

# **The Chthonian Planet - Why Life Exists on Earth**

**Published March 30, 2023**

**by**

**Richard F Cronin BChE, MBA, PE (retired)**

PRINCIPIA  
SCIENTIFIC



**International**

## The Chthonian Planet - Why Life Exists on Earth

Human activity in no way affects the Weather nor Climate (Issue date March 17, 2023)

Richard F. Cronin, BChE, MBA, P.E. (retired). 40 years Industrial Chemicals Manufacturing. 30+ years E.I. DuPont de Nemours, Wilmington, Delaware.

### I. Abstract

I.a Earth's varying proximity to the gravity fields of the Sun and out to Jupiter (Sorokhtin 43, Kent 63) and perhaps even Saturn (Mitrovica 13) move Earth's tectonic plates, thus opening our ocean trenches and faults to release seismic heat into the South Pacific, the basis for the El Niño Southern Oscillation. Even the moon's gravity affects our tectonic plates (Zbikowski 59, Hofmeister 90). This knowledge of Tidal Pumping has just evolved over the last decade or more. The crust is thinnest, coldest, and brittle on the ocean floor. The Pacific plate, Australian plate, and Nazca plate are the fastest moving tectonic plates in the world. Opening of the Peru/Chile Trench plus movement of the Nazca plate drive the El Niño. Opening the Tonga Trench plus seismically active regions to the east of Papua New Guinea drive the La Niña (Kamis, 70). The sea surface temperatures in the Southwest Pacific during the autumn and winter of 2022 were notably warm. The strong, sustained La Nina produced the unsettled weather which we have experienced since the autumn of 2020, due to the combination of Precession (Earth's seasonal tilt causing the Winter Solstice in the Northern Hemisphere which brings the Southern Hemisphere incrementally closer to the Sun) plus the Perihelion (Earth's closest approach to the Sun, approximately two weeks after the Winter Solstice). In addition to these annual events are planetary conjunctions, alignments, and oppositions, especially involving Venus and Jupiter. Milankovitch cycles affect solar irradiance, but more importantly, they also affect gravitational interactions. Tidal Pumping is the true cause of "Extreme Weather".

I.b Through the variable distance between the Sun and Earth, Earth's inclination, solar activity, and solar pole reversals, the Sun's magnetic field and solar wind distort Earth's magnetic field to produce Ohmic heating at Earth's core (Rusov, 24, Jackson, 26, Stefani, 65). Several exothermic geochemical and hydrocarbon-forming reactions, abiotic hydrocarbons, contribute vastly more heat. None of this is included in the current estimates of Earth's internal heat.

I.c Earth is unique in possessing moving tectonic plates and seismic heat to maintain liquid water. The uptick in seismic heat from the Earth's core produces sulfur-bearing acids in the Lower Mantle to decompose carbonate minerals and produce CO and CO<sub>2</sub> in immeasurable quantities, vastly exceeding human combustion of coal and hydrocarbons. Almost all of these gases vent from the ocean floor. Acid gases react with the alkaline waters. With the loss of the initial proto-atmosphere to provide a rocky planet, Earth is best described as a Chthonian planet (Mestan, 4). Life would not exist without our seismic activity distributing water around the planet.

I.d The internal heat of the Earth also solves the Faint Young Sun Paradox (Tuttle, 29). Cyanobacteria, the first photosynthetic life, appeared 3.5+ billion years ago, when the Sun was only 70% as luminous as today. Earth's surface should have been frozen solid.

I.e Earth's exact position in our Solar System plus the Sun's irradiance and magnetic output, Earth's geochemistry, the exact masses of the major celestial bodies and their distribution, plus the exact distance of our Solar System from the center of our Milky Way plus the mass distribution of the Milky Way are the prerequisites to start and sustain Terrestrial Life.

## II. Note to Readers

The reader is asked to review for content. Certainly the references could have been better enumerated in the body of the paper, although several citations were excluded in the hope of brevity. Just scanning the titles of the references is advised. I take full responsibility for any errors or omissions. Going forward, there is much more work to perform.

## III. Purpose

III.a. I affirm that I have no conflict of interests nor have I received any compensation for this work. My first interest is to stop human deprivation and death brought on by the insane war on Carbon in addition to the recently enacted war on Nitrogen. The farmers of the Netherlands have rejected their government policies aimed at restricting farming due to mis-guided, unscientific fears of ammonia and urea emitted from agricultural lands.

III.b Paleo-Climatology is a valid, necessary field of study. Climate change viewed over anything shorter than one or two centuries is pseudo-science. For his 1896 analysis, Svante Arrhenius (1) assigned a uniform 10 grams of moisture per cubic meter in the atmosphere. Gilbert Plass (6) ignored albedo, the cooling effects of water and entirely ignored black body radiation emitted directly from the Earth's surface plus aerosols from cloud tops (Stannard 60, Stallinga 74).

III.c My other interest is to expunge the pseudo-science of Climatology entirely. Meteorology will be maintained and advanced, especially with seismic, oceanographic, and astrophysical (tidal pumping) considerations. The word "Intergovernmental" must also be eliminated, as in the Intergovernmental Panel on Climate Change (IPCC).

III.d. "I would rather have questions which cannot be answered than answers which cannot be questioned." Dr. Richard Feynman

III.e "Carbon is the Element of Life. Control Carbon and you control Life itself." Dr. Richard Lindzen

III.f "If you declare War on Elements in the Periodic Table, you will lose." Richard F. Cronin.

III.g "Man makes rules to exert control over other men and women. God's Laws 'TRUMP' man's puny rules." Richard F. Cronin

## II. Table of Contents

1. Introduction – Mass in Motion
2. Planetary Motion
3. Earth's Internal Heat & Expansion Tectonics
4. Geochemical Reactions
5. Hydrocarbons & Coal
6. Great Extinctions & Petroleum Traps
7. Other Heat Contributors
8. GeoReactor
9. Seamounts & Submarine Volcanoes
10. Planetary Cooling - Water Cycle
11. Southern Hemisphere
12. Atlantic Ocean
13. Indian Ocean
14. El Niño Southern Oscillation (ENSO)
15. Circulation Cells and Jet Streams
16. Medieval Warming Period
17. Pleistocene Ice Ages
18. El Niño – WW-II, European Theater 1943/1945
19. La Niña - 2020/2023
20. Conclusions
21. Acknowledgements
22. References

## 1. Introduction – Mass in Motion

1.a. Earth is unique in possessing plate tectonics and liquid water. Without these two attributes, Life on Earth would not exist. Tidal pumping by other celestial bodies move our tectonic plates. These are driven by the Sun's gravity field and the gravity of other planets as far out as Jupiter (Sorokhtin 43, Kent 63) and even Saturn (Mitrovica 13). Cyclical planetary alignments and conjunctions impose additional Tidal Pumping stresses. Mantle Convection and Subduction are questionable (Lyustikh 8, Horvath 49) Gravitational forces by the Sun and other planets rip open the Earth's tectonic plates to form ocean trenches and faults. Seismic heat, driving ocean currents, evaporation, and weather is greatly misunderstood. This paper will describe in greater detail.

1.b Our very existence is defined by Mass and Time. Protons, Neutrons, and Electrons in Motion. We are creatures of Matter bound in Time. Heat is Mass in Motion. Molecules bumping up against one another. Heating by thermal compression. Minerals within the Earth are stratified by gravity, then alter form under Earth's decompression to provide the reagents for myriad exothermic geochemical reactions, including Sulfur-bearing acids, water, hydrogen, methane, hydrocarbons and immeasurable quantities of CO<sub>2</sub> from acidic decomposition of carbonate minerals. Almost all is vented into the oceans where the crust is thinnest and most fractured. This paper will describe in greater detail.

1.c Equations of Energy. Newtonian Physics:  $F = \frac{1}{2} mv^2$ . Einsteinian Physics:  $E = mc^2$ . Mass in Motion. The very term "Space-Time" is unhelpful. Mass in Motion produces Space. Moving celestial masses bend space and push the boundaries of space.

1.d Photons have no mass. Radiant lamps are the weakest form of heating. There are no major industrial applications for radiative heating; only radiative cooling (black body radiation). Short Wave Infrared radiation (700 to 1000 nm) received on the Earth during the day is immediately absorbed, then re-radiated as Long Wave Infrared (8000 nm +) during the night. Convection and conduction in the oceans and the atmosphere are by far the dominant heat transfer mechanisms of the Earth. Thus the water is redistributed around the globe and assures Life. This paper will explain in greater detail.

1.e The Northern Winter Solstice, combined with the Perihelion, set up Tidal Pumping stresses to open up the ocean trenches in the Southern Hemisphere. There are many flaws with the current model of Mantle Convection and subduction, if they exist at all (8, 22, 22, 27, 41, 49, 71, 79). Therefore, all of the interior heat of the planet is delivered to the ocean floor. Heat in the Peru/Chile Trench and Nazca plate to drive the El Niño. The trenches and active plate fracture zones of the Southwest Pacific, driving the La Niña. The weather you experienced in 2022-2023 was due to the seismically heated waters of the Southwest Pacific driving a vigorous La Niña. More vigorous than usual given planetary alignments and conjunctions. This paper will explain in greater detail.

## 2. Planetary Motion

2.1 Gyration of the Earth such as Precession and other planetary alignments impose gravitational forces and heaves apart our tectonic plates. Tidal pumping. Not pumping water. Not lunar tides. Opening up our tectonic plates and seismic activity due to the Earth's gyrations (Rotation, Perihelion, and Milankovitch Cycles - Precession, Obliquity and Orbital Eccentricity) as well as planetary alignments and varying distance from the gravity fields of other major celestial bodies — everywhere from the Sun out to Jupiter (Sorokhtin 43, Kent 63), and even Saturn (Mitrovica 13). The Sun and Jupiter control the barycenter of the entire Solar System (3). In essence, the Sun and Jupiter act as a set of imbalanced bolos with the Earth flung about between. Tremendous stresses. Great Conjunctions, involving Jupiter and Saturn deserve greater analysis. Even the Moon exerts tectonic tidal forces on the Earth's surface. (Zbikowski 59, Hofmeister 90). It is well known that the moons of Jupiter are savagely heated by tidal pumping. This paper will describe in greater detail.

2.2 Cyanobacteria, the earliest photosynthetic life form, developed approx. 3.5 billion years ago when the Sun was only about 70 % of its current luminosity. Without this internal heat, Earth's surface should have been solid ice. The internal heat assured liquid water on the surface. Through Endosymbiosis (Lynn Margulis), Cyanobacteria became our cellular mitochondria, the power house of your cells.

2.3 The geography of Earth's oceans is due to repeated tidal pumping and eons of repeated stressing. With the stresses of the Winter Solstice and Perihelion, the broad Southern Oceans and Ring of Fire trenches formed. The Aphelion (Earth's greatest distance from the Sun) allowed land masses to form in the Northern Hemisphere, but the Summer Solstice contributes to North Atlantic surface warming.

2.4 Earth's rigid crust is a minuscule portion of our planet. Moreover, the crust is thinnest in the ocean basins. The floor of the ocean is cold and brittle, resulting in fractures and trenches. The lithosphere is described as plastic and the asthenosphere, top of the Upper Mantle, is described as viscous. Molten layers of silicates and carbonates exist throughout the Upper Mantle (66). The Earth can best be described as a large gummy ball which readily flexes under tidal pumping. The seismic heat release is not uniformly distributed. Rather, we have hot spots in mantle plume volcanoes, mid-oceanic ridge systems, and especially oceanic trenches. Trench systems of the Ring of Fire are tearing the planet apart under the cyclic forces of tidal pumping.

2.5 The internal heat of the Earth is erroneously thought to move Earth's tectonic plates via mantle convection and recycling of oceanic crust via subduction. In fact, the internal heat of the Earth is delivered to the surface, principally to the ocean floor where the crust is thinnest. Rather than recycling of oceanic crustal plates, we have Expansion Tectonics, pushing apart the planet under planetary decompression (4, 27, 32, 41, 87)

2.6 Trace gases such as carbon dioxide (0.04 of one percent) and methane (ppb) have nothing to do in the Earth's weather or longer term climate change. The internal heat of the Earth delivered to the ocean floor. Warming of the ocean waters due to tectonic plate movement and seismic energy release delivers localized weather as well as longer term climatic changes. The mechanisms are the same, they just vary in magnitude and duration (Kamis 70).

2.7 Milankovitch cycles (Precession, Perihelion, Obliquity and Orbital Eccentricity) influence the amount of solar radiation received by the planet but unrecognized is the effect of tidal pumping. (Buis 75, Ross 64). Precession causes the Perihelion, where the elliptical orbit of the Earth brings the Earth closest to the Sun. This information has been coming forward over the last decade by geologists, geophysicists, and astrophysicists. Unfortunately, these disciplines have been excluded from the discussion about climate.

2.8 Video of Precession causing the Perihelion. <https://youtu.be/2o-Sef6wllq>

2.9 Animation of the Solar System as a Vortex. [https://youtu.be/0jHsq36\\_NTU](https://youtu.be/0jHsq36_NTU)

2.10 The Solar System's center of mass, the barycenter, is driven by the Sun and Jupiter, much like an imbalanced set of bolos.

2.11 2022 Conjunctions (<1 degree separation)

Date	Object	1	2
12 Feb 2022 21:38 EST	Venus	Mars	
12 Mar 2022 08:13 EST	Venus	Mars	
29 Mar 2022 09:07 EDT	Venus	Saturn	
04 Apr 2022 18:05 EDT	Saturn	Mars	
30 Apr 2022 14:42 EDT	Venus	Jupiter	
28 May 2022 20:03 EDT	Jupiter	Mars	

2.12 As a major celestial mass moves through space it bends space (Relativistic effects) and thereby creates a gravity well. Space bends inward toward the moving celestial mass. Space is fluid, much as a body of water. A good way to visualize this and understand the barycenter (center of mass of the Solar System) would be to visualize the motion of our Solar System as a waterskiing show with multiple skiers towed behind a powerboat with a wide transom. The show begins on a small island in the middle of a large lake. The Sun would be the starboard engine and Jupiter would be the port engine. The four (4) rocky planets (Chthonian planets with internal heat sources, Meston 4) and the asteroid belt are towed behind the power boat as it rotates counterclockwise around the Milky Way. Significant stresses are imposed on the towlines of the inner planets. The skiers stand upright in good balance but carve a groove in the fluid water surface, producing their own gravity wells. They gracefully sway and surge, all the time smiling and waving to the spectators. It's even more complicated in 3 dimensions as the Solar System corkscrews around the Milky Way.

2.13 Earth (Gaia) is in the middle. Venus is second on the left, showing a complete planetary alignment from Mercury to Mars. The asteroid belt lies beyond Mars. Tuttle (29) suggests that the asteroid belt is the remnants of a planet or binary planet system which collided and destructed. He describes this former planet as “Asteria”. The Titus-Bode Law is a formula for the progressive spacing between the planets and the Sun. The Titus-Bode Law aided in the discovery of Uranus and Ceres, the largest body in the asteroid belt and now defined as a dwarf planet. See Fig. 2.a.



2.14 Spreading out from the grooves cut in Space (the gravity well), you have Gravity Waves. Einstein’s theoretical concept which was just proven in 2017 by the observation of Neutron Star Merger GW170817 (Aug. 17, 2017). Neutron Star Mergers have become an intense topic of research by astronomers. One other item of interest is that Neutron Star Mergers are now known to be a principal source of the super-heavy R-Process elements like the Actinides, the fissiles. There is much more of the Actinides than previously thought, produced by these events. This will be discussed more fully in Section 8, regarding the GeoReactor.



### 3. Earth's Internal Heat & Expansion Tectonics

3.1 The current models for the Earth's internal heat consider only two main sources in roughly equal amounts: the heat produced by radioactive decay in the mantle and crust, and the primordial heat left over from the formation of the planet. A minor amount is contributed by lunar tides. If this were true the planet should have been in continuous cooling from the end of the Hadean Period, 4 billion years ago.

