

TIDAL PUMPING, SOLAR WEATHER, & GEOTHERMAL HEAT DRIVE EARTH'S WEATHER & CLIMATE

Richard F. Cronin, BChE, MBA, P.E (ret.), American Geophysical Union, Geochemical Society
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E-mail: richard.f.cronin@gmail.com

AUTHOR INTRODUCTION: Retired and Independent researcher. Entire career in the private sector. No employment in academia nor government service. BChE Chemical Engineering Univ. of Detroit-Mercy 1973, MBA Univ. of Delaware 1980, Professional Engineer (non-practicing). Member American Geophysical Union and Geochemical Society. Forty (40) years experience in industrial commodity chemical processes, much as Earth's geochemical processes. Thirty two (32) years with E.I. DuPont de Nemours in Process Engineering, Design, and Project Engineering leadership. This paper is entirely my own based upon my engineering education, experience, literature search, and logical deduction. I have received no funding for this work.

PURPOSE: My only wishes are to refute the fiction of man-made climate change, eliminate Energy Poverty from subsidized "unreliable energy" schemes and spur honest scientific study. Claims of man-made climate change have been used to assert political control and deprivation on human activity. Academics continue the fiction under fear of rejection and unemployment.

ABSTRACT – The energy of Tidal Pumping, also called Tidal Heating (the gravity fields of major celestial bodies squeezing smaller celestial bodies to drive tectonics and submarine volcanism), plus Geothermal Heat delivered to the plate boundaries of the Ring of Fire have only recently come into awareness. Tidal Pumping produces the El Nino Southern Oscillation. The Solar Maximum (11 year Solar Cycle) produce cosmic rays which induce waves in the polar jet stream. Of the total amount of energy delivered to the surface of Earth, radiation, from whatever source, is greatly overstated. Radiation is the weakest form of heat transfer, only used in paint booths, heat lamps and microwave ovens. Heat is delivered by convection of gases and most importantly, the convective and conductive properties of liquids emitted from the Earth's interior (55)(56). J.E. Kamis uses the term: "Heated and Chemically Active Fluids" (HCF). (69 – "Plate Climatology"). Exothermic geochemical reactions, plus Ohmic heating from the distortion of Earth's magnetic field by the solar wind and the Sun's magnetic field (23)(25)(87) as well as energetic cosmic rays producing aerosols for cloud formation are just recently being acknowledged. Due to Inverse Beta Decay, electrons flow out from the Earth's inner core and contribute more Ohmic heating. As a result, the Earth has a magnetic field and a net negative charge. Herndon describes how Lower Mantle Decompression drives pressure waves to cause compressive heating at the bottom of the lithosphere (17).

Tidal Pumping, Solar Weather, Geothermal Heat (specifically, exothermic geochemical reactions) and the interaction the Sun's magnetic field with Earth's magnetic field drive changes in weather and climate. None of this was appreciated by Gilbert Plass (6) and earlier.

DEDICATIONS - To the most special people in my life, Judy Cronin, love of my life, now departed, and our sons Steven and Robert. Tom Waeghe for the paper by A. Cazenave (130).

FUNDING – I have received no outside compensation for this work. This work is entirely my own.

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ETHICS DECLARATION – I have no ethical conflicts nor outside influences in this work.

1) INTRODUCTION

Tidal Pumping driving tectonics was first identified in 1977 as Voyager 1 flew by Jupiter. Jovian moons Europa, Ganymede, and Io are flexed, heated and volcanic due to the gravity field of Jupiter exerting variable gravitational pull as these moons pass from apogee to perigee in their eccentric orbits. Tidal Pumping is also referred to as Tidal Heating (29), i.e. repeated squeezing heats a rubber ball. Also, per NASA these moons pump one another (123). Io is the most volcanic celestial body in the solar system and is described that its volcanoes are “misplaced”. Although Saturn possesses the most prominent rings in our solar system, all gas giants have these rings where moons have been ripped apart by Tidal Pumping forces. Tidal Pumping is a very substantial force.

