affect shrinks the magnetosphere enough to come in contact with the ionosphere and form a ring current around the Earth along the ecliptic plane. This induced ring current then forms its own magnetic field that is aligned 23.5° with respect to the Earth's tilted spin axis which has recently become a much stronger dipole magnet. The interaction of the ring

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current and its resulting magnetic field surge strength are sudden enough and strong enough to jerk the dipole magnetic field of the mantle into alignment with the ring current. Hence, the CMS is rotated about the Earth's core by almost the amount of the spin axis's tilt of 23.5°. This surprisingly simple explanation not only gives a reason with sufficient energy, but also the amount of CMS or crustal displacement. Thank you, Robert Johnson – such eloquence. This amount of displacement comes very close to matching my previous predictions based on the prior geomagnetic poles and central locations of prior polar ice sheets.

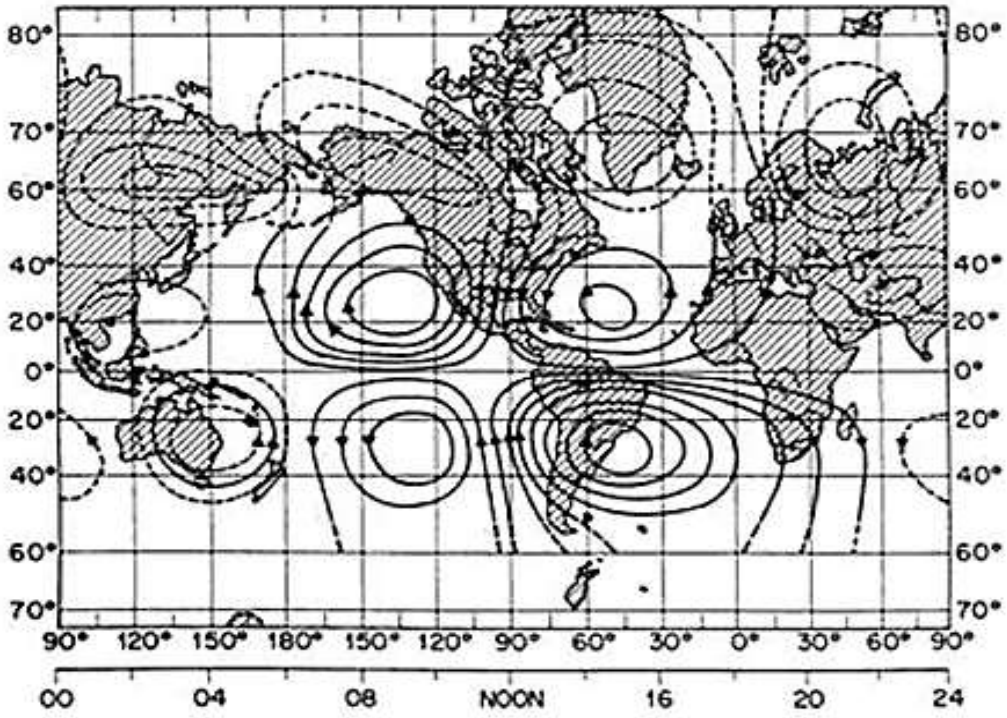

FIGURE 16.1 Planetary-scale distribution of telluric currents according to Gish (1936a, 1936b) at 1800 GMT.

Telluric currents within the Earth's crusts. (c. Global map of telluric currents made in 1936 which may not be totally accurate for today's time)

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V. Mathematical Verification

Let's run the numbers. Does a partially escaping CME directed toward Earth have enough energy to move or jerk the Earth's mantle and crust as a unit?