3.2 Heat from exothermic geochemical reactions have been largely ignored. The cause(s) of Earth's cyclical periods of Ice Ages and Warm Interglacials are still unknown. I will expand on this discussion in Section 14.

3.3 "Over the past decade, estimates of the heat flow across the core–mantle boundary, or across a chemical boundary layer above it, have generally increased by a factor of 2 to 3..... The increased estimates of deep-mantle heat flow indicate a more prominent role for thermal plumes in mantle dynamics, more extensive partial melting of the lowermost mantle in the past, and a more rapidly growing and younger inner core and/or presence of significant radiogenic material in the outer core or lowermost mantle as compared with previous estimates." (T. Lay, et al, 58)

3.4 Current literature states that Earth's internal heat is 47 Terawatts (TW) +/- 2 TW. This figure is derived from Davies & Davies, University of Cardiff, 2010, using temperature measurements of continental bore holes and a lesser number on continental shelves (23). No bore holes in Greenland, Antarctica, nor waters beyond the continental shelves, which is where the greatest heat release occurs. Deep ocean regions, especially ocean trench systems were "modeled" but these are the regions of most exacting interest. The heat contribution is dominated by ocean trenches and hot spots such as mantle plume volcanoes, including submarine volcanoes which can be estimated in the hundreds of thousands (Hillier & Watt 20, Le Maistre 75)

3.5 The particular flaws in the work of Davies and Davies are the assumptions of "hydrothermal circulation in young oceanic crust" and, more importantly, that heat transfer is only by thermal conduction through the mantle.

3.6 The very term "hydrothermal circulation in young oceanic crust" is in error, when we consider the absence of mantle convection and subduction. Rather than mantle convection, the Earth is undergoing decompression and expansion. Expansion Tectonics by J. Maxlow (87), G. Scalera (27), F. Stoppa (32), also described as Whole Earth Decompression Dynamics by J.M. Herndon (110) and the Chthonian Planetary Model by J. Mestan (4).

3.7 The Earth was compressed by the initial accretion process which also included a thick, heavy gas/liquid proto-atmosphere. Per Herndon, the gas/liquid proto-atmosphere exerted approx. 300 Earth-masses onto a rocky inner “kernel” about 2/3rds of Earth’s current size. Thermonuclear detonation of the Sun and the solar wind ripped off the initial proto-atmospheres of the four (4) inner planets to initiate the expansion process. This loss of atmosphere has also been observed in remote stellar systems where a gas giant orbits so close to its star that the planet’s atmosphere is being ripped into the star.

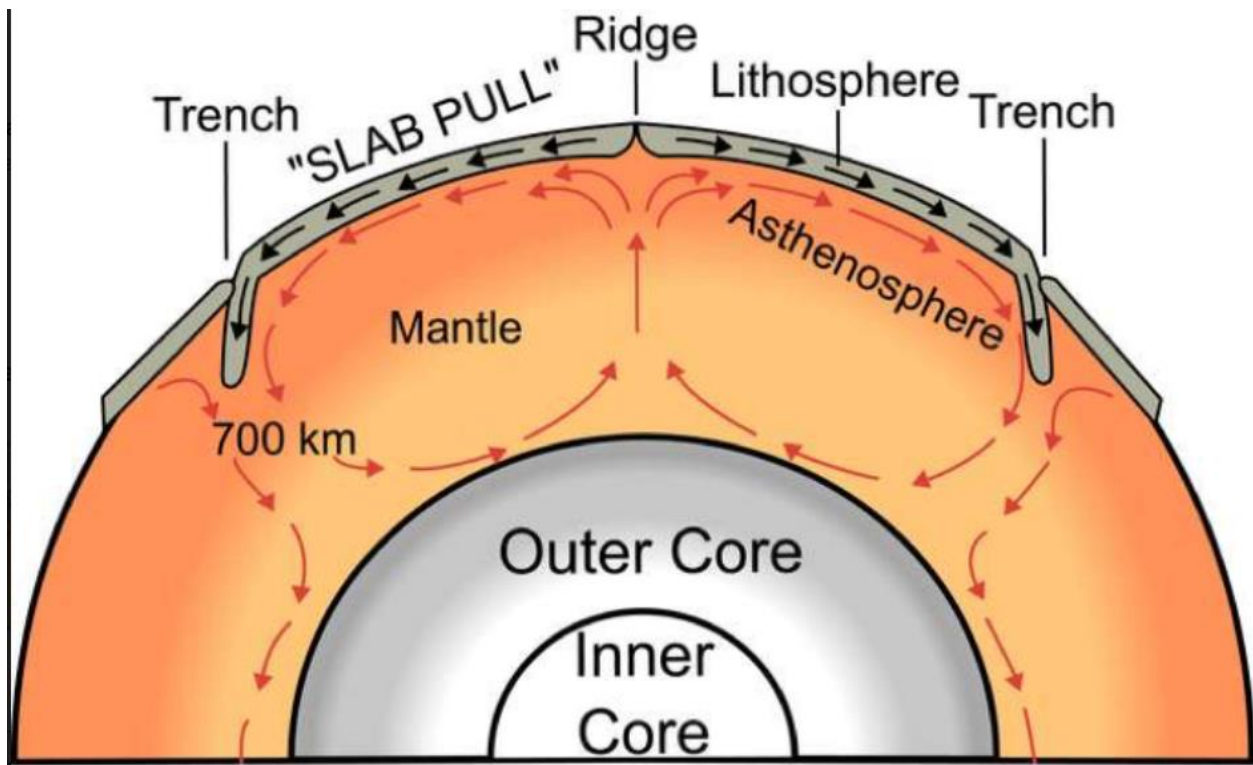
3.8 The earlier concepts of Expansion Tectonics coupled with Tidal Pumping forces resolve many of the shortcomings of Mantle Convection and Subduction. (Lyustikh 8, Horvath 49, etc. See references on Expansion Tectonics).

3.9 The Mid-Atlantic Ridge is the dominant geological feature of the Atlantic Ocean. It is a spreading ridge system, pushing Europe and Africa away from the Americas. If mantle convection and recycling of crustal plates were true, there should be corresponding subduction zones around the perimeter of the Atlantic, yet there are none. Only plate fracture zones like the Atlantic Transition Zone at the base of the continental shelves. All along the Continental Shelves plate fracture zones deliver nutrients and warmth to support marine life. Fig 3.a



3.10 Moreover, the paradigm of mantle convection has been further complicated by the dubious assumption of “slab pulling” all the way down to the Lower Mantle, as if there was a gigantic subterranean suction pulling the slab downward. Herndon describes that beyond a certain point an allegedly subducting slab would encounter greater density and viscosity in the asthenosphere and Upper Mantle to reach a point of “refusal”, much the same as a friction piling in foundation work (Rayleigh analysis). Again, as shown in Fig. 3.a , the current model in geology shows a mid-oceanic spreading ridge system and corresponding plate transition zones along continental shelves. There are no trench/subduction zones circling the Atlantic Ocean. Rather, the perimeter of the Atlantic Ocean, especially the North Atlantic is marked by continental shelves built up by plate fracture zones such as the Atlantis Transition Zone. The geology of the Atlantic is markedly different from the Pacific. Tidal pumping formed the Pacific Ocean and planetary expansion explains the Atlantic and Indian Oceans. More in Sections 12 and 13.

Dubious Slab Pulling extending deeper than the Transition Zone. Fig. 3.b



3.11 The Ring of Fire is a series of trench systems circling the Pacific Ocean. The Earth has been torn open under tidal pumping stresses by the Sun. The Perihelion is the closest approach between the Earth and the Sun. The Perihelion follows the Winter Solstice by two weeks. These combined events shaped the geography of the planet, with continental land masses across the Northern Hemisphere and the broad Pacific Ocean of the Southern Hemisphere.

3.12 With Expansion Tectonics, the Mid-Atlantic Ridge is pushing apart the planet, while Tidal Pumping on the trenches and faults of the Pacific Ring of Fire is pulling apart the planet. Planetary expansion increases the containment volume of the ocean basins.

3.13 L.B. Bezrukov (55, 56) and colleagues observed the flaw in the assumption of thermal conduction only through the Mantle and at least acknowledged heat transfer by the convection of hot gases and liquids produced in the Earth at great depths.

3.14 The theory of Continental Drift was put forward to explain such things as the remains of the Mesosaurus, a fresh water reptile, found both in Africa and South America. Also, common mineralogy shared on either side of the Atlantic Ocean can be explained by new crustal material pushing outward from the Mid-Atlantic Ridge. There is nothing comparable to Continental Drift suggested for the Pacific Ocean.

3.15 The internal heat is delivered to the surface, specifically the ocean floor of our planet and greatly exceeds any causation from minuscule trace gases in our atmosphere of which human contributions are meaningless. Concerns about aerosols or dust particles may have some merit, but the water cycle and specifically low cloud cover is the dominant factor in controlling warmth at the surface (Kauppinen & Malmi 69).

#### **4. Geochemical Reactions**

4.1 The geochemical reactions throughout the Upper and Lower Mantle are almost entirely exothermic (give off heat). Several mineral transformations are caused by planetary decompression. In broad measure, from 660 to 1500 km down conditions are acidic and under Oxidizing conditions (Oxygen available) while the Upper Mantle is alkaline and under Reducing conditions (Oxygen depleted).

4.2 Significant amounts of sulfur, carbon, and oxygen reside at the Core-Mantle Boundary, especially metal sulfides (i.e. Iron Sulfide, pyrites). (L. Deng 34). Iron, Sulfur, and the heavy Actinides accreted to the core of the planet by Enstatite Chondrites, the meteoric building blocks of all major celestial bodies (Boyett 61, Deng 34, Herndon 38, Hofmeister 16, et al)

4.3 With heat coming from deeper inside the planet, the Iron Pyrites undergo a melt separation (Deng, 34, Unemotional 42). The molten Iron joins with the Outer Core and molten sulfur percolates upward. Of the non-metals, sulfur is second only to carbon as a reducing agent. Therefore, from 1500 to 2900 km down, the Lower Mantle is under reducing conditions. As further evidence of this melt separation, it has been observed that the rotation of the planet has sped up relative to the earliest use of atomic clocks in the 1960s. A new record was set on July 27, 2022. Rotation speeds up as more Iron consolidates to the Core.

4.4 Hydrous minerals like Ringwoodite reside in the Transition Zone, between 410 to 660 km down, and have been found in diamond inclusions. At the conditions between 500 to 660 km, hydrous minerals undergo melt dehydration releasing water and producing magma. (Panero, 77). Ringwoodite converts to Bridgemanite.

4.5 At a depth of approx. 1500 km and planetary decompression, Oxygen is liberated from the transformation of Magnetite ( $\text{Fe}_2\text{O}_4$ ) and Hematite ( $\text{Fe}_2\text{O}_3$ ) to denser Iron oxides. In interview, Univ. of Bayreuth researcher, Dr. Elena Bykova describes that these regions contain 8 to 10 times as much oxygen as exists in our atmosphere and that "Rivers of liquid Oxygen" are percolating up from these regions (109). Molten sulfur reacts with liquid Oxygen to produce  $\text{SO}_2$  and other sulfur-bearing acids. Hematite ( $\text{Fe}_2\text{O}_3$ ) and Vanadium Pentoxide also serve as catalysts to convert  $\text{SO}_2$  to  $\text{SO}_3$ , then  $\text{SO}_3$  reacts with water to Sulfuric acid ( $\text{H}_2\text{SO}_4$ ) (Dai 79). All of these reactions are exothermic (give off heat).

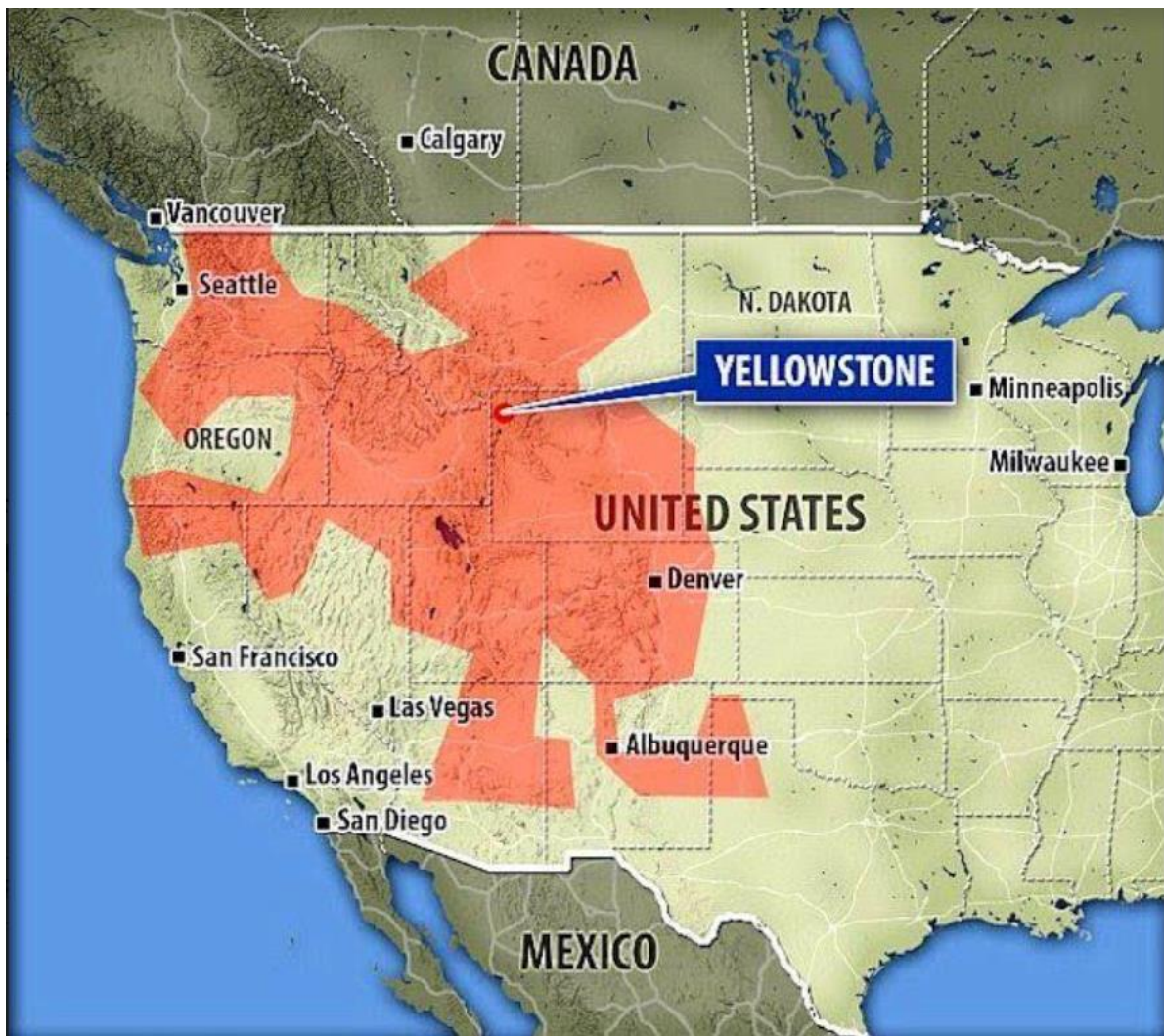
4.6 Oxygen also reacts with many metals in the Lower Mantle. (Karato, 31) Several catalysts are metal oxides. Metal fires are extremely exothermic. Lithium is a metal which can spontaneously combust. Lithium battery fires in electric buses are an increasingly frequent occurrence.

4.7 Upon planetary formation heavier metals descended into the Lower Mantle (Kamis 70). Osmium-Iridium-Rhodium alloys have been identified in Lower Mantle and surface deposits of mantle plume discharges (Bird 10, Kamis 70). The presence of Iridium supports Dr. Gerta Keller's hypothesis of extensive volcanism as the cause of the Great Extinctions (Keller, 28). See section 5.