The Tidal Pumping effect is exerted upon Earth by the Sun and even planets from Venus out to Jupiter (9)(11)(13)(21)(24)(32)(34)(35)(42)(44)(61)(62 - Kent & Olsen)(66)(67)(79)(83)(98)(100)(130)(131). The work by Cazenave, et al (130) and A. Rizzo (131), are particularly noteworthy:

A. Cazenave: “A 6-year cycle has long been recognized to influence the Earth’s rotation, the internal magnetic field and motions in the Earth’s fluid core. Recent observations have revealed that a 6-year cycle also affects the angular momentum of the atmosphere and several climatic parameters, including sea level rise, precipitation, land hydrology, Arctic surface temperature, ocean heat content and natural climate modes.”

A. Rizzo: “A 6-year oscillation has long been recognized to affect the Earth’s rotation, fluid motions in the outer core, and the internal magnetic field. Recent analyses reveal that the same 6-year periodicity also influences atmospheric angular momentum and multiple climatic variables, including global mean sea level, precipitation, land hydrology, Arctic surface temperature, ocean heat content, and natural climate modes. Here, we discuss how these Earth observations could, in principle, be linked to a torsional mode in space-time geometry, consistent with the General Singularity (GS) framework’s Unified Field Equation (UFE), which extends Einstein-Cartan theory.”

Mars and the moon also have this Tidal Pumping effect (21)(58)(61)(77)(88)(117). Likewise, Earth tidally pumps Venus, which drives its volcanism. The realization that Tidal Pumping causes tectonics completely overturns the dated concept that crustal movement is driven by the Earth’s internal heat. With Tidal Pumping causing tectonics, all of the internal heat of the planet is delivered to the surface, specifically where oceanic plateaus or rises have formed at plate junctures. Seismic activity is very pronounced, with geysers, hydrothermal vent fields and submarine volcanoes. Moreover, the heat from exothermic geochemical reactions are just now coming into awareness.

A key point is that heat distribution is localized in deep ocean “hot spots” while the grossly oversimplified climate models treat the Earth’s biome as homogenous and cannot represent these myriad complexities. Until recently the heat of geochemical reactions has not even been acknowledged. Over the span of a few years these energy inputs drive the El Nino Southern Oscillation, heralded as “Extreme Weather” by catastrophic climate change adherents.

Although first published in March 2023, I am not alone. Many others follow. Conduct Word Searches for: “SSRN Richard Cronin Solar Planetary Tidal Pumping”, “SSRN Richard Cronin Chthonian Planet”, Brian Catt, Willie Soon, Phil Plait, Rhys Taylor, as well as “Orbital Variations” and “Stability of the Solar System”

2) MECHANICS OF DEFORMABLE BODIES AND THE UNIVERSAL LAWS OF GRAVITY

One of the defining courses in Freshman engineering studies is Mechanics of Deformable Bodies - deflection in beams and columns bowing out of verticality.

Gravity has been considered one of the weakest forms of energy. However, Newton's Universal Laws of Gravity do not speak to the deformation of celestial bodies. We know that the Earth has been deformed into a globe simply by its rotation. A point of emphasis regarding Tidal Pumping effects from more distant planets such as Venus and Jupiter is a modification of Newton's Universal Law of Gravity, wherein the force of gravity is a function of the inverse of the distance squared between the two bodies. This assumes rigid, unyielding bodies but in truth we know that the interiors of the planets have semi-molten and elastic properties which deform the celestial body. Even a small amount of deformation results in significant tectonic stresses on the thin, brittle crust. Moreover, Newton's treatment only allows for one body acting upon another with no consideration of multiple bodies acting simultaneously. That is, multiple overlapping gravity wells, much as wave fronts amplify or dampen troughs in an ocean.

