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Mechanism of Solar Activity Triggering Earthquakes and Volcanoes: Consequence of Whole-Earth Decompression Dynamics

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ABSTRACT

Recently published scientific evidence implies that activities on the sun cause earthquakes and volcanic eruptions on Earth. However, the geophysical basis is inexplicable within the currently popular, but flawed geoscience paradigms. However, the mechanism of solar activity provoking earthquakes and volcanic eruptions follows logically from Whole-Earth Decompression Dynamics. Here I disclose the mechanism for changes in solar weather triggering earthquakes and volcanoes which operates as a multi-stage amplifier: A change in the charged particle flux impinging the Earth's magnetic field induces electric current into the georeactor, which causes ohmic heating, which disrupts sub-shell convection, which results in extra uranium settling-out, which causes a burst of nuclear fission energy, which replaces some of the lost heat of protoplanetary compression, which causes a burst in whole-Earth decompression, which results in a burst of heat emplaced at the base of the crust and/or Earth's surface experiencing a bit of decompression-driven movement, the extent of which is a function of the degree of sub-shell convection disruption.

Keywords: Protoplanetary, Space weather, Solar wind, Georeactor, Cosmic ray, Geomagnetic field.

INTRODUCTION

Although long suspected, recently published evidence points to activities on the sun provoking earthquakes [1-8] and volcanic eruptions [9, 10]. However, as noted by Novikov et al. [5], "*The main problem with this research is a lack of physical explanations of a mechanism of earthquake triggering by strong variations of space weather conditions*".

The "*lack of physical explanations*" results from the scientific community adhering to false geophysical paradigms while ignoring or attempting to suppress contradictions thereto [11].

There is widespread belief that our solar system planets of the formed according to the planetesimal theory [12] despite evidence to the contrary: Earth formed mainly as a consequence of the protoplanetary theory, and only minimally by the planetesimal theory [13].

The currently popular idea of geomagnetic field generation by a convection-driven dynamo mechanism in Earth's fluid core [14] is flawed because thermal convection there is physically-impossible for two reasons [15]: First, due to compression from the weight above, the bottom of the fluid core is 23% denser than the core-top. The small decrease in core-bottom density

from thermal expansion (< 1%) is insufficient to make the core top-heavy as required for convection [16]. Second, for sustained convection, heat brought to the core-top must be quickly removed, a physical impossibility as the core is surrounded by an insulating silicate blanket, the mantle, that has significantly lower thermal conductivity, lower heat capacity, and greater viscosity than the Earth's core.

There are problems with plate tectonics theory: Mantle convection, which is a critical necessity for plate tectonics, is physically-impossible for the following reason: Because of compression by the weight above, the bottom of the mantle is 62% denser than the surface crust [17]. Decreasing mantle bottom density by thermal expansion (<1%) cannot make the mantle top-heavy as required for convection [15, 16]. Additionally, other *ad hoc* assumptions are necessary to make plate tectonics seem to describe geological observations. For example, mountain ranges that predate the assumed collision-formation of Pangea, require the assumption of fictitious supercontinent cycles [18]. Also, inherent errors in geomagnetic paleolatitude determinations [19] lead to false interpretations, for example, rocks from Vancouver Island, Canada thought to have formed in Baja California, Mexico [20].

Trying to pose said "*physical explanations*" on the basis of such a flawed understanding of solid-Earth geoscience is like trying to navigate to a series of addresses in London using an Istanbul city map. However, there is a logical and causally related basis for said "*physical explanations*" that derives from Earth's initial formation as a Jupiter-like gas giant, codified as *Whole-Earth Decompression Dynamic*s [21, 22], the replacement for plate tectonics.

Whole-Earth Decompression Dynamics, the underlying basis of most geology, geophysics and surface phenomena, is predicated upon the understanding that Earth had fully condensed as a Jupiter-like gas giant when the sun's thermonuclear reactions ignited and the resulting T-Tauri solar winds stripped the ices and gases from Earth's surface [21-25]. The internal energy sources were a consequence of Earth's protoplanetary formation.