4.8 Heavy metal elements expelled by the volcanism of Yellowstone explains the Uranium deposits of Wyoming's Powder River Basin as well as lighter metals of Iron and Magnesium which provided the rich, fertile soils of Nebraska, Kansas, and Iowa.

4.9 At 350 km down in the western U.S., centered on Yellowstone, a molten carbonate reservoir covers an area larger than Mexico. Researchers from the University of London (52) describe that just this carbonate layer has an area measuring approx. 1.8 million sq. km with a thickness ranging from 25 to 70 km. In interview, the researchers from Univ. of London estimate that if just 1 % of this Yellowstone carbonate layer ALONE decomposed it would be equivalent to burning 2.3 trillion barrels of oil. The researchers from University of London downplayed any likelihood of carbonate decomposition but decomposition is assured by sulfur-bearing acids ascending from the Lower Mantle See items 4.2 and 4.5 above.

Image Forbes Magazine 30-April-2017, Molten carbonate reservoir Fig.4.a



## 5. Hydrocarbons & Coal

5.1 Serpentinization proceeds by the simple reaction of water with mafic & ultramafic minerals like olivine to produce Hydrogen and various minerals with a scaly appearance, like crocoite and the asbestos minerals. Thus the name. This reaction is exothermic.

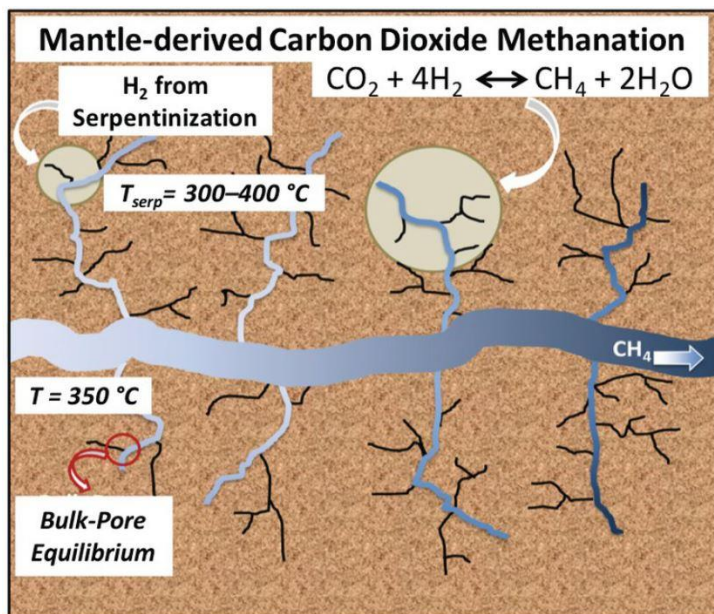
5.2 Decomposition of carbonate minerals via sulfur-bearing acids from the Lower Mantle produce CO and CO<sub>2</sub>. Fischer-Tropsch (F/T) and Sabatier reactions produce methane and, with extended residence time in petroleum “traps”, longer chain oil is produced in immeasurable quantities. Most is diffused from the ocean floor. Land-based sources are grossly misstated.

5.3 Fischer-Tropsch (F/T) Reactions. Under reducing conditions, at approx. 350 C+ and with an Iron or Cobalt catalyst:  $\text{CO} + 3\text{H}_2 \rightarrow \text{CH}_4$  (methane) + H<sub>2</sub>O. Left to dwell, F/T reactions will build out into the longer chain hydrocarbons (oil). F/T reactions are exothermic.

5.4 Per the Gemological Association of America, Culligan-like diamonds contain .... iron-rich metallic inclusions surrounded by a fluid jacket composed of methane and hydrogen.”(57) This is a F/T reaction. Iron is the catalyst.

5.5 Sabatier Reactions (methanation of CO<sub>2</sub>) proceed similarly to F/T reactions. Under reducing conditions at 350 C and in the presence of a Nickel or Alumina catalyst  $\text{CO}_2 + 4\text{H}_2 \rightarrow \text{CH}_4 + 2\text{H}_2\text{O}$ . Methanation of CO<sub>2</sub>.

Fig. 5.a, Source: “Deep Carbon, Past to Present”, publ. 2019 (66)



Caption: A schematic explaining how carbon dioxide may turn into methane in tiny fractures within ocean crust. *Credit:* From Cole D, Striolo A (2019) The Influence of Nanoporosity on the Behavior of Carbon-Bearing Fluids. In Orcutt BN, Daniel I, Dasgupta R, eds. 2019 Deep Carbon: Part to Present. Cambridge UK: Cambridge University Press. Courtesy of Thu Le et al./Scientific Reports.

5.6 Complex long chain biochemicals initiated anaerobic life, starting approx. 4.2 billion years ago. Oil, bituminous coal, and anthracite coal did not derive from trees of the Early Carboniferous (Boyce, et al 46), Abiotic hydrocarbons were produced by mineral sources — Serpentinization, Fischer-Tropsch (F/T) and Sabatier reactions. These processes produce hydrocarbons on all planets.

5.7 Porous sandstone on the inland seas of West Texas is the catalyst support and alumina is the active catalyst to provide for Sabatier reactions (methanation of CO<sub>2</sub>). Hydrogen and CO<sub>2</sub>-laden brines washed thru the porous fixed catalyst bed of sandstone. Sodium sulfates plus lye (NaOH and KOH) in the brines serve as detergents to wash the petroleum out of the catalyst bed. The exothermic heat of reaction warms the brines and provides thermal circulation of the reaction stream. Exiting the sandstone formation, the oil and water separate with the oil floating upwards and trapped beneath the salt dome of the Permian Basin. The brine continues to circulate by convective forces.

5.8 With extended residence time F/T Reactions and Sabatier Reactions proceed to branch into longer chain petroleum, then progressively venting off volatiles to produce heavy crudes, tars, bitumen, sub-bituminous coal (35 to 45 % carbon), bituminous coal (45 to 86 % carbon), and anthracite (black coal, 86 to 97 % carbon). Anthracite is found in regions such as Scranton, PA in seams of “trap rock”.

5.9 The only true “fossil fuel” is lignite (brown coal, soft coal). Lignite is 65 to 70 % carbon value but it contains significant moisture. Lignite derives from peat bogs (25 - 35 % carbon) laid down around 60+ million years ago. To double the carbon content and transform into lignite the peat bogs had to be sealed and gently warmed to vent off volatiles.

5.10 With exposure to rain, the peat bogs would have simply remained wetlands or evolved into steppes or pine barrens as continental upthrust drained prehistoric inland seas, such as is the case in Wyoming, a major lignite producer. Rather, the bog was sealed by pyroclastic ash. Entire forests buried in Pompeii’s pyroclastic ash have been converted to coal. In past ages, pyroclastic ash from Yellowstone covered Wyoming.

5.11 Logically, the peat bogs were covered over by pyroclastic ash during the extensive planetary volcanism described by Dr. Gerta Keller (28). The pyroclastic ash from Yellowstone produced the Uranium deposits in Wyoming’s Powder River Basin. Lighter elements contained in the pyroclastic ash produced the rich fertile soils in Nebraska, Kansas, and Iowa.



## 6. Great Extinctions & Petroleum Traps

6.1 A petroleum “trap” is a geological formation which contains gas and oil. It provides the residence time for petroleum-forming reactions described above as well as a sealed containment. Over time, the bitumen fractions vent off volatiles to produce bituminous coal,

6.2 The Alvarez Hypothesis for the Great Extinctions is based upon the layer of Iridium found around the globe, supposedly delivered by an asteroid. Rather, highly dense Iridium and other heavy metals reside in the Lower Mantle (See item 4.7 above) and were brought to the surface by the extensive volcanism as described by Dr. Keller.

6.3 Dr. Keller also proposed that the Chixulub strike caused the basaltic formations of India’s Deccan Traps. The Chixulub strike associated with the Cretaceous/Tertiary Extinction fell into the waters off Yucatán. Only a portion the impact zone is onshore. Much like the Tunguska meteor, the asteroid strike was like an airburst nuclear detonation, as the heated and compressed air blast exploded the asteroid. Chixulub is on the same line of latitude as the Deccan Traps, on the opposite side of the world.

6.4 The Bedout strike associated with the Permian/Triassic Extinction fell into the waters northwest of Australia (Becker, 18). The Permian Extinction is associated with the Siberian Traps. The Bedout strike is almost on the same line of longitude as the Siberian Traps. Certainly a tremendous tsunamis were formed, but no dust clouds. Moreover, even impacts as large as Chixulub and Bedout would not have caused the ocean acidification which caused marine life extinctions. Acids from submarine volcanoes and hydrothermal vents turned the oceans anoxic (Schobben, 81)

6.5 An additional contributor to the extinction(s) was the loss of ozone protection due to stratovolcanoes. (Liu & Peng, 103)

6.6 I would propose that the asteroid impact(s) provided the planetary shock wave which triggered the extensive volcanism. Much like a brain concussion, the impact slammed the semi-molten interior of the Earth against the opposing point in the Earth’s crust. The massive shock wave then reverberated throughout the planet. The Alvarez Hypothesis and Keller Hypothesis are not exclusionary. They worked in tandem.

6.7 Dr. Keller specifically cites extensive volcanism of the Cretaceous/Tertiary Extinction forming the Deccan Traps. The Permian/Triassic Extinction formed the Siberian Traps. Extensive basaltic lava plains provide excellent petroleum traps

## 7. Other Heat Contributors

7.1 The Institute of Cartography & Geology of Catalonia describes the multiple origins of the Earth's heat. (88). Grossly unappreciated in the current literature.

—> Latent crystallization heat

—> Gravitation (Gravity Compression Force)

—> Remnant heat of planet formation (Thermal Decompression)

—> Kinetic or Friction heat (force fields generated by the Moon and the Sun — tidal pumping).

—> Physicochemical exothermic reactions (including gases with molten minerals, gas-liquid, gas-gas, & solid-solid (solid state reactions at high P-T))

—> Radiogenic decay of isotopes

7.2 The Sun's magnetic field interacts with Earth's magnetic field much like an imbalanced electrical transformer. Also, the solar wind distorts the Earth's magnetic field into a teardrop shape. These distortions of the Earth's magnetic field induces Ohmic heating at Earth's core. (Jackson et al, 26). Planetary conjunctions driving magnetic field alignments have been correlated to Maunder Minima (Stefani, 65). Others have been linked solar weather to volcanism but my knowledge does not extend into these areas. I will leave it to others to describe the contribution to warming from such solar phenomena. (V.D. Rusov, et al, 24)

7.3 With planetary decompression occurring in lurches, pulses pass through the planet and cause thermal compression on the bottom of the Earth's rigid crust, another heat source. Herndon calls this effect "Mantle Decompression Thermal Tsunami".(19)

Quoting Discovery Magazine, Oct. 27, 2020 (when we entered into our current La Niña):

"The pulse — or "microseism" in geologist lingo — was first documented in the early 1960s by a researcher named Jack Oliver, then at the Lamont-Doherty Geological Observatory. He's best known for his later work that supplied some important early evidence for shifting tectonic plates. Oliver figured out that the pulse was coming from somewhere "in the southern or equatorial Atlantic Ocean" and that it was stronger in the Northern Hemisphere's summer months". (or, the Southern Hemisphere's winter).

7.4 Iceland experiences "earthquake swarms" across the Reykjanes Peninsula during the months spanning the Summer Solstice. The Northern Hemisphere inclines towards the Sun, although the Earth is at its greatest distance from the Sun during the Aphelion. Tidal pumping occurs, but much less than the Winter Solstice and Perihelion, spanning Dec.1 - Jan. 4, which affects the tectonic plates and traces of the South Pacific.

7.5 Hydrothermal vents and simple ocean floor seepage are immeasurable and these deeply acidic discharges react with alkaline ocean waters to release the Heat of Neutralization and the Heat of Dilution.

## 8. GeoReactor

8.1. A very controversial source of internal heat is the hypothesized Soliton-type breeder fission reactor, the GeoReactor, proposed by Herndon-38, Hollenbach, Tuttle-29, Ragavan, V.D. Rusov - 113, and others. As the GeoReactor cycles up, there is the necessary heat for the mineral transformations at the Core-Mantle boundary and throughout the Mantle, initiating the chain of exothermic geochemical reactions, starting from the melting of metal sulfides at the Core-Mantle Boundary.

8.2 The concentration of Actinides is explained not only by their great atomic mass. The Actinides have great electromagnetic properties, magnetism, paramagnetism, and electrostatic properties. (Tuttle, 29). With sufficient accumulation the heat of radioactivity would cause partial melting. Eutectic melts exhibit high surface tension and surface adhesion for other dust particles. It is also known from Neutron Star Merger GW180817 that such events are Kilonovae and are currently thought to be a far greater source of the Actinides than Supernovae.

8.3 The outer planets from Jupiter to Pluto exhibit a large unexplained internal heat sources. Pluto is too distant to be affected by tidal pumping from the gas giants and too small to have significant radioactive isotopes. (New Horizons Mission).

8.4 M.a. Padmanabha Rao has observed the signature daughter elements of nuclear fission in solar flares (113). The means of concentration at the Sun's surface rely upon all of the electromagnetic and eutectic properties described above. The Actinides are the most electropositive elements on the Periodic Table and readily gather electrons to drop out of plasma state first. This explains stellar evolution from the Faint Young Sun. In essence, stars are delayed fission boost devices. Separate paper pending.

8.5 Evidence of the GeoReactor can be found in the presence of the signature isotopes of nuclear fission in ice cores plus anomalous deep earth and ocean floor locations. Chlorine 36 and Cesium 137 in ice cores taken from Vostok, Antarctica (Baroni, 114) as well as in ground water 50 meters down in a mud volcano in the Caucasus (Nevinsky, 14). Carbon 14 observed in hydrothermal vents around the East Pacific Rise and correlated with heightened hydrothermal vent activity during two (2) major deglaciations (L. Stott, 111).

8.6. Several papers regarding Carbon 14 found in anomalous deep Earth diamonds and dinosaur remains. Carbon 14 decays to de minimus quantities in about 60,000 years. There is no way C-14 should be found in such locations. The presence of C-14 in these locations has been issued by Creationists who believe in the Biblical chronology of the Earth. They are dismissed out of hand and accused of contaminating their samples. The Earth is 4.55 billion years old but C-14 is found in these deep Earth locations due to the GeoReactor. Independent parties need to conduct their own confirmation for deep Earth sources of other nuclear fission products such as Beryllium-10. Radioactive ideal gases deep inside hydrothermal vents and volcanoes would be valuable.

8.7. Anton Wagner and colleagues have identified Iron 60 and Plutonium 244 in ocean floor rock originating from hydrothermal vents and taken from regions south of Vietnam. Note that this rock specifically originated from hydrothermal vents, not overlying sediments. Wagner and colleagues were very meticulous in removing sedimentary deposits. Plutonium is only produced in Neutron Star mergers, Supernovae, and fission breeder reactors. (85).

8.8. At 3 to 5 TW (Herndon & Hollenbach ), the GeoReactor's heat output is minor but the GeoReactor is the source of the geo-dynamo to generate the Earth's magnetic field. The origins of Earth's magnetic field is placed at 3.5 billion years ago, the same timing as Cyanobacteria, the earliest photosynthetic life. The magnetic field was necessary to protect life on the surface.

8.9. The cyclic nature of the Soliton GeoReactor explains Interglacial Warming Periods with greater heat injected into the South Pacific (sustained ENSO) via convection and more moderate events such as the Medieval Warming Period, with reduced volcanism and a greater portion of heat transfer via conduction thru land masses. Gentle surface heating around the continental perimeters of the Northern Hemisphere. Warmth from the Gakkel Ridge reduced the ice cover. Without moisture from the South Pacific, there is less snow across the Northern Hemisphere and reduced Arctic snowfall with reduced Arctic ice.

8.10 At best, the internal heat of the Earth is indeterminate, but it is far, far greater than 47 TW described by Davies and Davies. The vast bulk of this heat is delivered from oceanic trench systems, submarine volcanoes, hydrothermal vent fields, spreading ridge systems, tectonic plate fracture zones, faults, and plate transition zones.