a. The largest predicted solar CME if 100% reached the Earth = 10^{38} ergs = 10^{31} Joules (based on references by Robert Johnson)
b. A typical flare emits 10^{29} ergs; the Carrington event emitted 10^{34} ergs
c. Super-flares measured on other stars are 10^{33} to 10^{38} ergs.
d. *Average mass of a CME = 1.6×10^{12} kg.
e. *Velocity of ejected CME = 3200 km/s
f. * Energy of CME = ½ x m x v^2 = ½ x 1.6×10^{12} kg x $(3200 \text{ km/s})^2$ = 1×10^{32} ergs (* based on values taken from Wikipedia)
g. Mass of Earth = 6×10^{24} kg; mass of mantle = m_1 = 4.6×10^{24} kg.; mass of core = m_2 = 1.4×10^{24} kg.
h. Rotational energy of a sphere = ½ x I x w^2
i. Angular velocity for Earth = w = 7.3×10^{-5} radians/sec
j. Avg. radius of Earth = r_2 = 6400 km;
   radius of outer core = r_1 = 3450 km.
k. Moment of inertia for entire core = I = 2/5 x m_2 x r^2 = 7×10^{30} kg-km^2
l. Moment of inertia for mantle = 2/5 m_1 x $(r_2^5 - r_1^5) / (r_2^3 - r_1^3)$
   = 8.4×10^{24} kg-km^2
m. Rotational energy of Earth = 2.138×10^{29} Joules = 2×10^{36} ergs.
n. Rotational energy of mantle = 2.23×10^{22} Joules = 2.2×10^{29} ergs.
o. Rotational energy of core = 1.9×10^{28} J = 1.9×10^{35} ergs.

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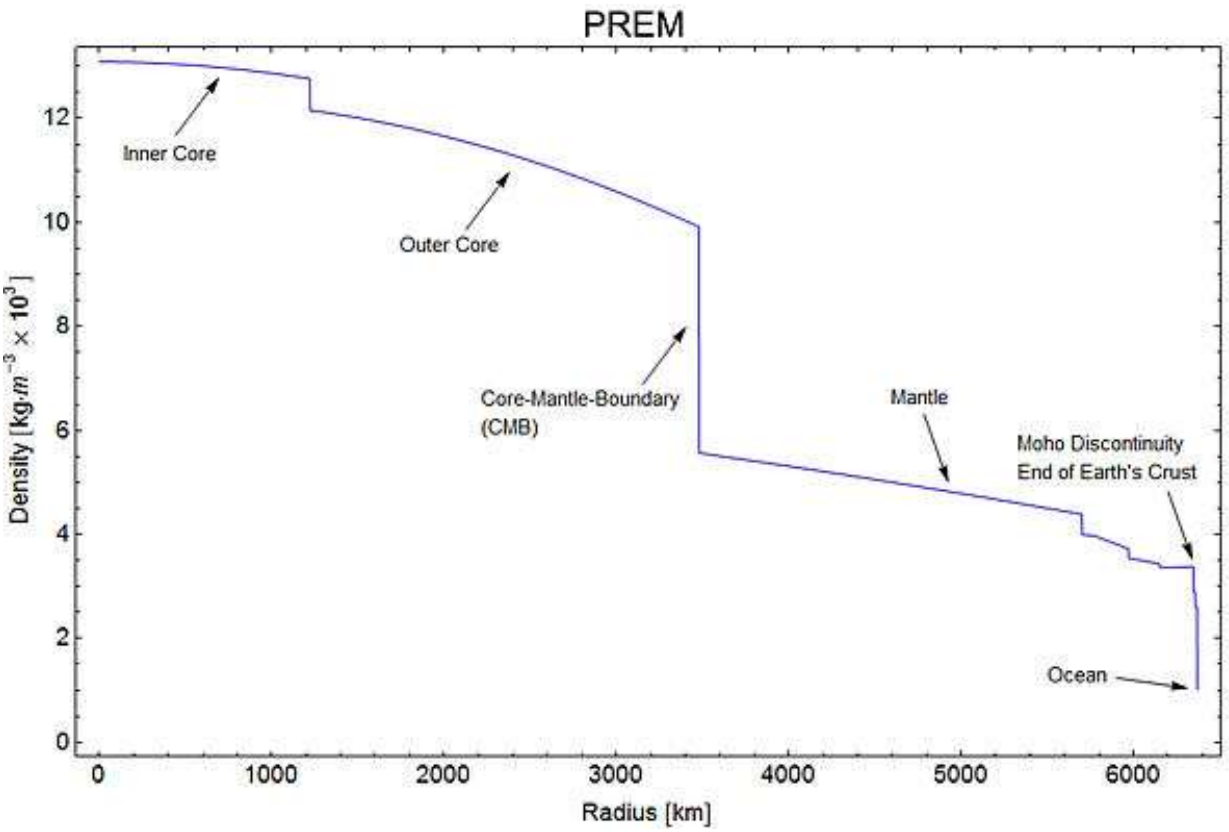

Diagram A: Densities Differences with respect to the Earth's radius (d. Structure of the Earth by Wikipedia / densities of the Earth)

The values of the rotational energy of the mantle are very small, 2.2 x 10^{29} ergs, in comparison to even a small percentage of the energy of a super-massive CME, 1 x 10^{38} ergs, that could possibly reach the Earth in the form of magnetic energy. If then only a small percentage of this magnetic energy were converted to kinetic energy, a sufficient amount of energy is still available to brake and/or change the direction of rotation of the mantle and shear the viscous connection between the interface of the lower mantle and outer liquid core for several hours. The rotational energy of the core at 1.9 x 10^{35} ergs and its gyroscopic properties are sufficient to resist its own change in angular momentum from external forces.