Finally, the Solar System orbits the Milky Way and in so doing imparts another variable which affects the gravity wells described by Einsteinian physics. Masses outside of our Solar System impart their gravitational influence. (125)(130)(131)(132). The gravity fields of other major celestial masses deform us, particularly the Sun, but Venus and Jupiter as well. The Earth is a Deformable Body with pliant layers beneath a thin, brittle crust. The Lithosphere is described as plastic. The Asthenosphere is described as elastic (103). Reservoirs of molten carbonates exist in the Upper Mantle (51) and molten Sulfur at the Core Mantle Boundary (120). Regions of liquid Oxygen also exist in the Lower Mantle (108).

3) EL NIÑO SOUTHERN OSCILLATION (29)

The El Niño is annually observed around Christmas time by an initial upwelling of cold water in the eastern Pacific, bringing up anchovies from the Humboldt Current. A bounty of fish — a Gift from the Child. Then the waters continue to warm in the central Pacific and can cause a fish kill. The El Niño Southern Oscillation (ENSO) occurs as the Earth passes thru the Northern Hemisphere's Winter Solstice (Dec. 21) and the Southern Hemisphere swings towards the Sun. Then, two weeks later, is the Perihelion (Jan. 4), Earth's closest approach to the Sun. The Sun's proximity plus the Earth's rotation impose a drag force across the South Pacific, pulling the Pacific plate from the southeast to the northwest. These annual events are part of the Milankovitch Cycles which have been highly correlated to changes in weather but the significance is not in solar radiation; rather, in the Sun's Tidal Pumping stresses. Additional discussion is found in Section (11) - Formation of Continental Land Masses.

The continental shelves lie at a depth 140 to 145 below current sea level. These were the beaches formed during the low water levels of the Ice Ages. Methane clathrates are pockets of methane encapsulated in frozen fresh water. Clathrates are abundant approximately 100 to 1000 meters below the continental shelves. With Tidal Pumping stresses opening the divergent Galapagos Triple Junction (Galapagos Hot Spot) seismic heat melts the clathrates to provide an initial cold water upwelling (69, J.E. Kamis. "Plate Climatology"), signaling the onset of the El Niño. Deep water anchovies rise to the surface, providing a Christmas gift from "The Child" to the fishermen. The initial cooling switches to warming as the clathrate melting diminishes.

The existence of methane and FRESH WATER ice is linked to the Hydrocarbon Chemistry of Serpentinization, Fischer-Tropsch and Sabatier reactions — an entirely separate discussion around Abiotic Hydrocarbons (See below, (6) Geochemistry & (7) Abiotic Hydrocarbons).

The most logical source of the El Nino is the divergent plate system at the Galapagos Triple Junction in the eastern Pacific (1.4 degrees South latitude, 90 degrees West longitude). With the planet's rotation, the Pacific Plate is dragged from southeast to northwest triggering geysers at the Galapagos Hot Spot. The Galapagos Plateau lies at a depth of only 800 to 900 meters. With warmer waters in the Central Pacific, a low pressure center forms, drawing moist air westward and the Galapagos, Peru as well as the Amazon Basin have their rainy season, spanning December to May. The Tidal Pumping drag force also causes “de-spinning” of the planet (21, 32, 88).

The source of the La Nina extends from the submarine volcanoes of Tafu-Maka in the Tonga-Trench (15 degrees South latitude & 174 degrees West longitude) to the Banda Sea Triple Junction (6 degrees South latitude, 130 degrees East longitude). The Banda Sea Triple Junction is a Ridge-Ridge-Trench system. Tafu-Maka is a dual caldeira volcanic system, sharing the same magma chamber. These caldeiras are at depths of 1400 and 1560 meters respectfully. Tafu-Maka was the epicenter of the Tonga-Hunga submarine volcano of January 15, 2022. The Tonga Trench is a subduction zone with the Pacific plate sliding beneath the Australian plate while there is divergent zone at the Galapagos Triple Junction. The La Nina is observed with elevated surface temperatures (SST) around Papua New Guinea, the Bismark Sea and the Torres Strait.