## **9. Seamounts & Submarine Volcanoes**

9.1. Via bathyscaphic ocean floor mapping, Hillier and Watt provided an estimate of 3.0 million oceanic seamounts which by definition are formed by submarine volcanoes. This estimate excludes estimates above latitudes 60 degrees North and South. Reference: "Global distribution of seamounts from ship-track bathymetry data". (20)

9.2. Separately, J. Le Maistre (75) points to NASA satellite observations of axial seamounts and cites an estimate that 80 % of all volcanic activity occurs under the oceans.

9.3. Oregon State's Volcano World website estimates that 75% of Earth's magma flow comes from submarine volcanoes, but their data is only from 1997 and earlier.

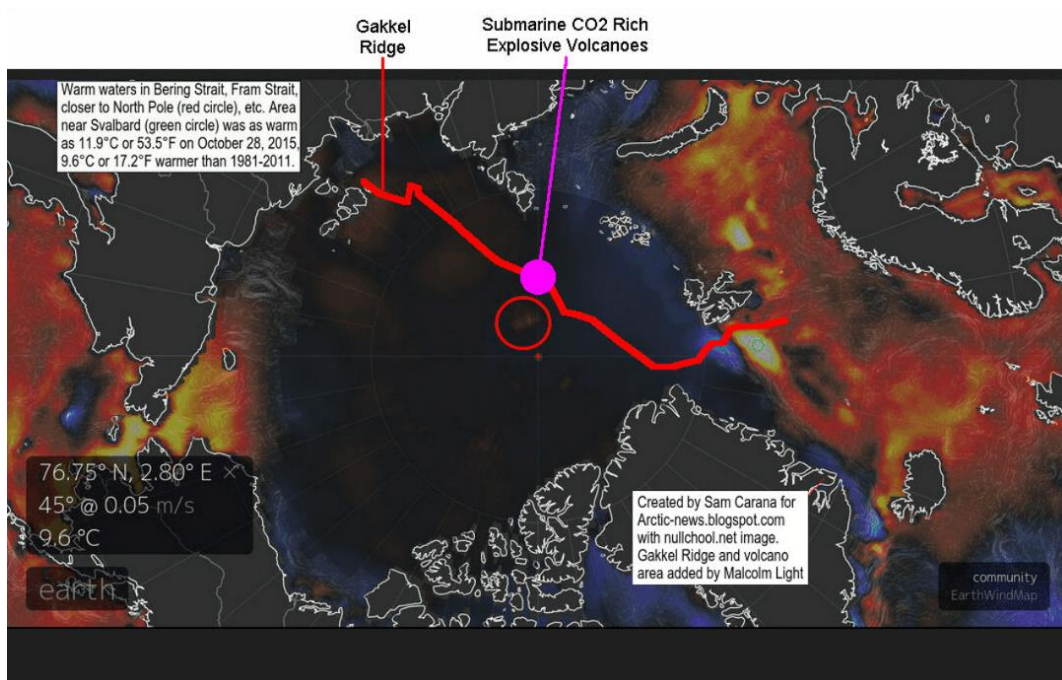
9.4 Seamounts which derive from submarine volcanoes are prominent features of the Atlantic Ocean, including the New England Chain and the Grimaldi Seamounts stretching across the Atlantic. (GEOMAR - 115)

9.4. Per the Smithsonian's 'Volcanoes of the World' database, there have been 1350 subaerial volcanoes identified since the beginning of the Holocene. This resource also describes 56 - 88 active eruptions per year. Therefore, the percent of actively erupting subaerial volcanoes in any given year ranges from 4 to 5 %.

9.5. Applying these percentages to 3 million seamounts indicates that actively erupting submarine volcanoes at the low end ranges as much as 120,000 in any given year and this excludes estimates for latitudes above 60 degrees even though the polar regions are very seismically active. The height of these submarine volcanoes range down to  $h > 0.1$  km, as magma is quenched immediately upon contact with ocean waters, forming pillow lava, rather than building into a higher peak. Submarine volcanism is a subject deserving far more study.

9.6 The internal heat of the Earth cycled up to bring us out of the last two glacial periods. (Stott - 111). Bolivia has numerous active and inactive volcanoes. Black pumice is rich in Iron and Magnesium. The dust described in the linked paper came from Bolivia's volcanoes and enhanced the growth of photosynthetic life on the surface waters of the South Pacific as we exited glaciation. (116)

9.7. The Earth is a globe with the thickest crustal regions around the equator. The crust is thinnest in the Arctic. Arctic researcher Sam Carana has provided information about the Gakkel Ridge, spanning beneath the North Pole. Directly under in the North Pole is a cluster of "CO<sub>2</sub>-rich explosive volcanoes". Credit: Arctic News, Sam Carana, Fig. 9.a



9.8 Woods Hole Oceanographic Institution continues to expand the list of known submarine volcanoes and hydrothermal vent fields.

## 10. Planetary Cooling - Water Cycle

10.1 For practical purposes, the water cycle is an almost limitless cooling mechanism. Evaporation - Convection - Cloud Formation - Condensation - Freezing & Precipitation cast off the Heat of Evaporation and the Heat of Fusion from the planet. The effects of water vapor were held constant or completely ignored in the analyses by Svente Arrhenius (1896) and Gilbert Plass (1956). To simplify his analysis, Arrhenius assumed uniform atmospheric moisture as 10 grams per cubic meter (1). Gilbert Plass (6) entirely ignored the radiative effects of albedo plus black body radiation from cloud tops. (Stannard 60, Stallinga 74).

10.2 Radioactivity is called the Weak Force because it is Weak. Radiation is used in medical applications, X-rays, and instrumentation. None in large scale heating applications. Radiation is the weakest form of heat transfer vs. convection and conduction.

10.3 Visible light ranges from 400 to 700 nm. This is 46 to 50 % of total solar radiation received. Trivial warming. The photo-electric effect. The radiation which provides warming on the surface is Short Wave Infrared (SWIR) , spanning 700 to 1000 nm and comprises approx. 49 % of total solar radiation. This band is absorbed right at the surface. At night the surface of both land and ocean cools by emission of Long Wave Infrared (LWIR). This lies in the 8000 nm and higher. Again, very superficial heating which is immediately re-emitted during the night.

10.4 Discussions involving the Stefan-Boltzmann effect with non-condensable gases are meritless. The Stefan-Boltzmann effect only applies with radiation emitted from a surface. Liquids and solids have a free surface. Aerosols and droplets in clouds have a surface. CO<sub>2</sub> and other non-condensable gases have no free surface.

10.5 If CO<sub>2</sub> (0.04 of one percent in our atmosphere = 400 ppm), for any reason, warms the molecule will emit a photon in one-ten thousandth of a second and scatters minuscule amount of LWIR. It scatters radiation. It does not point it back down at the ground.

10.6 We do not live inside a glass-paned enclosure (a greenhouse). We live beneath a patchy blanket of clouds with warm, moist air below and cold, dry air above. Kauppinen & Malmi (69) - "low cloud cover fraction practically control the global temperature".

10.7 John Tyndall's 1850s apparatus to erroneously attribute "heat trapping" to CO<sub>2</sub> was conducted inside a sealed tube fitted with a glass pane. In truth, Tyndall had fashioned a miniature greenhouse which in no way describes Earth's atmosphere. Rather, we live beneath a patchy ever-changing blanket of clouds with warm moist air below and cold dry air above. Phase change in clouds radiates Earth's surface heat into outer space via Long Wave Infrared Radiation emitted from cloud tops.

10.8 You cannot “trap heat” in our atmosphere. You can “store” heat in water vapor. Our atmosphere freely communicates with outer space. There are no practical use of non-condensable gases to store heat. Water is the transport molecule which transfers heat off of the planet. It takes approx. 10 days from evaporation to condensation in the clouds.

10.9 With all stated above, there are really only five considerations which bear merit in assessing the sources and movement of heat thru the Earth’s biome. They are grossly misunderstood — 1) Tidal Pumping, 2) Geochemical Heat & related internal heat sources 3) the nearly infinite and tunable cooling properties of the Water Cycle, 4) Conduction and 5) Convection. Most noteworthy is the seismic heat delivered into the oceans of the planet. Convection moves heat thru the ocean waters as well as the atmosphere by means of moisture-laden air streams.

10.10 Considerations of aerosols, dust, and cirrus clouds even invite geoengineering efforts. “Make Sunsets” is another group of lunatics who have been turned down by the Mexican government for their idiocy. Brayton Williams a co-founder of San Mateo-headquartered venture capital firm BoostVC who previously told CNBC the firm invested \$500,000 in Make Sunsets, told CNBC the startup was “definitely not shutting down.” ... “When you work with super early stage startups you get very accustomed to roadblocks and naysayers. Not sure we have seen a success yet that didn’t have to overcome massive hurdles early in the process,” Williams told CNBC. “Onwards!” (CNBC interview).

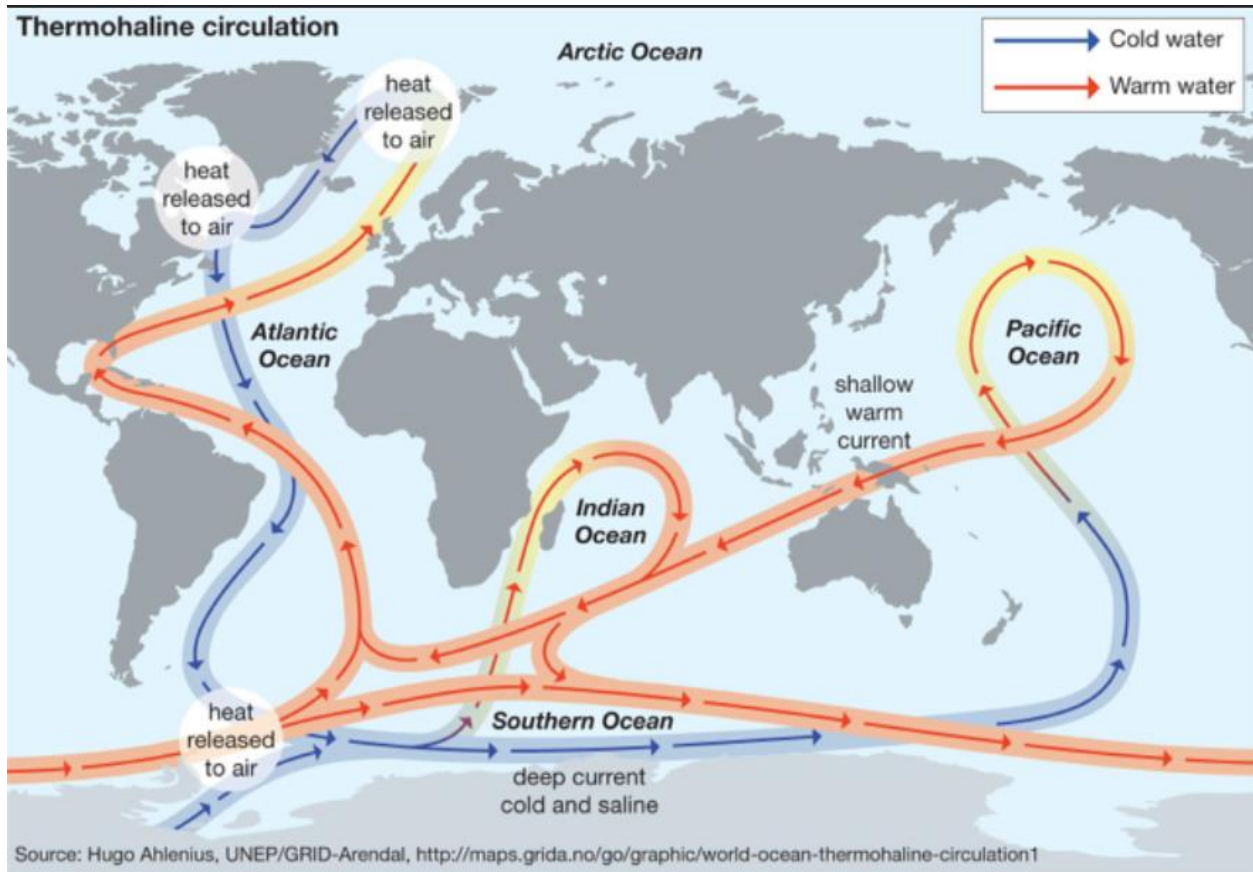
10.11 Finally, to the extent that anyone is still worried about CO<sub>2</sub>, recent studies show that CO<sub>2</sub> uptake by phytoplankton is far greater than previously thought. (Ref – GEOMAR)

## **11. Southern Hemisphere**

11.1 Tidal pumping by the annual Perihelion, Winter Solstice as well as the 41,000 year cycle of Obliquity are of particular interest. The Perihelion occurs two weeks following the Winter Solstice. The Southern Hemisphere is under tidal stresses as the Southern Hemisphere swings incrementally closer towards the Sun plus the Earth is at its closest distance from the Sun. The barycenter shifts and even more so with planetary alignments. Therefore the trench systems in the Ring of Fire open up, notably in the waters at the two (2) terminal points at either end of the Pacific’s Ring of Fire.

11.2 In “The Theory of Plate Climatology”, James Edward Kamis (70) describes a single “Source Point” for the La Niña and El Niño as centered on the multi-plate, seismically active regions to the east of Papua-New Guinea (North Bismarck, South Bismarck, Solomon Sea, Caroline Plate, and Maoke Plate). It seems doubtful to me that this region could spawn the El Niño off the coast of Peru via eastbound ocean floor currents.

11.3 The cold, ocean floor thermohaline current in the Pacific sweeps northward, then warms in Equatorial waters, and loops back to the southwest. No eastbound ocean floor current exists. Thermohaline Circulation, Encyclopedia Britannica Fig. 11.a.



11.3 The “Single Source” point for the ENSO as presented in the Theory of Plate Climatology seems not to explain the specific location nor predictable seasonality of the El Nino. Rather, I propose that the ENSO is a binodal operation. It just depends upon where the stresses imposed by Tidal Pumping find relief. I hope that this is viewed as an extension of Plate Climatology, not a refutation.



11.4 At the Perihelion and Northern Hemisphere Winter Solstice, the incrementally closer distance between the Sun and S. Hemisphere induces greater plate movement across the Southern Hemisphere with greater seismicity in the Peru-Chile Trench and Nazca plate to drive the El Niño. Alternately, these tidal stresses can find relief and induce greater seismicity in the Tonga Trench to drive the La Niña. Elevated surface water temperatures near Papua-New Guinea are due to a heat plume emitted from the Tonga Trench, in addition to the heating of these surface waters by the New Hebrides Trench, the New Britain Trench as well as the multi-plate, seismically active regions east of Papua-New Guinea. Sea surface temperatures are highest in these regions east of Papua New Guinea, as well as the Torres Strait and the Bismarck Sea.

11.5 Chen and Tang describe that in the years 1989 to 2019 the hot zones of Richter 5+ earthquakes have migrated from the New Hebrides Trench towards the Tonga Trench and from the Central American Trench towards the Peru/Chile Trench. (92).

11.6 The Tonga Trench is the fastest moving tectonic region in the world and is the second deepest trench following the Mariana Trench. The deepest point in the Tonga Trench is the Horizon Deep, located at 23.25 degrees South latitude. The deepest point in the Peru/Chile Trench is the Richards Deep, lying at 23.18 degrees South latitude. Earth's current Obliquity is approx. 23.35 to 23.37 degrees. It is logical that these corresponding measures represent the line of maximum annual stress across the South Pacific.

11.7 Earth's Obliquity ranges from 24.5 to 22.1 degrees over a 41,000 year cycle. We are currently near the mid-point and moving towards the smaller value. The Earth was at the higher value at the end of the last major deglaciation, approximately 11,700 years ago, the beginning of the Holocene. Decreased Obliquity will provide more stable, moderate climatic conditions. More moderate summers and winters.