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VI. Illustrating Temperature Boundaries

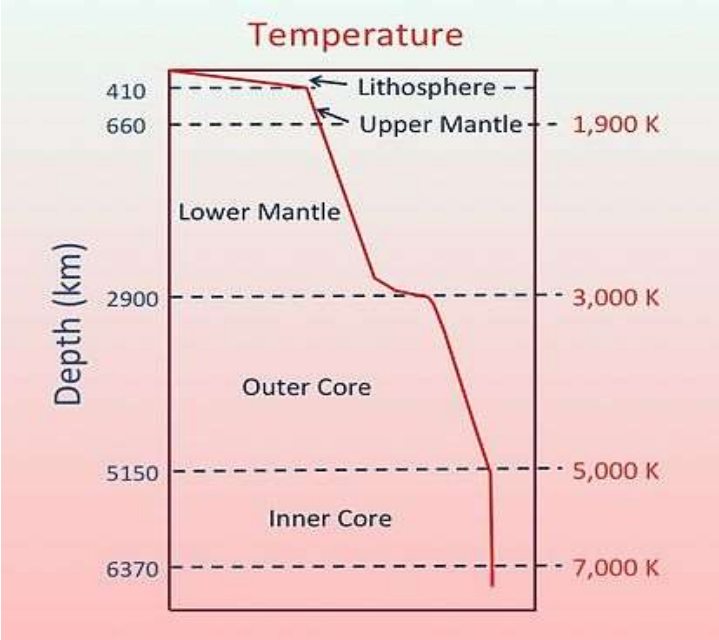

Diagram B: Temperature Schematic of Inner Earth (e. Geothermal gradient by Wikipedia)

Seismology reveals a definite boundary at a depth of 2900 km for the mantle and the outer core. Supposedly, in normal fashion the core rotates with respect to the mantle by about one revolution every year. Hence, this boundary could be easily disturbed if unusual external forces acted on the mantle.

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VII. Illustration of Earth Plasma Sheets

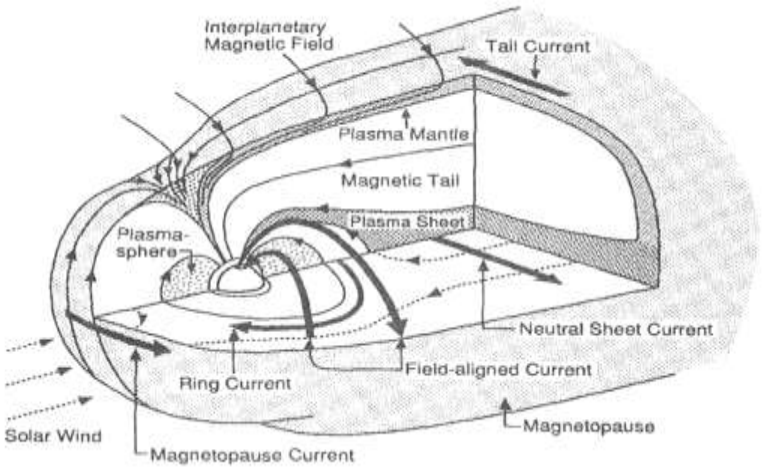

Diagram C: Earth Plasma Sheets Showing Ring Current (f. From PlasmaUniverse.com)

The diagram C above illustrates how the solar wind or a highly magnetized CME cloud could reach the magnetopause of the Earth and set up currents that would then collapse the protective plasma sheath against the ionosphere to establish a ring current around the Earth. Since the magnetized plasma of the ejected CME is directed closely along the ecliptic plane or orbital plane of Earth the ring current will very quickly establish itself about this plane which is 23.5 degrees offset from the dipole magnet of the spinning Earth and its mantle. This magnetic alignment will rotate only the mantle and crust allowing the gyroscopic stability of the core to maintain its existing spin axis. Hence, the poles of the spin axis move underneath the rotated crustal/mantle shell (CMS) and establish new magnetic poles. However, the residual magnetism in the mantle produces a different location for the current geomagnetic poles. These current geomagnetic poles are wandering mostly in the direction of the spin axis poles since new memory for the spinning dipole magnet of Earth is being re-established within the mantle.