Another point in support of these two hot spots are the studies of Chen & Tang and the migration of M5+ earthquake activity between 1989 – 2019. Migration trended from the New Hebrides Trench to the Tonga Trench and from the Central American Trench towards the Peru/Chile Trench. (90)

The La Niña spanning 2020-2023 caused severe drought in California and the U.S. Southwest plus persistent high water temperatures in the Western Pacific. Accumulated Tidal Pumping stresses finally produced the largest ever-recorded submarine volcano off Tonga Hunga on Jan. 15, 2022, spewing an estimated 150 million tons of water vapor (137) as high as the stratosphere and increasing the atmospheric water vapor content by more than 5 % (138). Zhou, Dhomse, et al predict that as much as 25 million tons of water will remain in the upper atmosphere through 2030 (138). Jupiter's closest approach to Earth in 59 years on Sept 26, 2022 may have added to Tidal stresses and Pacific warming. Colloquially we may say that the steam vaporizer was briefly dialed to high setting. Climate change reports proclaimed that 2023 was “the hottest year on record”. Actually, there was opposing discussion that the planet cooled (121).

A brief El Niño returned in early 2023. Cooling in late 2023 and early 2024 provided rain and snow in both Hemispheres. Mud slides impacted California after years of drought. Anomalous cooling of Atlantic equatorial waters were observed in 2024. More specifically, rains across North Africa suppressed the dust which typically seed the formation of tropical storms in the Eastern Atlantic. Hurricane activity in the Atlantic was noticeably absent until the La Nina returned in September, bringing the floods from hurricane Helene, spawned in the Gulf of America, but dry conditions spurred extensive fires in California in late 2024/early 2025, typical of strong La Nina conditions. Cold and early autumn snows fell across Europe, snow in South Africa and even Saudi Arabia. Heavy snow and cold conditions worsened around the Northern Hemisphere in late 2024/early 2025. Heavy snows coated the beaches of Argentina and Brazil.

The lag time between significant seismic activity and major weather effects appears to be one to two years. Eruption of Mt. Tambora in 1815 produced the “Year without a Summer” in 1816. Another interesting event was the Total Eclipse over the U.S. on April 8, 2024. The Moon had a very small effect. Jupiter was 30 degrees up and to the left of the Sun. Venus was 15 degrees down and to the right. Mars was 35 degrees to the lower right of the Sun. It is reasonable that the combined gravity of the Sun, Jupiter, Venus, and Mars pulling on Earth’s tectonic plates caused the M 4.8 earthquake in northern New Jersey on April 5, 2024.

Milankovitch cycles (Precession, Obliquity, & Orbital eccentricity) have been highly correlated with changes to weather and climate (127). However, NASA Science Editorial Board (128) and many others dispute that changes in solar irradiance due to Milankovitch cycles have significant impact on surface warming. Perhaps so, but Milankovitch cycles are the principal drivers of Tidal Pumping and volcanology. Radiation is not the issue. The conclusion is that solar radiation’s contribution is a small part of the Earth’s total Energy Budget.

4) FAINT YOUNG SUN PARADOX

The earliest photosynthetic life emerged 3.5 billion years ago when the Sun was only 70% as luminous as today. This presents the Faint Young Sun Paradox. If we only allow for solar radiation, the Earth should have been a solid block of ice. Obviously, Tidal Pumping and the internal heat of the planet maintained liquid water in our oceans. Think of that amount of heat !

5) OTHER PLANETS

Other planets exhibit significant internal heat, beyond what is explicable by radiogenic heat and thermal decompression. The gas giants all generate more heat than they receive from the Sun, with Neptune generating 2.7 times more energy. This energy radiating from the planet’s core is what drives the strong surface winds reaching 1,900 km/hr (Mach 1.5) and the Great Dark Spot.

Astronomers are perplexed by the observations of Pluto from the New Horizons mission. It is too small to have much radiogenic heat or any residual heat of planetary accretion and it is too distant to be Tidally Pumped by the gas giants, yet Pluto has significant seismic activity. There are mountain ranges as high as the Rockies comprised of a frozen mixture of nitrogen/water ice. Active lava flows of this nitrogen/water ice provide lava flood plains across the Sputnik Planum.