Two powerful, unknown, energy sources follow from Earth's protoplanetary origin, a central nuclear fission breeder reactor and the potentially much more powerful stored energy of protoplanetary compression. There is an intrinsic relation between the two that is manifest in connection with their response to changes in solar activity and geodynamic consequences.

EARTH'S NUCLEAR FISSION GEOREACTOR

Earth's condensation from within a giant gaseous protoplanet resulted in its inner 82% existing in a highly-reduced state of oxidation. Because of its oxygen-poor environment, uranium concentrated in the fluid core, instead of mantle silicates. The uranium precipitated and settled at the center of Earth where it functions as a self-regulating nuclear fission breeder reactor, called the georeactor [21, 24, 26-32], schematically illustrated in Figure 1. If Earth's magnetic field is generated by a convection-driven dynamo, magnetic amplifier, as suggested by Elsasser [33], it is produced by the georeactor [29, 32], not in the Earth's fluid core where convection is physically impossible [15].

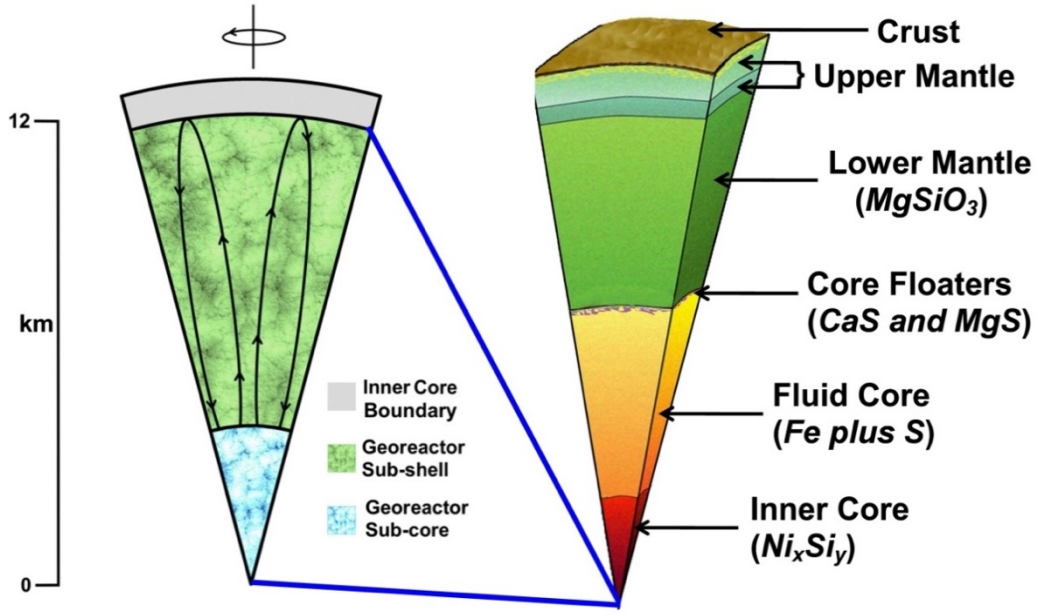

Figure 1. Schematic representation of Earth's nuclear fission georeactor with planetary rotation and fluid motions are indicated separately; their resultant motion is not shown. Also, major portions of the Earth's interior from [34] based on [21, 24, 26-32] and the fundamental mass ratio relationships shown in Table 1

Table 1. Fundamental mass ratio comparison between the endo-Earth (lower mantle plus core) and the Abee enstatite chondrite. Above a depth of 600 km seismic data [35] indicate data layers suggestive of veneer, possibly formed by the late addition of more oxidized chondritic and cometary matter, whose compositions cannot be specified at this time

Fundamental Earth Ratio	Earth Ratio Value	Abee Ratio Value
lower mantle mass to total core mass	1.49	1.43
inner core mass to total core mass	0.052	theoretical 0.052 if Ni_3Si 0.057 if Ni_2Si
inner core mass to lower mantle + total core mass	0.021	0.021
D′′ mass to total core mass	0.09*	0.11**
ULVZ† of D′′ CaS mass to total core mass	0.012****	0.012**

***Calculated assuming average thickness of 200 km. ** = avg. of Abee, Indarch, and Adhi-Kot enstatite chondrites. D′′ is the "seismically rough" region between the fluid core and lower mantle. ULVZ *** is the "Ultra Low Velocity Zone" of D′′. ****Calculated assuming average thickness of 28 km. Data from references [17, 36, 37]**

Two independent lines of evidence support georeactor existence.