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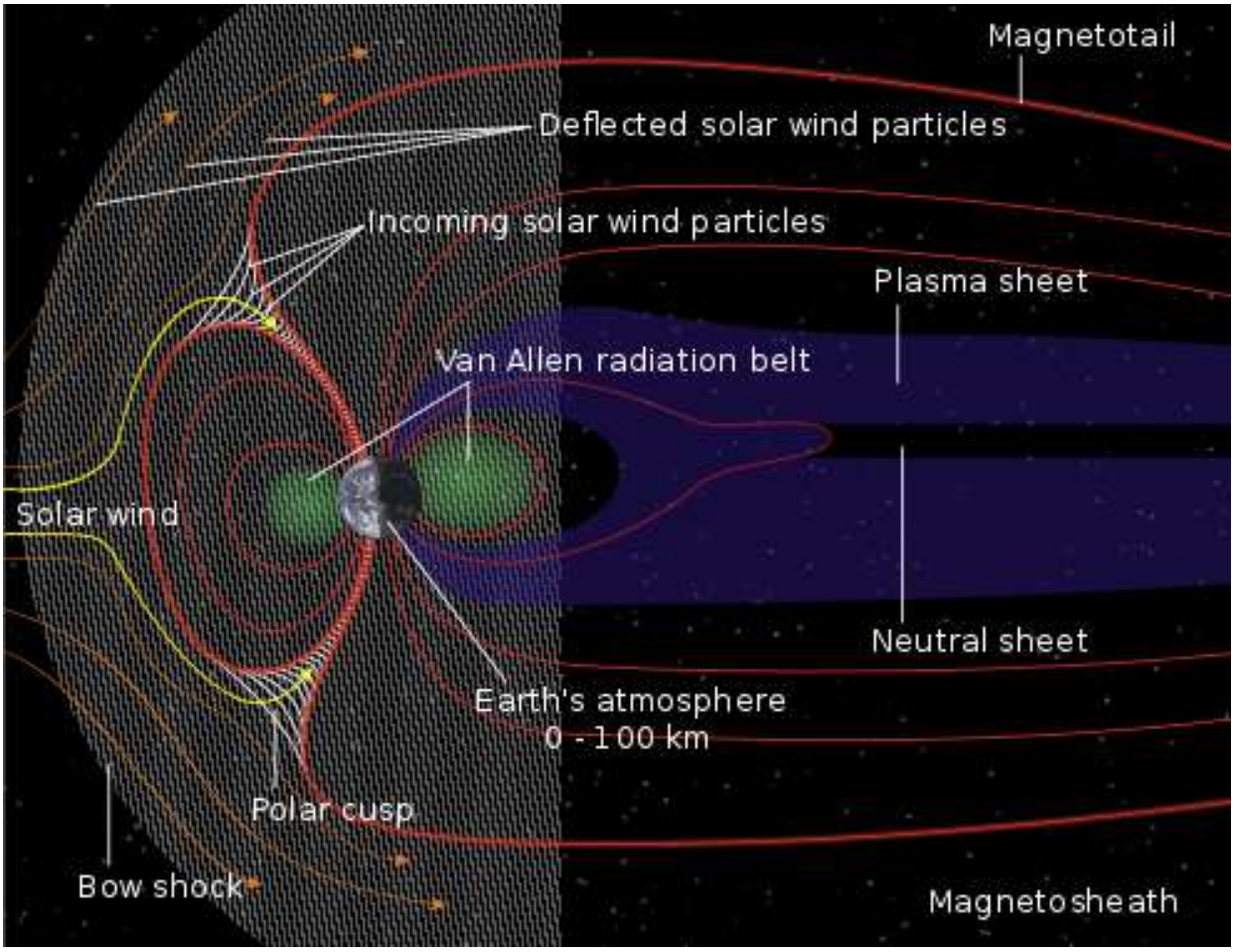

Earth's magnetosheath and Van Allen radiation belts act as plasma sheets to both shield the planet from solar wind radiation and partially guide charged charged particles toward the polar regions. If the solar wind retains a strong magnetic field developed by a supermassive CME, then the magnetosheath and radiation belts are shrunk inward toward the top of the ionosphere. This magnetic field will glance off the plasma sheets if it is not directed closely along the ecliptic or orbital plane of Earth. (g. Earth magnetosphere by Wikipedia)