6) GEOCHEMISTRY

Entirely excluded from discussion of the internal heat of all planets are myriad exothermic geochemical reactions and Ohmic heating (interaction of the solar wind and magnetic field of the Sun with the Earth’s magnetic field) which merit a separate lengthy treatise. Currently only radiogenic heat and the residual heat from planetary accretion are considered (22 - Davies & Davies, 2010). In board description, the Lower Mantle is acidic and under Oxidizing conditions (Oxygen available). The Upper Mantle is alkaline and under Reducing conditions (Oxygen deficient). Metal sulfides melt at the Core-Mantle Boundary, 2900 km down (33, 41, 132). Approximately 90% of Earth’s Sulfur resides in these regions (120, 132). Molten sulfur initiates the geochemical reaction sequence.

Oxygen is produced by transformation of simple Iron oxides (hematite - Fe_2O_3) and (magnetite - Fe_3O_4) into more Iron rich allotropes (Fe_5O_7). Researchers at Univ. of Bayreuth describe “Rivers and lakes of liquid Oxygen” between 1500 to 2000 km down (108 - E. Bykova et al 2016). Molten Sulfur burns exothermically producing all of the strong sulfur-bearing acids, which react with vast reservoirs of molten carbonate minerals in the Upper Mantle to give off heat and produce immeasurable amounts of CO and CO_2 . Ringwoodite at the bottom of the Transition Zone, 660 km down, undergoes melt dehydration, liberating water (38, 76, 133).

In 2017, researchers from Univ. of London identified a reservoir of molten carbonate minerals approx. 350 km beneath Yellowstone, 25 to 70 km thick and covering an area the size of Mexico (51, Heir Majumber et al 2017). They estimate that if just one (1) percent of this reservoir were to decompose it would be equivalent to burning 2.3 trillion barrels of oil. Mind you, Yellowstone is only one of 40 to 50 “hot spots” globally. Others include Hawaii, Iceland, Samoa, the Gulf of Guinea, Campi Flegrei near Naples, Cape Verde Islands and Melbourne Australia.

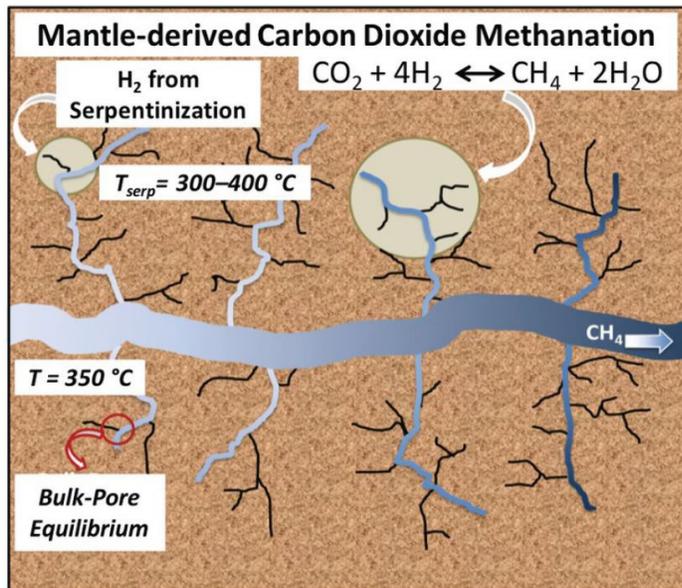
Image from “A Massive Lake of Molten Carbonates the Size of Mexico was just discovered under the U.S.” Forbes Magazine, Oct. 24, 2017 (65)



Subsequent exothermic geothermal reactions include Serpentinization of mafic and ultramafic minerals like olivine to produce Hydrogen, Fischer-Tropsch reactions (methanation of CO) and Sabatier reactions (Methanation of CO_2). Finally, complex organosynthesis from Flash Chemistry is extremely exothermic. Such conditions are present in the micro-passages feeding hydrothermal vents. Such passages are the logical precursor for the precise replication of complex organic compounds present in RNA and DNA. Again, all of these reactions are exothermic (produce heat) and although the amount of heat is indeterminate none of this heat is even acknowledged in the Earth’s heat budget.