Calculated georeactor nuclear fission production of $^{3}He/^{4}He$ ratios are in precisely the range of ratios observed in oceanic basalts [24].

Geoneutrino (antineutrino) measurements, at a 95% confidence level, at Kamioka, Japan [38] and Grans Sasso, Italy [39], indicate georeactor nuclear fission output energy of 3.7 and 2.4 terawatts, respectively. These fissionogenic energy values are similar to the 3-6 terawatt range employed in Oak Ridge National Laboratory georeactor simulations [24, 30].

Georeactor formation is a natural consequence of density layering in oxygen-starved (highly-reduced) planetary matter [26-28]. The two-component, self-regulated [40] nuclear fission georeactor assembly is capable of sustained thermal convection in its charged-particle-rich sub-shell, and is ideally suited for magnetic field generation in planets and large moons [32, 41, 42].

Fissionogenic heat produced by the georeactor's nuclear sub-core is transferred via convection in the nuclear waste sub-shell to the inner-core heat sink and then to the larger fluid-core heat sink [29]. This process maintains the adverse temperature gradient necessary for thermal convection [16].

The two-component structure of the georeactor provides a natural means of self-regulation. The georeactor sub-shell consists of uranium and radioactive waste, namely, fission fragments and nuclear decay products which are reactor poisons. If, in the microgravity region near Earth's center, the sub-shell components were of uniform density, the reactor poisons would consume a sufficient quantity of neutrons to prevent sustained nuclear fission. Uranium, the densest substance settles out and engages in nuclear fission, which disrupts the georeactor assembly. Eventually a steady state is reached wherein the amount of fission energy produced balances the uranium precipitation and the energy transferred to the inner core by convection [40], illustrated in Figure 2.