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VIII. Summary of Johnson's Predictions

All of Robert Johnson's predictions can be utilized by a CMS displacement hypothesis. Let's summarize these predictions and any issues.

a. The 'granite problem' is addressed better in a global fashion and handles both the opposing positions listed by Johnson – the 'magmatists' who require sedimentary strata being transported to great depth to form metamorphotic and felsic rock; and, the 'transformists' who require water in the chemistry of formation in an in-situ process. Wasting and uplift cycling over long periods of time of the original continental granitic crust caused the felsic-type sedimentary strata. The water and other volatiles of Earth's impactor mixed with the original mafic mantle to create the felsic upraised mega-continent surrounded by a mafic oceanic crust. The 'granite problem' is easily and immediately addressed. Phase changes inside the crust as Johnson proposes could possibly create other granite, but not in a global fashion as is known to exist today.
b. Since entire plates of continental crust are displaced in the CMS model, enough kinetic and heat energy can be provided over a long range of longitude spanning two hemispheres to synchronize suddenly such tectonic uplifts as the entire Andes and other ranges in North America which Johnson addresses. Electrical energy may have played a part in creating thermal expansion and phase changes to raise this mountain range, but do not necessarily explain the global extent, synchronicity and suddenness.
c. The large vertical displacements can also be explained by the subsequent vertical heaving of the crust due to geoid adjustment that may range from ½ to 2 miles in altitude for the CMS model. These vertical adjustments can more easily explain the uplift of many large plateaus such as the Colorado Plateau.
d. A quick lateral movement of the continental plates can also explain the folding of a mountain range by horizontal forces as a first step prior to the entire range being uplifted due to geoid adjustments and possibly due to Johnson's thermal expansion and phase changes. The heat source can either be derived by sliding friction and/or the postulated electrical energy of CME's from the Sun.

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e. Both Johnson and I do address why mountain building occurs over short periods of time with large spans of dormancy. Johnson claims that CME's are released toward the Earth and magnetize the ionosphere which in turn discharge to the crust. His idea is enthusiastically adopted by this author, but I also use the magnetic disturbance of a close encounter of another celestial body which possibly disturbed the Sun to make such super-massive CME's. This author's hypothesis still requires the crustal/mantle shell (CMS) displacement that in turn creates sudden global crustal heaving and folding.

IX. Remnant Magnetism of Mountain Ranges

Robert Johnson describes another important factor, remnant magnetism. Molten rock cools below its Curie point and retains an imprint of the magnetic field at that time. As is quoted by Johnson, "It is of interest, when anomalous remnant magnetism is identified with mountain ranges, as is the case for example in the Andes (Roperch et al., 2000); the Canadian Cordillera (Enkin et al. 2000); the Elkhorn Mountains (Diehl, 1991); and the Rockies themselves (Irving et al., 1986)." Anomalous remnant magnetism can only occur from the Earth's natural dipole magnetic field. Therefore, these measured remnant magnetic vectors can only indicate tectonic movements with respect to the present magnetic field. This analysis is not quite that simple. The known dipole is known to slowly drift at both poles. However, in this author's hypothesis, the current residual dipole field should only be several degrees from its original position prior to the Great Deluge and the displacement of the CMS.

So, Johnson is absolutely correct in assessing that these anomalous changes in the magnetic field reflect large movements of the tectonic plates in question. But, the newly melted rock should show the correct dipole position since it cooled above the Curie point after the tectonic plate movement and CMS displacement. The anomalous magnetic field directions are of the rock that remained above the Cure point at that time. Then the tectonic plate motions of these rocks would reflect anomalies.

In the case of the Andes, Roperch et al., (2000) conclude that "there is a consistent pattern showing counterclockwise rotations to the north and

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clockwise to the south, the magnitudes of which vary from about 28° to 38° (ibid., p. 795).” Of course, Johnson attributes these immense movements, often in different directions to massive electrical discharge currents which caused the partial melting of rock in the region. My different interpretation of the data is that a crustal/mantle shell motion of 20 to 30 degrees latitude occurred in a southerly direction for the North and South American plates which were jostled into certain rotations.