## **12. Atlantic Ocean**

12.1 As opposed to the Pacific Ocean the prominent geological feature of the Atlantic Ocean is the Mid-Atlantic Ridge. See Fig. 3.a above. There are also numerous seamount chains. Prominent hydrothermal vent fields extend from the Cape Verde Islands, the Lucky Strike and Moytirra vents near the Azores to the Lost City field at the intersection between the Mid-Atlantic Ridge and the Atlantis Transform Fault, a prominent fracture zone. It is a long-lived site of active and inactive ultramafic-hosted serpentinization and abiotic hydrocarbons.

12.2 Much like the waters off Peru and Tonga, rich fishing grounds extend from the North Sea, Georges Bank, along the Continental Shelf of the U.S. East Coast, the Caribbean and Gulf of Mexico. These regions are also home to significant gas and oil deposits, Ocean floor hydrocarbon seepage feeds the bottom of the marine life food chain. It is known that phytoplankton cycle between sunlight surface waters and greater depths, with greater CO<sub>2</sub> uptake than previously thought (GEOMAR Ref). This line is also the route of the Gulf Stream and the warm surface waters of the Atlantic Meridional Overturning Current (AMOC). Finally, this line is the historic track for Atlantic hurricanes. How much does seismic heat from the ocean floor contribute to surface heating deserves further examination.

12.3 The Grimaldi Seamounts span from the Carpe Verde Islands over to volcanically active Montserrat in the eastern Caribbean. By definition, seamounts formed by volcanic activity. In essence, the Grimaldi Seamounts are much like the island chains of Hawaii and Emperor Islands. These seamounts serve as a kind of “speed bump” for the cold south-going ocean floor portion of the Atlantic Meridional Overturning Current. (Ref). This acts to push up the Pycnocline and surface Mixed Layer. Warmer waters to the surface in the north-going leg of the AMOC. See Figure 11.a. above.

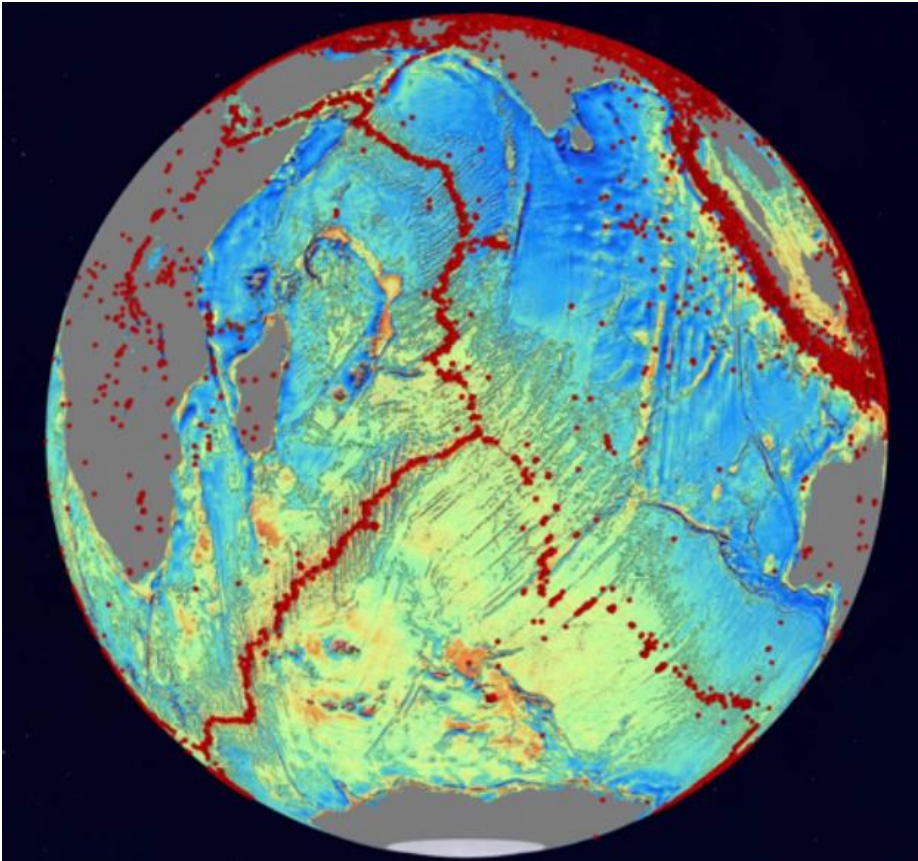
12.4 “Earthquake swarms” can number in the thousands along Iceland’s Reykjanes Peninsula. Further work needs to be done to understand the seasonality of this seismic activity. However, the Summer Solstice is two weeks before the Aphelion, when the Earth is most distant from the Sun, so planetary stresses from tidal pumping are lesser during the Northern Hemisphere summer than the winter. However, the regions immediately off the continental shelves on both the Atlantic and Pacific coasts of North America do exhibit warming in the summer months. Plate fractures open up, although not as dramatically as during the Perihelion affecting the Southern Hemisphere.

### **13. Indian Ocean**

13.1 The Indian Ocean appears to be dominated by a Triple Junction of spreading ridge systems. The Central Indian Ridge, Southwest Indian Ridge, and Southeast Indian Ridge. These are divergent plates much like the Mid-Atlantic Ridge. The Central Indian Ridge meanders north-north west and connects with another Triple Junction of divergent plates. The Nubian (African) Plate, the Arabian Plate, and the Somalian Plate. The Great East Africa Rift lies between the African Plate and Somalian Plate.

13.2 To the east lies the Sunda Double Trench which are sources of heat injected into the Indian Ocean and a contributor to the annual Indian/Bangladesh monsoons.

Encyclopedia Britannica Fig. 13.a



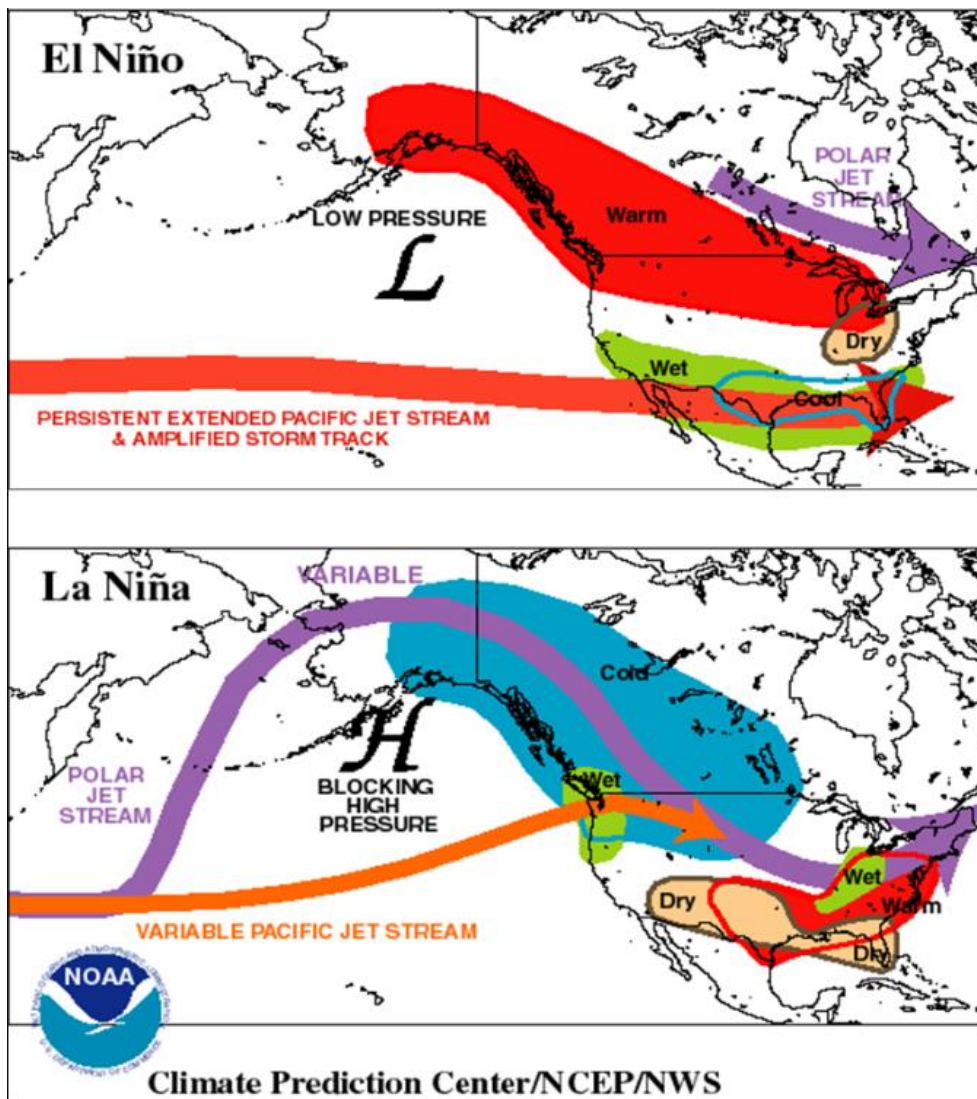
## 14. El Niño Southern Oscillation (ENSO)

14.1 A thorough reference regarding the ENSO is “Who Turned on the Heat? The Unsuspected Global Warming Culprit -- El Niño-Southern Oscillation”, Copyright 2012 Bob Tisdale (30)

### El Niño

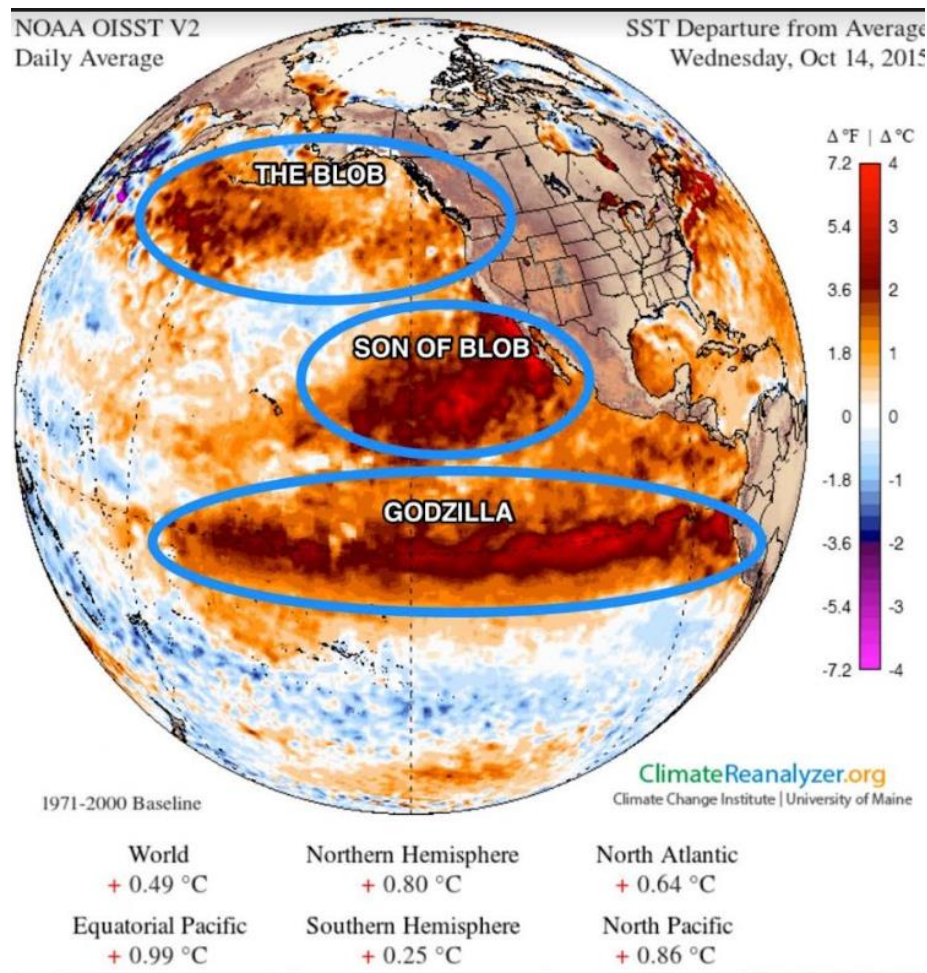
14.2 A facet of the El Niño are strong shearing winds over the Gulf of Mexico and Western Atlantic which suppress the hurricanes. Moisture is carried northward. The polar jet stream dips down along the latitude of New Brunswick, Canada, but moisture remains offshore. In the summer, cold rain fronts drive down on Europe with ample snow in the winter.

NOAA Northern Hemisphere Jet Stream Patterns, El Niño & La Niña, Fig. 14.a

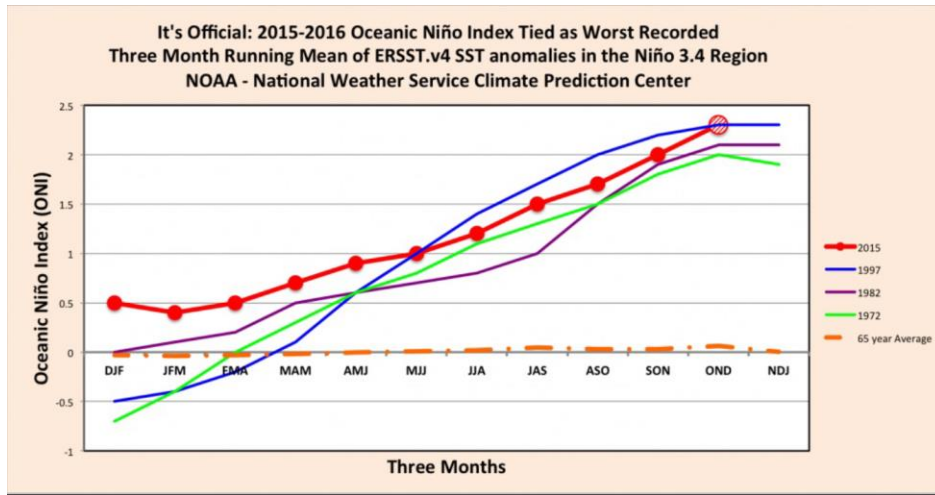


14.3. With heat from the Peru/Chile Trench and Gofar Transition zone abutting the Nazca Plate with the East Pacific Rise, the El Niño brings warmer waters off the coast of Peru, which extend into the eastern and central Pacific, weakening the trade winds. Peru experiences southerly winds year round with high humidity from December to April. The Amazon accumulates moisture from rain forest transpiration during the dry season (Ref) but the moist air mass is drawn westward by the evaporation from the El Niño in the Peru/Chile Trench producing the Amazonian rainy season, spanning February to July. Moist, stagnant air from the Horse Latitudes and Amazonian rain forest is drawn westward by the convection offshore of Peru. Ample rains fall on the eastern flank of the Andes.

NOAA Sea Surface Temperatures, Oct. 14, 2015, Strong El Nino . Fig. 14.b



The El Niños of 1997 and 2015 are tied as the strongest on record. Note El Niño spikes in those years. Fig 14.c



14.5 During an El Niño, warm waters dominate the eastern and central Pacific. The east-to-west Pacific trade winds in 1997 and 2015 ceased entirely. The powerful air stream flowing across the Gulf of Mexico and western Atlantic provided shearing winds which suppressed the Atlantic hurricanes, leaving the U.S. East Coast sweltering in the summer. Hardly any snow on the ski resorts of upstate New York, but ample snows further south. “Extreme Weather”.

14.6. Neptune and Uranus were in conjunction throughout the 1990s. On January 33, 1997 Jupiter joined them. Tidal pumping from Jupiter affected the Eastern Pacific plates.

## La Niña

14.7 The La Niña brings more intense flooding monsoons across Bangladesh, while the Northern Hemisphere suffers extreme drought across the mid-latitudes in the summer months. Extreme low water conditions across rivers of America’s interior as well as Europe. Yet earlier the spring of 2022 the Yellowstone River flooded over its banks. The heavy precipitation across Canada and the northern tier states of the U.S. is notable in heavy winter snows and springtime floods. Buffalo NY was buried. Ample snow has fallen across Colorado ski resorts in the winter of 2022. Snow fell on Los Angeles.