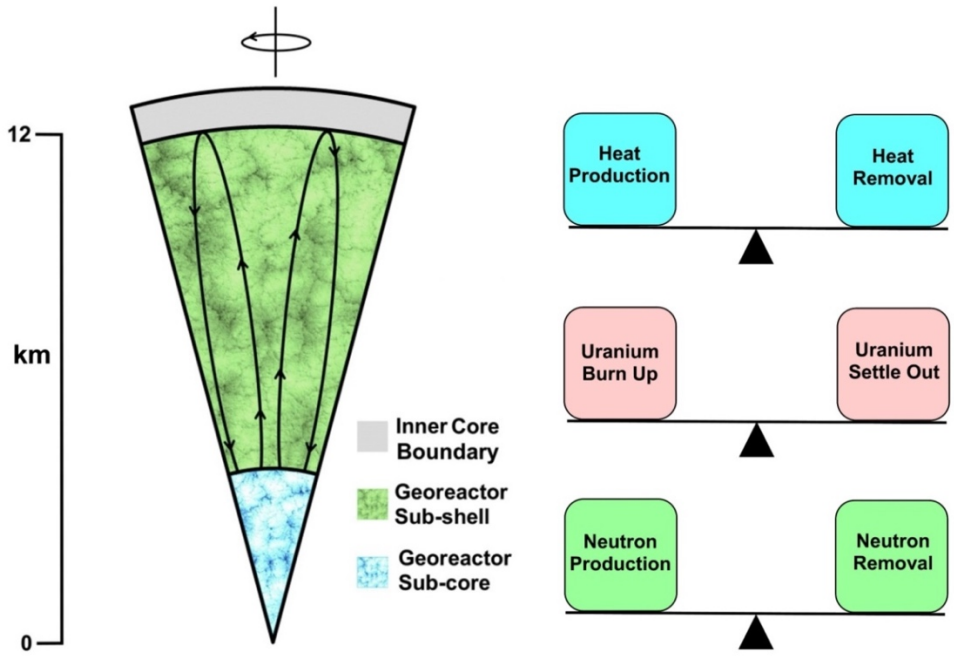

Figure 2. Schematic representation of Earth's georeactor, not to scale, with non-resultant planetary and fluid motions indicated separately (left) and (right) representations of the balances that must be maintained for stable georeactor operation. From [40]

The geomagnetic field, I posited, is produced by sustained convection in the radioactive waste sub-shell [24, 27-29, 32, 41, 43, 44]. The geomagnetic field has been stable, without reversals, for periods longer than 20 million years [45, 46], although more frequent polarity reversals and excursions occur. Clearly, disruptions in georeactor sub-shell convection can lead to geomagnetic field collapse, for example caused by [40]:

- Major trauma at Earth's surface, such as asteroid impact or
- Induced electrical current into georeactor caused by changes in space weather.

Disruption of georeactor sub-shell convection could result by energy from the solar wind transferred via the geomagnetic field into the georeactor by Faraday's law of electromagnetic induction [47]. A simple apparatus, illustrated schematically in Figure 3, demonstrates the principle of electromagnetic induction.

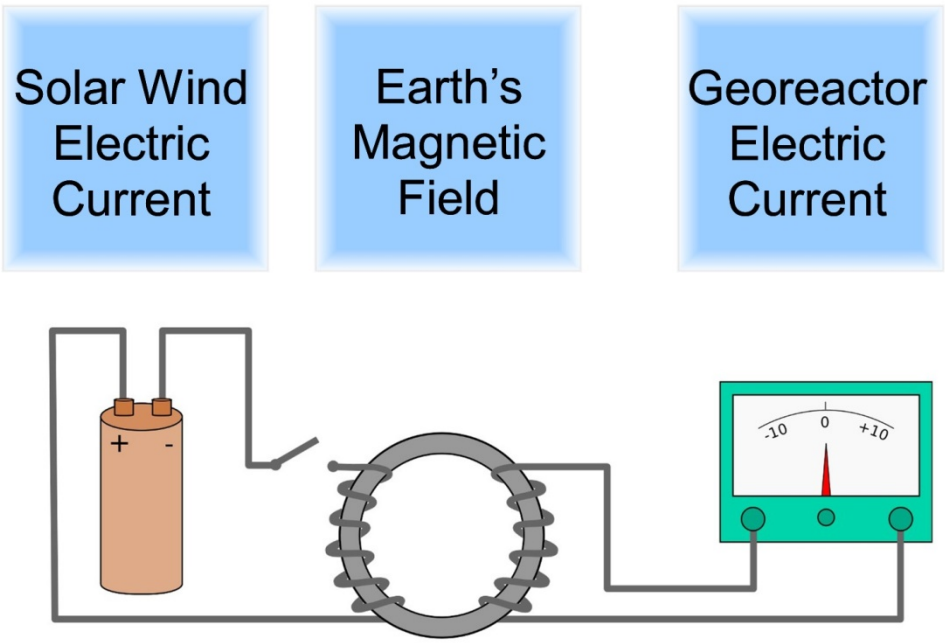

Figure 3. Schematic diagram of an apparatus for demonstrating the principle of electromagnetic induction and their corresponding components in nature. From [40]

When the switch in Figure 3 is closed, the galvanometer displays only a momentary pulse. When the switch is opened, the galvanometer displays a momentary pulse in the opposite direction. Only a *changing* electrical current can be transferred through electromagnetic induction. The blue boxes in this figure illustrate components in nature that correspond to the schematic electrical components indicated [40].