Looking on a map of tectonic plates (see the map of divergent and convergent plate boundaries), the current plate motions are westward and southward for the South America plate, almost directly eastward for the Nazca plate, northeastward for the Cocos plate bordering Central America, and northwestward for the Pacific plate bordering the North America plate. Possibly, during the CMS displacement event the South America plate rotated clockwise as is indicated by magnetized rock of the Andes. And, the Nazca plate countered this movement by moving northward and counterclockwise before recovering its normal eastwardly direction. The Cocos plate broke away from the Nazca plate and continues moving northward, but changing rotation from CCW to CW. The huge Pacific plate probably did not change rotation or direction that much. All these postulated motions during the Great Deluge event are highly speculative. The important thing to take away from this review is that the South and North America plates changed dramatically on the order of 28° to 38° of rotation and/or direction from the Earth’s magnetic dipole. This observation can only be answered by a global CMS displacement that very possibly occurred at the Pleistocene and Holocene boundary about 11,500 years BP.

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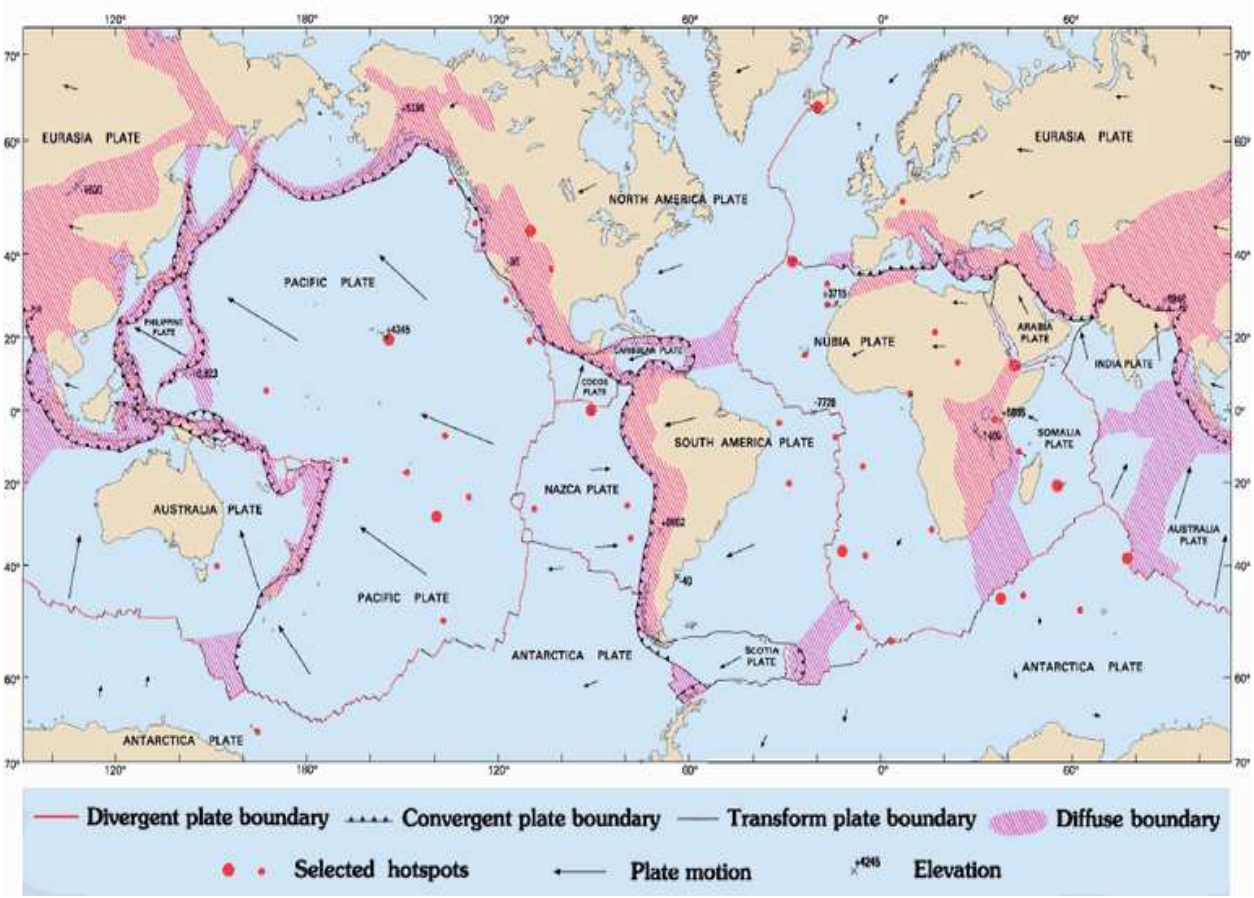