14.8. In addition to deeply flawed farming practices, the Dust Bowl years of the 1930s occurred during a strong, sustained La Niña. Drought across the Plains States, punctuated by springtime flooding conditions further north.

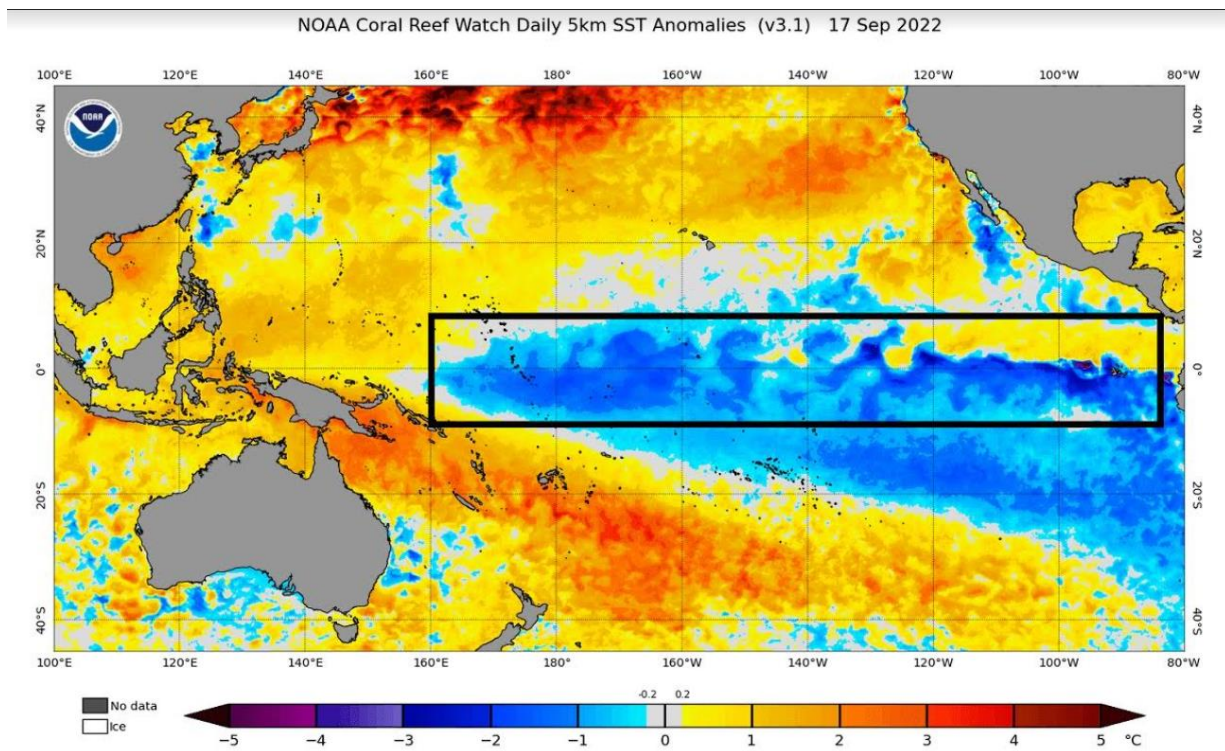
14.9. We have been under pronounced La Niña conditions since autumn of 2020. In 2021 we went through the entire alphabet in tropical storms and hurricane names. Entirely typical of La Niña. The hurricane season of 2022 was right at the average of 14 named storms.

14.10 Areas of drought are also caused by an increase in katabatic winds. Moisture condenses on the southern face of the Himalayas, producing monsoons and floods across northern India and Bangladesh. Cold dry air flowing down from the Himalayas undergoes compressive heating to produce continuous dry, warm conditions for Central Asia. (Light, 50)

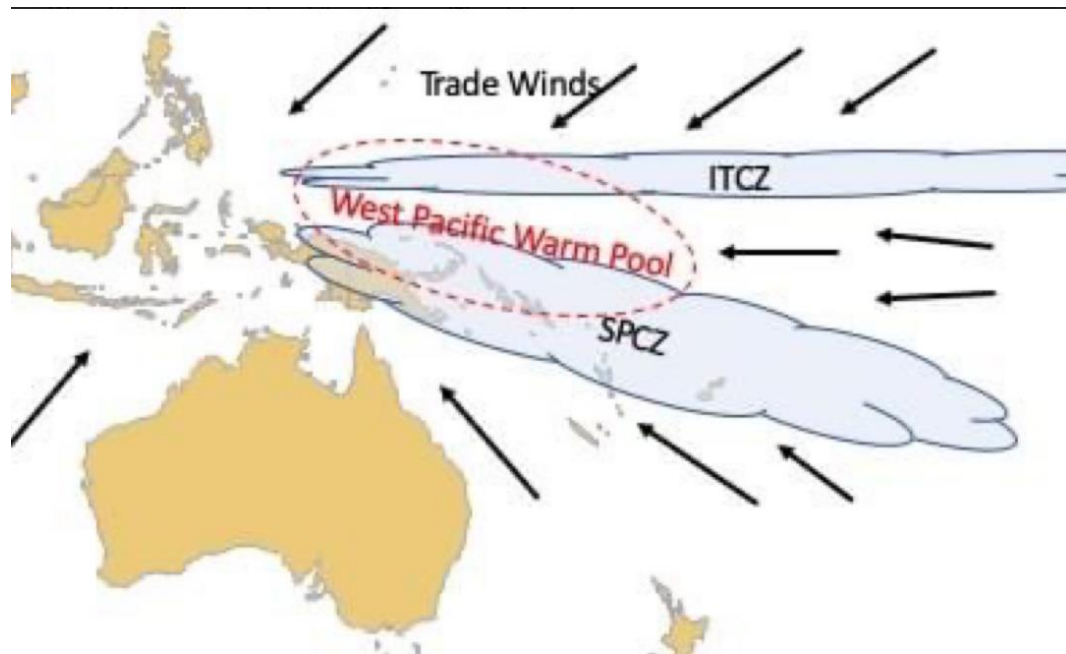
14.11. There is also a seasonality in seismic activity across the Himalayas, with as much as 2X in the winter vs. the summer. This is attributed to monsoon rains and changes in hydrology. (Avouac - 117).

14.12. Sea surface temperatures, Nov. 2022, showing cooler waters in the central Pacific and elevated temperatures in the southwest Pacific, building from the Tonga Trench to the plate fracture zone east of Papua-New Guinea. Typical for a strong La Niña.

Fig. 14.d



14.14 Increased evaporation from the West Pacific Warm Pool strengthens the Pacific trade winds, and also draws increased air flow from regions to the east and west of Australia. These are typical aspects of a strong La Niña. Fig. 14.e



14.15 The dominant weather driver today is the El Niño Southern Oscillation (ENSO) with warming of the eastern Pacific (El Niño) and the warming of the western Pacific (La Niña). These events are driven by volcanic/seismic activity across the Southern Oceans. Convection currents carrying heat to the surface and greater evaporation. Undersea volcanoes drive the action as planetary Tidal Pumping (Precession, Obliquity, Perihelion, Orbital Eccentricity, etc.) applies stresses to the tectonic plates of the planet, opening up the Trench systems of the Ring of Fire.

## 15. Circulation Cells and Jet Streams

15.1 The present global model for north-to-south air circulation is a uniformly configured system of "cells". The Hadley Cell, the Ferrell Cell, and the Polar Cell, arranged like intermeshing gears. The presumption is that the dominant driver of the solar radiation warms Equatorial waters. This model may have merit over the Atlantic Ocean but it breaks down when we consider the effects of the ENSO produced in the sub-Equatorial Pacific as well as topographical features such as mountain ranges producing katabatic winds. Several challenges to the cell model

15.2 The Hadley Cell is used to describe the Tropics, with warm moist air ascending from the Equator and flowing northward to descend at about 30 degrees North latitude, say the same latitude as New Orleans LA and Cairo, Egypt. Moisture from the Equator drops ample rains along this latitude. This latitude is nominally the region of the west-to-east Pacific Jet Stream at high elevations. The Hadley Cell brings the strong east-to-west Atlantic trade winds along the surface. Dust kicked up from the deserts of North Africa is pulled along with the trade winds, providing nucleation sites for rain and tropical storm formation.



15.3 The Ferrell Cell or mid-latitude cell extends from 30 degrees N to 60 degrees N, about the latitude of Yellow Knife, Yukon Territory or Oslo, Norway. The Ferrell Cell rotates opposite to the Hadley Cell. Any moisture not dropped along latitude 30 N streams along the surface and spreads gentler rains across the mid-latitudes. Again, this seems to apply in the regions affected by the Atlantic Ocean but the ENSO dominates the Pacific Ocean and the globe. Continental topography also plays a role. Katabatic winds are produced by mountain ranges.

15.4 Roughly along 60 N is the Polar Jet Stream. The Polar Cell rotates in the same rotation as the Hadley Cell. Cold air from the Arctic descends along this latitude but can be pulled further south by a strong El Niño.

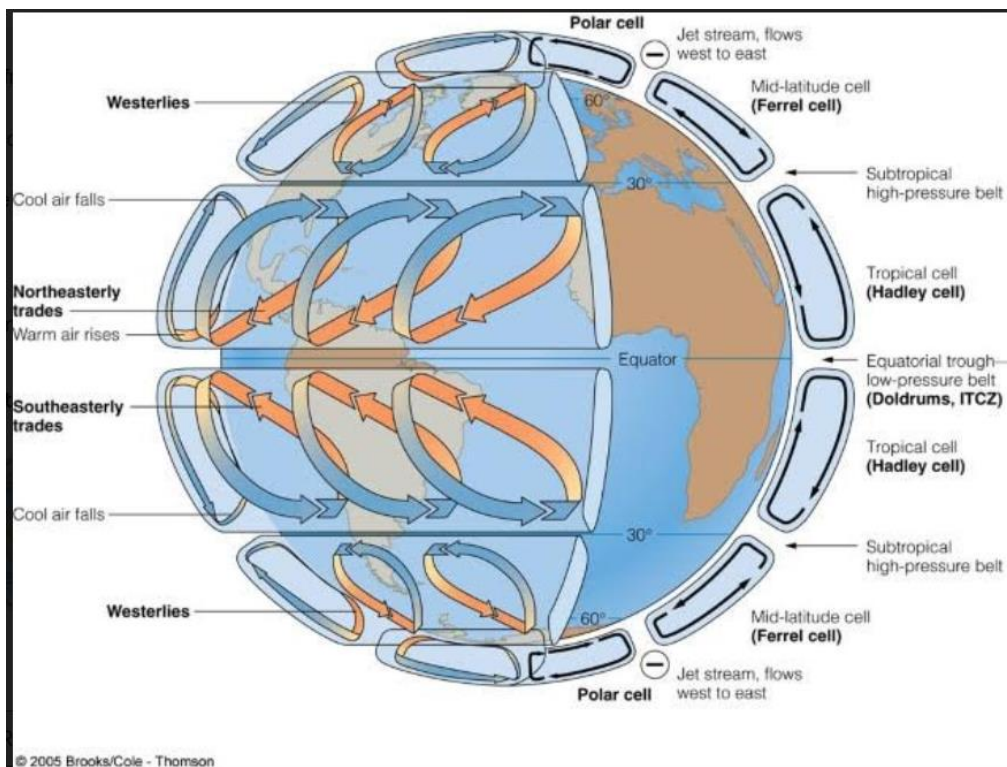
15.5 During a strong El Niño, the waters of the central and eastern Pacific warm dramatically. A strong convection column ascends from these waters and produce a draft which pulls the Pacific Jet Stream south and strengthens it, thus providing strong shearing winds which suppress hurricanes over the Gulf of Mexico and western Atlantic.

15.6 The Polar Jet stream is also pulled further south. The ample moisture from the waters of the eastern Pacific bring moisture up the U.S. East Coast.

15.7 Cold air from the Polar Jet stream plus moisture pushed up along the U.S. East Coast and blizzards that shut down the U.S. Atlantic seaboard for days.

15.8 In the strong El Niño years of 1997 and 2015, we had brutally hot and humid conditions during the summer and blizzards in the winter. "Extreme Weather".

Oversimplified Model for Circulation Cells, Fig. 15.a



## 16. Medieval Warming Period

16.1 The Medieval Warming Period (circa 950 to 1250 AD) has been correlated with diminished global volcanism and related changes to ocean circulation patterns. With diminished volcanism and less seismic warming across the oceans, the convective heating of the Southern Oceans shifted more to continental land masses of the Northern Hemisphere via conduction, warming the water around coastal regions in the higher latitudes. The GeoReactor referenced in Section 7 was in a down cycle. Reduced evaporation/convection across the Southern Oceans vs. proportionately greater conduction through continental land masses in the Northern Hemisphere. Michael Mann was correct in his paper that the effects of the Medieval Warming Period were largely observed in the North Hemisphere (Mann - 15). With diminished water vapor delivered from the Southern Oceans, extended drought afflicted the U.S. Southwest and the Anasazi people abandoned their cliff dwellings.

16.2 The Atlantic Meridional Overturning Current (AMOC) is initiated by the salt-bearing icebergs of the North Pole. The snow on top of the iceberg is fresh water, light and fluffy. Salt water will freeze at approx. 28 F. The denser frozen salt water is on the bottom of the iceberg. As the icebergs melt by the north-going warm surface waters of the AMOC, the bottom of the iceberg starts melting. This makes the waters beneath the iceberg saltier and denser so they sink down to the abyssal depths and start their trip southbound. Ultimately, by melting from below, we reach the much-feared "tipping point" and the iceberg upends. Yikes !

16.3 It is known that during the Medieval Warming period the AMOC slowed. The driver wasn't there because icebergs weren't forming as much. The Arctic waters were heated from the Gakkel Ridge and preventing the salt water from freezing, producing an ice-free Northwest Passage and open waters north of Siberia. An interesting book on this is "1421: The Year China Discovered America," by Gavin Menzies. He offers evidence that the Chinese circumnavigated Asia, Africa, and Europe in 1421.

16.4 With gentler warming across the latitudes of Iceland, gentle rain fronts descended across England and Europe, principally raining at night. Just as described in Arthurian legends — Camelot.

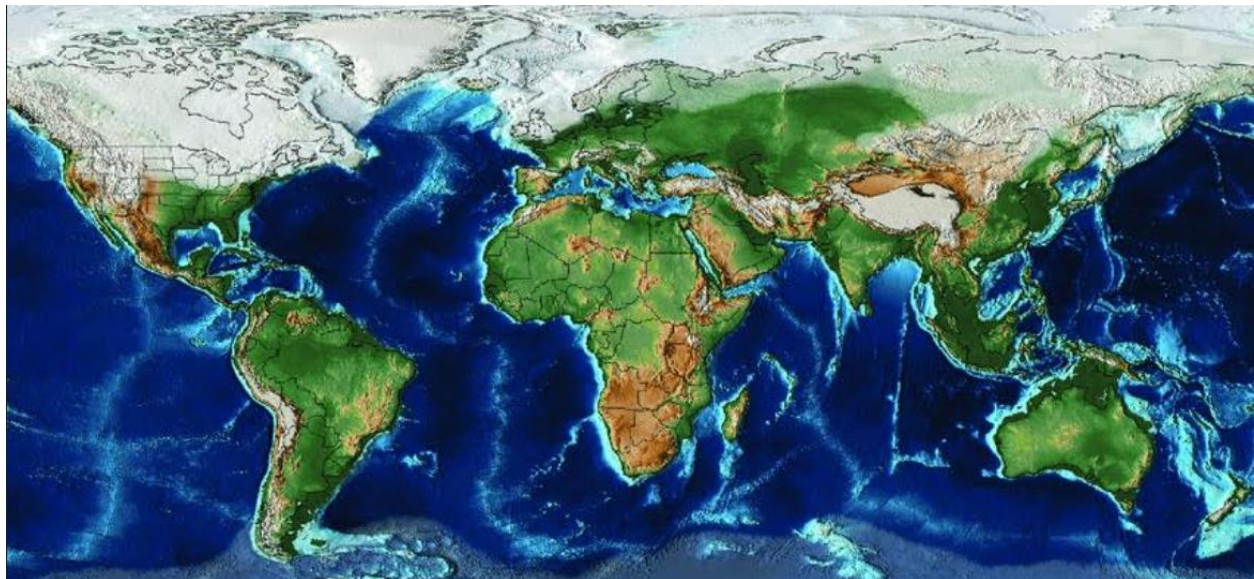
## 17. Pleistocene Ice Age.