The solar wind comprises an electrical current of charged particles that stream from the sun. *If the solar wind were constant, no electrical current would be induced into the georeactor.* Exceptionally large changes in the solar wind or in the ring current of charged particles trapped in Earth's magnetosphere or in the cosmic ray flux, however, will cause electrical current to be induced into the georeactor sub-shell producing ohmic heating, diminishing sub-shell convection, and potentially leading to geomagnetic field collapse with concomitant magnetic excursion or reversal [40].

Diminishment of georeactor sub-shell convection may result in a spike of georeactor nuclear fission energy output due to additional uranium settling-out, even if not sufficient to cause a magnetic reversal or excursion [40].

MECHANISM OF SOLAR ACTIVITY TRIGGERING EARTHQUAKES AND VOLCANOES

The nuclear fission georeactor energy serves three major functions:

- Geomagnetic field production,
- Source of heat channeled to hotspots, such as Hawaii and Iceland, and
- Replacing the lost heat of protoplanetary compression.

The gases and ices of Earth's complete condensation as a Jupiter-like gas giant amounted to about 300 Earth-masses. This massive weight compressed the rocky portion to about two-thirds Earth's present diameter and emplaced within it the tremendous energy of protoplanetary compression. After being stripped of its gases and ices by the violent solar wind produced during thermonuclear ignition of the sun, over time Earth began to decompress. Whole-Earth Decompression Dynamics describes the geological and geophysical consequences of Earth's decompression [21-25].

The stored energy of protoplanetary compression is the primary energy source for Earth's decompression. However, for decompression to progress without cooling and impeding decompression, the lost heat of compression must be supplied by georeactor nuclear fission. In addition to doing work against gravity, the stored energy of protoplanetary compression heats the base of the crust by a process known as *mantle decompression thermal tsunami* [48]. Decompression beginning within Earth's mantle propagates outward like a wave through silicates of decreasing density until it reaches the rigid crust where compression and compression-heating takes place. That compression-heating is the heat source for the geothermal gradient as well as for other surface phenomena including shallow-source volcanoes.

The mechanism for changes in solar weather triggering earthquakes and volcanoes is as a multi-stage amplifier. A change in the charged particle flux impinging the Earth's magnetic field induces electric current into the georeactor, which causes ohmic heating, which disrupts sub-shell convection, which results in extra uranium settling-out, which causes a burst of nuclear fission energy, which replaces some of the lost heat of protoplanetary compression, which causes a burst in whole-Earth decompression, which results in a burst of heat emplaced at the base of the crust and/or Earth's surface experiencing a bit of decompression-driven movement, the extent of which is a function of the degree of sub-shell convection disruption.

This mechanism is applicable to solar weather triggering earthquakes and volcanoes as well as posing an explanation for the sometimes observed geomagnetic reversals associated with major geophysical events, such as basalt lava floods [49, 50].

CONCLUSIONS

Recently published scientific evidence implicates activities on the sun as causing earthquakes and volcanic eruptions on Earth, which is inexplicable by plate tectonics but understandable from Whole-Earth Decompression Dynamics. The natural mechanism for changes in solar weather triggering earthquakes and volcanoes is as a multi-stage amplifier that releases energy from Earth's two powerful internal sources, georeactor nuclear fission energy and the stored energy of protoplanetary compression. A change in the charged particle flux impinging the Earth's magnetic field induces electric current into the georeactor, which causes ohmic heating, which disrupts sub-shell convection, which results in extra uranium settling-out, which causes a burst of nuclear fission energy, which replaces some of the lost heat of protoplanetary compression, which causes a burst in whole-Earth decompression, which results in a burst of heat emplaced at the base of the crust and/or Earth's surface experiencing a bit of decompression-driven movement, the extent of which is a function of the degree of sub-shell convection disruption.

This mechanism provides a basis for understanding the manner by which solar weather triggers earthquakes and volcanoes. Further investigation should lead to more precise predictions of these geophysical phenomena. Moreover, this mechanism provides a basis for understanding the sometimes observed geomagnetic reversals that appear to be associated with major geophysical events, such as basalt lava floods. Further investigation should better connect geophysical events to geomagnetic markers.

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