Plate boundary types showing current motion of the individual plates (h. Map of Tectonic Plates and Their Boundaries; by ThoughtCo.com)

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X. Alignments of Earth's Dynamic Magnetic Fields

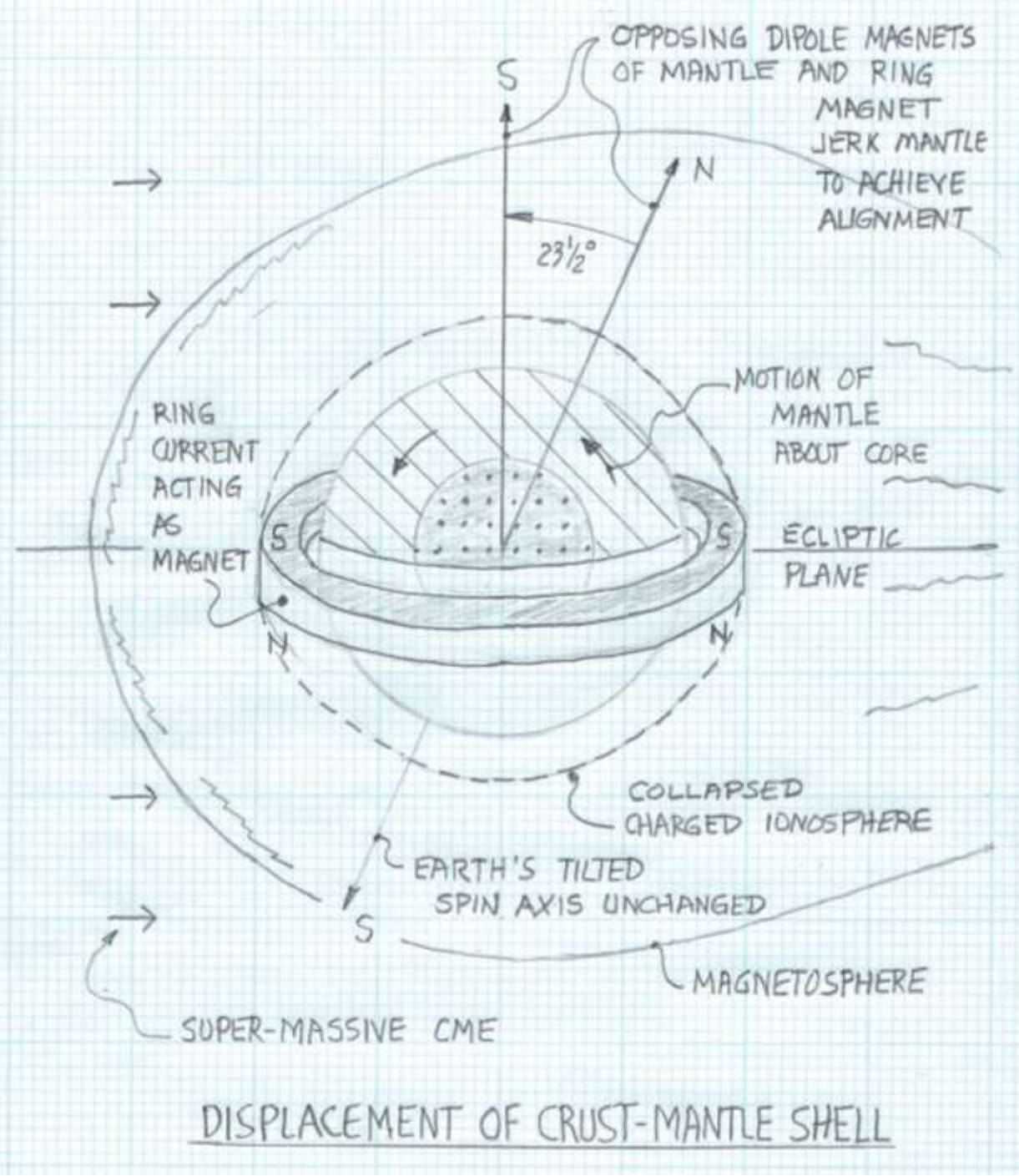

Diagram D: Predicted Rotation of Earth's Mantle about the Liquid Core

Diagram D illustrates the 23.5° of motion of the rotated CMS about the core. The crustal displacement creates a new geoid or oblateness for the Earth's crustal shape. A new equator and new polar regions are established on the

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crust, both oceanic and continental, which produces further calamity by creating accelerated Laurentide ice sheet melting, substantial calving of East Antarctica's ice sheet into southern oceans, inland lake run-offs, sudden uplifts or sinking of mountainous ridges and plateaus, earthquake swarms, and a higher frequency of volcanic eruptions.