17.1 The “Deeps” within the South Pacific trench systems driving the ENSO lie along +/- 23.5 degrees South latitude. These Trench systems developed as the Pacific Ocean underwent eons of planetary expansion. Logically, prior to sufficient planetary expansion, the formation of the Peru/Trench and Tonga Trench were relatively minor in earlier epochs. Logically, the Mariana Trench had a more dominant role in shaping climate. As the Mariana Trench tore apart and propagated new rips, the two trench systems of Tonga and Peru/Chile split off in separate directions to form the binodal regions which drive the ENSO today.

17.2 The deepest region in the Mariana Trench is the Challenger Deep at latitude +/- 14 degrees North, north of the Equator. During the Pleistocene Ice Ages ( 2,580,000 to 11,700 years ago) seismic heating centered on the Mariana and precipitation stayed in the Northern Hemisphere to form the Ice Age glaciers.

17.3 The Southern Hemisphere had limited precipitation and South Africa suffered under continuous drought conditions. Anthropologists describe that the population of Africa below the Equator fell to 600 souls.

Pleistocene Ice Ages, Fig. 17.a.



## 18. El Niño – WW-II, European Theater 1943/1945

18.1 As Eisenhower gravely pondered the invasion of Europe he was guided by his meteorologist about a break in the rain fronts descending from Iceland. At that time, meteorology was just a nascent science. Eisenhower committed to the invasion and the German high command dare not awaken Hitler to move the Panzers. The blizzards and brutal cold of the Battle of the Bulge plus the Russian front froze men in their trenches. El Niño.

18.2 The ancients were not far wrong. They called the planets “wandering stars”. The movement of the planets, planetary alignments, and all the bizarre movements of major celestial bodies decided the fates of man and empires.

## 19. La Niña - 2020/2023

19.1 Strong La Niña conditions started in the autumn of 2020 and persisted through 2022. On Dec. 21, 2020, in addition to the Winter Solstice, Jupiter and Saturn were at their closest distance from one another since 1623 and closest to Earth since 1226. A “Great Conjunction”.

19.2 under La Niña conditions there are no shearing winds across the Gulf of Mexico nor Western Atlantic, allowing hurricanes to form. In 2021, we used all the letters in the alphabet in names for tropical storms and hurricanes. 2022 was back to a very average year, with 14 named storms.

19.3 With a cooler North Atlantic and reduced evaporation, below average snow was predicted for Northern Europe in the winter of 2022. Winter rain bands shifted further south. Unlike the unsettled weather for Southern Europe, northern France, the Benelux countries Germany, and Poland had drier conditions. These are the opposite of El Niño conditions. Fig. 19.a



19.4 Significant tidal pumping stresses coincided with the Winter Solstice on Dec. 21, 2021 and Precession of the planet on Jan. 4, 2022 to initiate the processes around the Tonga Trench and regions to the west. An estimated 50 million tons of water vapor spewed from the Tonga Trench volcano on Jan. 15, 2022. This largest submarine volcano ever observed will produce a warm, wet planet for years. This submarine volcano was followed on Sept. 10, by a submarine volcano creating a new island.

19.5 On Nov. 11, 2022, a Richter 7.5 submarine earthquake struck off Alofi-Nuie as well as a Richter 7.1 earthquake near Nieafu-Tonga. On April 30, 2022, there was a planetary alignment of Venus-Earth-Mars-Jupiter. On Sept. 26, Jupiter made its closest approach to Earth in 59 years. On November 27, Hawaii's Mauna Loa volcano began erupting and continues into December. On December 7, there was the Martian eclipse or Mars opposition, a full moon in alignment with Mars with Jupiter and Saturn only slightly offline.

19.6 On June 24 and again on December 28, 2022 there were "planetary parades" when all 8 planets from Mercury out to Uranus visible on the southern horizon. Jupiter, Saturn, and Mars occupied a span from south to southeast, a 45 degree arc — all tugging at the Earth and pulling apart our tectonic plates.

19.7 Tremendous tidal pumping stresses. Tremendous seismic energy release. Totally unappreciated.

## 20. Conclusions

20.1 Tidal pumping upon our planet as well as Earth's internal heat drive our weather and climate. This knowledge has only come into awareness within the last decade thanks to geophysicists, geochemists, and astrophysicists.

20.2 Energy Poverty, Excess Winter Deaths, civil unrest, political instability and a host of human afflictions have resulted due to the virtual War on Carbon. Developing nations suffer the most. The War on Nitrogen (NO<sub>x</sub> and Ammonia) in agriculture just punishes farmers of the Netherlands even more. More Political Science.

20.3 The neurotoxin Lithium is mined in open pit quarries in Bolivia. Lithium dust is blown in all directions. Toxic Cobalt for batteries is mined in Zaire by child labor with no mine safety measures, no ventilation, and substandard to non-existent shoring. Where will we obtain the copper required for the electrical grid to serve wind farms and EVs? We are literally killing people today with the policies driving unreliable "green" energy sources.

20.4 "The Moral Case for Fossil Fuels" by Alex Epstein and "Merchants of Despair" by Robert Zubrin are painfully sobering.

20.5 The West has used the developing world as a dumping ground for centuries, Africa in particular. The International Monetary Fund refuses to extend loans to African nations for coal-fired power plants. Without gas or electric stoves, indoor air quality causes thousands of early deaths from women cooking over cow dung fires.

20.6 My personal experience has been that individuals with very advanced levels of education are the most rooted in the notion of man-made climate change or feel that man's activities must be controlled just for the sake of control. This even leads to political and economic policies suppressing human freedoms and insuring poverty. We already witness political instability and the collapse of governments across the world over food and fuel. These international instabilities are already washing up on our shores.

20.7 Reputations, monetary interests, scientific ignorance, and political gaming are great impediments. How to break through these barriers is a challenge for all of us.

## 21. Acknowledgements

21.1. I wish to express my thanks to many individuals. First and foremost, my supportive wife Judy as well as our wonderful sons and extended family. My mother, a Chemist, who set me on my path. My father, who demonstrated a hard work ethic all of his life. Mrs. Vitalya KEBLIS, my high school Chemistry teacher, and mentor. All of my colleagues throughout my career in Chemical Engineering. I also count my former colleagues in DuPont, Dr. J. Marvin Herndon (the GeoReactor), John O'Sullivan (Principia Scientifica International), Charles B. Dougherty (a deep personal friend and mentor), James Edward Kamis (Plate Climatology), and Robert J. Tuttle, author of "The Fourth Source. Effects of Natural Nuclear Reactors"

21.2. This paper is not intended as all-inclusive and raises more questions than it answers. Just as Richard Feynman states, this is to be welcome. Much more work is necessary to gain a fuller understanding of the processes of our Universe. I realize that this paper is contrary to prevailing models in geology and climate change but the supporting references on Tidal Pumping have evolved just over the past decade. Constructive commentary is welcome.

## 22. References

Most of this information has been issued in the last decade to half decade.

1 – "On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground", S. Arrhenius, Philosophical Magazine and Journal of Science, April 1896

2 - "Institute for Celestial Geodynamics" ( D. Zbikowski, et al ). Multiple Papers. (undated).

3 - "The Solar System Barycenter" 2005 - 2045  
[https://www.skymarvels.com/gallery/Vid-Solar-System-Barycenter.htm?fbclid=IwAR3Kdh8KT8CZSqXzJwS58trzTgsbBMEZ3OBKxYyJYaPlmC DqFOuxB\\_rPr-Y](https://www.skymarvels.com/gallery/Vid-Solar-System-Barycenter.htm?fbclid=IwAR3Kdh8KT8CZSqXzJwS58trzTgsbBMEZ3OBKxYyJYaPlmC DqFOuxB_rPr-Y)

4 - "Expanding Earth Research . Org" , Jan Mestan website (material 2014 - Present)

5 - "Criticism of Continental Drift Theory"  
Geomorphology - IAS instruction materials (undated)

6 – "The Carbon Dioxide Theory of Climate Change", G. Plass, Tellus A – Dynamic Meteorology and Oceanography, May 1956

7 - "Topological inconsistency of continental drift on the present-sized Earth"  
R Meservey. Science. 1969.

8 - "Problem of Convection in the Earth's Mantle" E. N. Lyustikh, Geophysical Research Letters: 01 January 1969

9 - "Pump-like Tidal Driving of Tectonic Plates - Plates 1" George W. Moore, AAPG Bulletin, GeoScience World, June 1, 1975

10 - "Evidence of a deep mantle history in terrestrial osmium-iridium-ruthenium alloys" J. Bird, W. Basset, Geophysical Research Letters, 1980

11 - "The earth tides"  
Judah Levine, National Institute of Standards and Technology (NIST) December 1982

12 - "Earth tides and the degassing of the Earth" N. Khitarov, G. Voitov, NIST, March 1982

13 - "Other Planets Influence Earth's Climate", Univ of Toronto, J. Mitrovica, A. Forte, Dec. 18, 1997 (→ particularly Jupiter & Saturn)

14 - "An attempt to determine tritium, Na-22, and Cl-36, and Radon in mud volcano in Taman (50 meters down in a mud volcano), I. Nevensky, et al, Radiation Measurement, publ. June, 2001

15 - "Medieval Climatic Optimum" Michael Mann, 2002

16 - "Earth's Heat Transfer Flux Revised and linked to Chemistry", A.M. Hofmeister, R.E. Criss, et al, Technophysics, 6-Sept.-2003  
→ "Enstatite chondrites are sufficiently radioactive to supply the Earth's heat flux, contain enough Iron metal, to account for Earth's huge core, and have the same Oxygen isotopic ratios as the bulk Earth."

17 - "Mantle Decompression Thermal Tsunami", J.M. Herndon, arXiv, March, 2006

18 - "Bedout: a possible end-Permian impact crater offshore of northwestern Australia; Research Article", L. Becker, et al, Science, 4-June-2004

19 - "Mantle Decompression Thermal Tsunami", J.M. Herndon, arXiv, March, 2006

20 - "Global distribution of seamounts from ship-track bathymetry data"  
J.K. Hillier, A.B. Watts, Geophysical Research Letters, July, 2007  
→ By definition seamounts are formed by volcanic activity. Hillier and Watt estimate 3 to 3.5 million seamounts and this excludes allowance for regions higher than Latitude 60 degrees. Conservatively, active submarine volcanoes are in the hundreds of thousands.

21 - "Deccan volcanism, the KT mass extinction and dinosaurs", G. Keller, A. Sahni, et al, Journal of Biosciences, 11-Jan. 2009



- 22 - "Can Earth's rotation and tidal despinning drive plate tectonics?"  
F. Riguzzi, G. Lanza, et al, Technophysics, 10-June-2009
- 23 - "Earth's surface heat flux." Davies & Davies, University of Cardiff, Feb. 2010
- 24 - "Solar Dynamo as Pacemaker for Earth's Global Climate", V.D. Rusov et al, arVix, January 2011
- 25 - "Researchers discover new force driving Earth's tectonic plates" Cande & Stegman, Univ. of S. California, July 7, 2011
- 26 - "On Ohmic heating in the Earth's core II: Poloidal magnetic fields obeying Taylor's constraint". Jackson, Livermore & Lerley, Aug., 2011
- 27 - "Earth Expansion Evidence: A Challenge for Geology, Geophysics and Astronomy" G. Scalera, S. Cwojdzinski, National Institute of Geophysics & Vulcanology (Italy), 4-Oct-2011
- 28 - "The Cretaceous-Tertiary Mass Extinction: Theories and Controversies", G. Keller, book publ. 2011 and other publications.
- 29 - "The Fourth Source. Effects of Natural Nuclear Reactors" Robert J. Tuttle, publ. 2012
- 30 - "Who Turned on the Heat? The Unsuspected Global Warming Culprit -- El Niño-Southern Oscillation", Copyright 2012 Bob Tisdale
- 31 - "New study suggest Earth's Lower Mantle penetrated by metallic blobs, S. Karato, K. Otsuka, PhysOrg, 13-Dec.2012
- 32 - "Mantle Expansion driving Lithosphere Tectonics. The Mediterranean Case." Francesco Stoppa, Geological Society of Italy, 2013
- 33 - "Spin-driven tidal pumping: Tidally driven changes in planetary spin coupled with secular interactions between planets." R. Greenburg et al, Feb. 2013
- 34 - "Effect of carbon, sulfur and silicon on iron melting at high pressure: Implications for composition and evolution of the planetary terrestrial cores", L. Deng, et al, Geochimica et Cosmochimica Acta, August 2013
- 35 - "Tidal strain and tidal stress in the Earth's interior" W. Kia, et al, Chinese Journal of Geophysics, November, 2013
- 36 - "Tidal Stresses - How Gravity Heats Things Up", Tim James, Dec. 2, 2013 ( author of 'Astronomical: From Quarks to Quasars, the Science of Space at its Strangest')

37 - "Secular Increase in the Earth's LOD (Length of Day) Strongly Implies that the Earth Might Be Expanding Radially on a Global Scale" G.G. Nyambuya , 4-March-2014

38 - "Terracentric Nuclear Fission Reactor: Background, Basis, Feasibility and Implications", J.M. Herndon, Current Science, 25-February-2014

39 - "New evidence for 'oceans' of water deep in Earth: Water bound in mantle rock alters view of Earth's composition", S. Jacobsen, B. Schmandt, Science Daily , June 12, 2014

40 - "Asian monsoons in a late Eocene greenhouse world"

A. Licht, G. Dupont-Nivet, et al, Nature, 4-August 2014

—> "But monsoons are still poorly understood, and today's climate models disagree about how increased carbon dioxide (CO<sub>2</sub>) in the atmosphere will alter them."

—> "Asian monsoon began ..... recently several independent teams to around 40 million years ago." (same duration as Central Asian drought)

41 - "A mechanism for Earth Expansion" , Peter Woodhead, 6-10-2014

42 - "Liquid iron-sulfur alloys at outer core conditions by first-principles calculations"

K. Unemoto et al, Geophysical Research Letters, 14-Sept. - 2014

43 - "Jupiter's effect on Earth's Climate" O. G. Sorokhtin, et al Nov, 2014.

44 - "Two massive releases of carbon during the onset of the Paleocene-Eocene Thermal Maximum", G. Bowen, et al, Nature Geoscience, 15-December-2014

45 - "Seafloor Volcano impulses may alter Climate", D. Kelley, Geophysical Research Letters and M. Tolstoy, Columbia Univ. - School Earth Institute, Feb. 15, 2015

"A new EarthSky study shows that these undersea volcanoes on strikingly regular cycles, ranging from two weeks to 100,000 years" (See Kent, et al, Rutgers, May 7, 2018).

46 - "Stanford geologists refute coal development theory" Boyce, Nelson, et al, Univ. of Stanford , 2-Feb. 2016

—> Coal, oil, and gas are NOT produced from squished trees. Fischer-Tropsch (F/T) and Sabatier reactions produce oil and gas on all planets in prodigious quantities.

—> The only true "fossil fuel" is lignite (brown coal, soft coal, thermal coal, 65 - 70 % carbon content, but heavily comprised of water), derived from peat bogs of the Early Tertiary Period. Peat has only 25 to 35% carbon value. Then, at 65 to 66 million years ago, these peat bogs were sealed over by pyroclastic ash from extensive volcanism of the Cretaceous/Tertiary Great Extinction. (Dr. Gerta Keller, et al).

—> Heavy crudes, petroleum tars, sub-bituminous coal, bituminous coal vent off volatiles to yield Anthracite (black coal, hard coal) which is 95% Carbon. These carbonaceous fuels all derive from F/T and Sabatier reactions.

47 - "Tectonic dissection and displacement of parts of Shona hotspot volcano 3500 km along the Agulhas-Falkland Fracture Zone ". K. Hoernle, et al, Geology, April 1, 2016

48 - "A window for plate tectonics in terrestrial planet evolution", C. O'Neill, A. Lenardic, Physics of the Earth and Planetary Interiors, June-2016 (Layman's text: "Does a planet need Plate Tectonics to develop Life ?", Phys .org)

49 - "One Paradox of Plate Tectonics", Laszlo Attila Horvath, Geologist Supervisor OKGT, Hungary, July-2016

50 - "Resilience of the Asian atmospheric circulation shown by Paleocene dust provenance"

A. Light, G. DuPont-Nivet et al, Nature Communications 4-August-2016

—> "Our results show that dust sources and near-surface atmospheric circulation have changed little since at least 42 Myr." (same duration as India-Bangladesh monsoons)

—> "Neither Tibetan uplift nor the decrease in atmospheric carbon dioxide concentration since the Eocene seem to have changed the atmospheric pattern in central Asia," Licht said. "Wind patterns are influenced by CHANGES IN THE EARTH'S ORBIT over tens or hundreds of thousands of years, but over millions of years these wind patterns are very resilient."

51 - "El Niño - NASA Earth Observatory", M. Carlowicz, S. S. Uz, 14-Feb.-2017

52 - "Pervasive upper mantle melting beneath the western US"

S. Hier-Majumber, B. Tauzin, et al Earth and Planetary Science Letters. April-2017

—> Just above the Transition Region there are Carbonate melts, source of CO and CO<sub>2</sub> by acidic attack from sulfur compounds (SO<sub>2</sub>, etc) produced in the Lower Mantle. CO and CO<sub>2</sub> are reagents for Fischer-Tropsch and Sabatier reactions to produce methane and water. Just in the Western U.S. ALONE, centered on Yellowstone, this carbonate melt zone measures approx. 1.8 million sq. km with a thickness ranging from 25 to 70 km. Decomposing just 1 % of this Yellowstone carbonate layer would be equivalent to burning 2.3 trillion barrels of oil.

53 - "How selenium compounds might become catalysts" Science Direct, 17-July-2017  
"Carbon-Halogen Bond Activation by Selenium-Based Chalcogen Bonding", S. Huber,  
P. Wonder, D. Werz , Angewandte Chemie International Edition (2017).

54 - "The great sulfur depletion of Earth's mantle is not a signature of mantle–core  
equilibration" C. Ballhaus, et al, Contributions to Mineralogy & Petrology, 25-July-2017

55 - "New vision of problem of Geoneutrinos and Earth heat fluxes." L.B. Bezrukov, et  
al, International Conference SN 1987A, 2-8 July 2017

56 - "How Geoneutrinos can help in understanding of the Earth heat flux"  
L B Bezrukov, A S Kurlovich, et al, 3rd International Conference on Particle Physics and  
Astrophysics (ICPPA 2017) 2–5 October 2017 (" The predicted intrinsic Earth heat flux  
is significantly larger than model dependent experimental value obtained under  
assumption that the main heat transfer mechanism is a thermal conductivity. We  
introduce an additional mechanism of heat transfer in the Earth's crust, namely the  
energy transfer by hot gases produced in the Earth crust at great depths.")

57 - "The Very Deep Origin of the World's Biggest Diamonds"  
Gemological Institute of America, Winter 2017

—> "Culligan-like diamonds contain .... iron-rich metallic inclusions surrounded by a  
fluid jacket composed of methane and hydrogen." This is a Fischer-Tropsch reaction.  
Iron is the catalyst.

—> Fischer-Tropsch reactions proceed as follows:  $\text{CO} + 3\text{H}_2$ , under Reducing  
Conditions ( $\text{O}_2$  deficient) and in the presence of an Iron or Cobalt catalyst and starting  
at 350C, yields methane and water. Further dwell time in a geological "trap" will produce  
petroleum — in unimaginable quantities. Sabatier reactions perform in much the same  
way with  $\text{CO}_2$  instead of CO catalysts of Nickel and Alumina.  $\text{CO}_2$  methanation.  
Alumina is contained in sandstone.

58 - "Core-Mantle boundary heat flow" , T. Lay, J. Hernlund, B. Buffett, Nature  
Geoscience, Jan 2008

59 - "Spectral, spatial-statistical, and graphical evidence that gravitational interaction  
with the Moon assists in driving Earth's tectonic plates Part 1" D.Zbikowski, Institute for  
Celestial Geodynamics, January 2018

60 - "The Greenhouse Effect: An Evaluation of Arrhenius' Thesis and a New Energy  
Equilibrium Model." Warren Stannard, Univ. of Western Australia, Jan. 2018

61 - "Enstatite Chondrites EL3 as building as building blocks for the Earth: The debate  
over the  $^{146}\text{Sm}$  and  $^{142}\text{Nd}$  Systemics", M. Boyet, et al, Earth and Planetary Letters, 15-  
April-2018.

62 - "A global forecast for great earthquakes and large volcanic eruptions in the next decade" D. Zbikowski, Institute for Celestial Geodynamics, Sept. 2018

—> "Movement of Earth's rotational axis with respect to the globe generates motion of the north and south rotational poles upon the surface. Motion of the north rotational pole with respect to the net surface consists of roughly circular wobbles with a quasi-annual period. The wobbles of polar motion are formed primarily from two components—the free Chandler wobble (433 days) and the forced annual wobble (seasonal, 365 days)."

63 - "Empirical evidence for stability of the 405 kiloyear Jupiter-Venus eccentricity cycle over hundred of millions of years.", D.V. Kent, P.E. Olsen, C. Rasmussen, et al, Rutgers University , May 7, 2018

—> "Every 405,000 years, gravitational tugs from Jupiter and Venus slightly elongate Earth's orbit, an amazingly consistent pattern that has influenced our planet's climate for at least 215 million years and allows scientists to more precisely date geological events like the spread of dinosaurs, according to a Rutgers-led study."

64 - "What Are the Milankovitch Cycles?" R. Ross, Live Science, Feb-20-2019

65 - "A Model of a Synchronized Solar Dynamo", Stefani et al, Solar Physics, 22-May-2019

66 - "Deep Carbon, Past to Present" by the Deep Carbon Observatory, published in 2019.

67 - "The Ability of Significant Tidal Stress to Initiate Plate Tectonics" by Zanazzi & Triaud, ICARUS, Science Direct, June-2019

68 - "Seismic monitoring reveals tidal stresses in the Earth's crust", C. Sens-Schönfelder, et al, Physics World, 15-April-2019

69 - "No experimental evidence for the significant anthropogenic climate change" J. Kauppinen & P. Malmi, Univ. of Turku, 29-June-2019

—> "this paper proves that the changes in the low cloud cover fraction practically control the global temperature."

70 - "The Theory of Plate Climatology" by James Edward Kamis. Book published 2019.

71 - "The phenomenon of subduction is incompatible with Earth's surface geometry and geomorphology" Lazlo Attila Horvath, Geologist Supervisor OKGT, Hungary, July 2019

72 - "Earth's Orbital Shifts may have triggered Ancient Global Warming", Scientific American, Sept. 3. 2019

73 - "Radioactive Chlorine from Nuclear Bomb Tests still present in Antarctica", Phys.Org, 16-Oct.-2019 → Specifically, Chlorine-36 in deep ice cores from Vostok, deep inside East Antarctica, completely unaffected by fall-out experienced on the perimeter of Antarctica, Cl-36 increases from below. → Chlorine 36 produced from the GeoReactor.

74 - "Milankovitch (Orbital) Cycles and Their Role in Earth's Climate" Alan Buis, NASA Jet Propulsion Laboratory, February 27, 2020

75 - "Global Warming ? Under Sea Volcanoes. The Axial Seamount" J. Le Maistre, 2020

76 - "Global Warming – Under-Sea Volcanoes", J.A. Shanahan, 18-May-2020

77 - "Dehydration melting below the undersaturated Transition Zone", W. Panero et al, Geochemistry-Geophysics-Geosystems AGU, June 2020

78 - "Tidal modulation of plate motions", D. Zaccagnino, C. Doglioni, Earth-Science Reviews, June 2020

—> "While mantle convection is fundamental ingredient of geodynamics the driving mechanism of plate tectonics remains elusive. .... GPS measurements are now accurate enough that, on long baselines, both secular plate motions and periodic tidal displacements are visible."

—> "Tidal oscillations also correlate with the seismic release."

79 - "Catalytic function of ferric oxide and effect of water on the formation of sulfur trioxide", Dai, Wang, et al, Journal of Environmental Management, June 2020

80 - "Planetary Alignment ? Increase in Volcanoes ?" EarthSky.org, July 22, 2020

81 - "A nutrient control on marine anoxia during the end-Permian Mass Extinction " M. Schobben, W, Foster, et al, Nature Geosciences, 17-August-2020

82 - "Carbon cycling in the deep Mariana Trench in the western North Pacific: Insights from radiocarbon proxy data." S. Shan, Y. Oi, et al, Deep Sea Research Part 1: Oceanographic Research Papers, October, 2020.

83 - "Hasn't Earth warmed and cooled naturally throughout history ?" NASA.gov, Oct. 29, 2020.

84 - "Solar system planetary alignment triggers tides and earthquakes" S. M. Awadh, Journal of Coastal Conservation, 4-March-2021

85 - "Exploding Stars alone cannot account for rapid heavy-element production, study reveals" PhysicsWorld, 19-May-2021 ( Anton Walner, et al, Plutonium and Iron 60 in ocean crust derived from hydrothermal vents,

86 - "Exploding stars alone cannot account for rapid neutron heavy element production reveals", PhysicsWorld, 19-May-2019

87 - "Beyond Plate Tectonics" by James Maxlow. Book published 1-Dec.-2021

88 - "Institute of Cartography & Geology of Catalonia", Notices issued 2007 through 2022." The origin of the Earth's heat, totally unappreciated -

—> Latent crystallization heat

—> Gravitation (Gravity Compression Force)

—> Remnant heat of planet formation (Thermal Decompression)

—> Kinetic or Friction heat (force fields generated by the Moon and the Sun (tidal forces).

—> Physicochemical exothermic reactions (including gases with molten minerals, gas-liquid, gas-gas, & solid-solid (solid state reactions at high P-T))

—> Radiogenic decay of isotopes

> Nuclear fission ( the GeoReactor).

89 - "Links of planetary energetics to moon size, orbit, and planet spin: A new mechanism for plate tectonics", A. Hofmeister, Univ. of Washington (St. Louis), January 2022

—> "Tug of sun, moon could be driving plate motions on 'imbalanced' Earth"

90 - "A previously unidentified fault revealed by the February 25, 2022 (Mw 6.1) Pasaman Earthquake, West Sumatra, Indonesia" P. Supendiab, et al

91 - "The hot zones of global Mw  $\geq 5$  earthquakes and their decadal migration during 1989–2019" Jin Chen & Hong Tang, Journal of Geosciences, March 2022

92 - "Reason for Earthquake Season Revealed" , Bollinger & Avouac, Live Science, March 2022

93 - "Water-Induced Diamond Formation at Earth's Core-Mantle Boundary" 11-Aug-2022

94 - "Precession helped drive glacial cycles in 2202 the Pleistocene."

S. Barker, A. Starr, Geophysical Research Letters. 26-May-2022

95 - "Undersea Volcanoes - The Axial Seamount - Carbon Sense" J. Le Maistre, 22-July-2022

96 - "Time and Date . com", International Earth Rotation and Reference System, 27-July-2022

97 – "An ocean inside Earth? Water hundreds of kilometers down", Phys.org, Sept. 27, 2022

98 - "Global-scale tidal forcing and plate tectonics have both shaped the tectonic evolution of Europa". C. E. Detelich, et al, 53rd Lunar and Planetary Science Conference (2022)

99 - "Extremeness of Seasons Determined by Planetary Motion Parameters" B. Ehlmann, EOS / AGU Advances, 7-Nov.-2022, taken from ("The Key Factors Controlling the Seasonality of Planetary Climate" I. Guendelman, Y. Kaspi, AGU Advances, 20-Oct.-2022)

100 - "Systematic changes in circumpolar dust transport to the Subantarctic Pacific Ocean over the last two glacial cycles" T. Struve et al, Proceedings of the National Academy of Sciences (PNAS), November 21, 2022

101 - "The 60- & 88-year temperature oscillations are related to planetary and solar oscillations" Dr. Antero Ollila, Dec. 19, 2022

102 - "Extreme climate changes influenced early life evolution at ~ 1.4 Ga: Implications from shales of the Xiamaling Formation, northern North China Craton" Y.He, T. Zhou, PreCambrian Research, December 2022

<http://ircamera.as.arizona.edu/NatSci102/NatSci102/lectures/climate.htm>

103 - "Dying in the Sun: Direct evidence for elevated UV-B radiation at the end-Permian mass extinction", Liu, Peng, et al, Science Advances, Jan. 6, 2023

104 - "Asthenospheric low velocity zone consistent with global prevalent partial melting" J. Hua, K. Fischer, et al, Nature Geoscience, Feb. 6, 2023

105 - "Scientists just discovered a hidden layer of molten rock beneath the Earth", BGR, J. Hawkins, Feb. 11, 2023

106 - "Causes of Climate Warming" F. Kogan, Remote Sensing of Land Surface Changes", publ. 23-Feb-2023

107 - "The Dynamical Consequences of a Super Earth in the Solar System", S. Kane. 'The Planetary Science Journal, Feb.-23-2023, → Life may not have been possible on Earth without Jupiter."

108 - "Gas monitoring at Volcanic Fields outside Naples exposes multiple sources of CO<sub>2</sub> emissions", G. Bruno et al, Italian National Institute of Geophysics and Volcanology, (Geology Geoscience, GSA), 7-March-2025

→"Phlegraean volcanic fields ... emit 4,000 to 5,000 tons of CO<sub>2</sub> each day .... Equivalent to the emissions from burning approx. 500,000 gallons of gasoline."

109 - "Structural complexity of simple Fe<sub>2</sub>O<sub>3</sub> at high pressures and temperatures", E. Bykova, et al, Nature Communications, 11-Feb.-2016



110 – “Whole-Earth Decompression Dynamics: New Earth Formation Geoscience Paradigm Fundamental Basis of Geology and Geophysics”, J.M.Herndon, *Advances in Social Sciences Research Journal*, February 25, 2021

111 – “Radiocarbon age anomaly at intermediate water depth in the Pacific Ocean during the last deglaciation”, L. Stott et al, *Paleoceanography and Paleoclimatology*, June 2009

112 – “KAMLAND-EXPERIMENT AND SOLITON-LIKE NUCLEAR GEOREACTOR”, V.D. Rusov, et al, arVix, 24-Feb-2009

113 – “Discovery of Self-Sustained  $^{235}\text{U}$  Fission Causing Sunlight by Padmanabha Rao Effect”, M.a. Padmanabha Rao, *IOSR Journal of Applied Physics*. 19-June-2019

114 – “Radioactive chlorine from nuclear bomb tests still present in Antarctica”, M. Baroni et al, *Phys. Org*, 16-Oct.-2019

115 – “Cobalt-rich Crusts – Ore Treasure on the Slope of Seamounts”, GEOMAR

116 – “Rapid shifts in circulation and biogeochemistry of the Southern Ocean during deglacial carbon cycle events”, Schoenfelt, et al. *Earth, Atmospheric and Planetary Sciences*, Oct. 15, 2018

117 – “Reason for Earthquake Season Revealed”, P. Avouac et al, *Live Science*, Jan. 4, 2008