XI. Summary of Corroboration with Johnson

In summary, Robert Johnson provides an excellent means to supply energy to the Earth for tectonic uplift processes by using super-massive CMEs that are released and wash over the Earth's magnetosphere. This idea is further enhanced in this paper by providing a trigger for causing a highly active Sun to occur in an infrequent manner due to an orbiting Nemesis brown dwarf star. This type of catastrophism is even less probable thereby creating large spans of uniformatism because highly focused CME's if ever developed during a visit from Nemesis may entirely miss the Earth and possibly cause calamity on another planet. The 'role of the di' may spare major catastrophe on Earth for thousands or millions of years.

In Johnson's model the magnetic energy of the CME is converted to electrical energy in the ionosphere that further charges increasingly conductive partially molten rock at plate boundaries which is then converted to more heat energy to create thermal expansion and phase changes for the tectonic uplifting processes. This associated idea is further enhanced in this paper by providing magnetic energy to align the Earth's dipole magnetic field and move the crustal/mantle shell (CMS). In this way the magnetic energy of the CME is also converted to kinetic energy to cause the upheavals in the crust and provide even more energy for uplifting processes.

Finally, the angular difference of the ecliptic plane where an electrical ring magnet is formed by a super-massive CME and the spin axis tilt of Earth's dipole magnet at 23.5° produces an estimate of CMS total motion. Johnson also describes remnant magnetism in the rocks in the Andes, Rockies and Coridilla Mountain Ranges that show immense rotational changes of the subject tectonic plates. These findings are even more evidence for the CMS displacement, which corroborates the main hypothesis for this author.

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d. The more important references by Robert Johnson related to this paper follow:

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8. Roperch, P. and Carlier, G., 1992. Paleomagnetism of Mesozoic rocks from the central Andes of southern Peru: Importance of rotations in the development of the Bolivian orocline. *Journal of Geophysics Res.*, v. 97, no. B12, p. 17,233 – 17,249. doi: 10.1029/92JB011291.
9. Appendix I. *Consideration of the possible effects on the Earth's orbit.* A reviewer questioned whether a CME of 10^{38} erg would change the Earth's orbital parameters. Excerpts from Johnson's response follow:
   "The normal solar wind contains numerous CME's of between 10^{31} – 10^{32} erg energy emitted on an almost daily basis which do not affect the orbit. Similarly, the approximate 7 x 10^{33} erg (Ponomarenko et al., 2007) had no measurable orbital effect."
   "Thus, under these worst cases limiting assumptions, a 0.4% change in the Earth's orbit is theoretically possible due to a 10^{38} erg CME impacting the Earth. Realistically, any effect would have been much smaller because firstly, the coupling efficiency is unlikely to have been 100%; and secondly, most of the energy would have been dissipated in Joule heating, not a change to the orbital energy."

e. Illustration sources:

aa. Artist rendition of super-massive CME swirling outward into the solar system – courtesy of NASA.

a. Continental drift vector map by Vecteezy - https://www.vecteezy.com/vector-art/108126-continental-drift-vector-maps.

b. Continental drift by National Geographic - https://www.nationalgeographic.org/encyclopedia/continental-drift/

c. Global map of telluric currents made in 1936 (which may not be accurate today) – by http://www.nlvocables.com/blog/?p=489.

d. Structure of the Earth by Wikipedia / densities of the Earth, https://en.wikipedia.org/wiki/Structure_of_the_Earth.

e. Geothermal gradient by Wikipedia, https://en.wikipedia.org/wiki/Geothermal_gradient.

f. Earth's Plasma Sheets Showing Ring Current

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g. Earth magnetosphere by Wikipedia https://en.wikipedia.org/wiki/Magnetosphere#/media/File:Structure of the_magnetosphere-en.svg.

h. Map of Tectonic Plates and Their Boundaries; by ThoughtCo.com, https://www.thoughtco.com/map-of-tectonic-plates-and-their-boundaries-1441098.

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