VII) PETROLOGY & ABIOTIC HYDROCARBONS (46)

Conditions inside the Earth and all planets exist to produce Hydrogen via Serpentinization, followed by methane, water and oil produced Fischer-Tropsch and Sabatier reactions. Left to dwell, the methane builds out into longer chain more complex hydrocarbons. Hence, “petroleum traps” are found beneath impermeable salt domes like the West Texas Permian Basin. Shales also serve as petroleum traps. The silica comprising sandstone serves as a catalyst support. Depiction of Serpentinization and Sabatier reaction (Methanation of CO₂). “Deep Carbon, Past to Present” published 2019, Figure 12.10 (65)

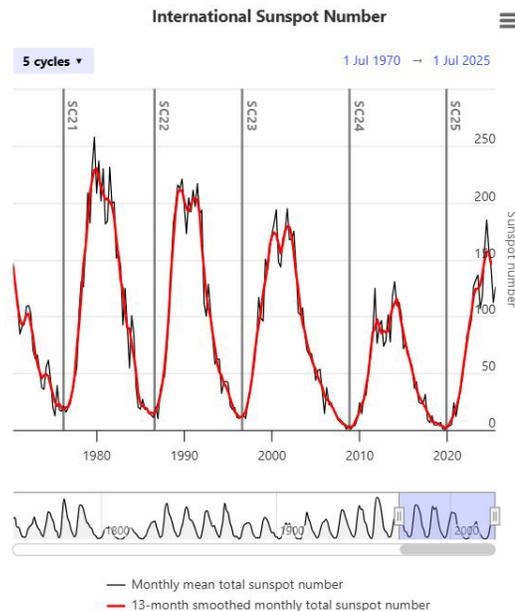


There are only two (2) “fossil fuels” — lignite coal (brown coal, soft coal) cooked up from peat bogs and coated over by pyroclastic ash as well as Kerogens, a light sweet crude derived from algae and plankton wedged into shales, like the Bakken Formation in the Dakotas and up into Canada. Sweet crudes do not have Sulfur and command a premium on world markets. The U.S. uses more heavy sour crudes due to our needs for asphalt. Abiotic hydrocarbons invariably contain Sulfur.

8) SOLAR WEATHER, SOLAR CYCLES & COSMIC RAYS (134, 135, 136)

The extent of energetic cosmic ray bombardment penetrating the magnetosphere to produce nucleation of aerosols and cloud formation is a growing awareness (H. Svensmark 2007). More significantly, the aurora borealis from coronal mass ejections are not just light shows. The ionosphere is heated and the polar vortex (polar jet stream) is driven into pronounced waves around the Northern Hemisphere. Arctic air streaming into mid-latitudes form fast-moving low pressure centers and flooding rains. At the bottom of the trough a blocking high pressure center forms a heat dome. This is keenly observed in Solar Maximums, such as we experienced in July and August, 2025 (Solar Cycle 25). Moreover, steam from volcanoes produce ice crystals in the lower atmosphere which also serve as cloud nucleation sites. The connection of Sun Spots to weather has been noted since the Maunder and Dalton Minimums, but has gained greater attention with the 2024-2025 Solar Maximum. Simply stated, Solar Weather greatly affects Earth’s weather.

Image taken from SpaceWeather.com. Solar Cycles 21 to 25



9) MAN-MADE CLIMATE CHANGE

“Saving the planet” from 400 ppm CO₂ (0.04 of 1%) is ridiculous yet Liberal politicians effectively destroy the auto industry by EV mandates and drive power costs so high that in the United Kingdom lower income elderly shut off their power entirely, roll up in blankets and die in the wintertime. UK’s National Health Service thoroughly tracks the causes of death and even has a descriptive term: “Excess Winter Deaths”. The U.K.’s National Health Service estimates that there are approximately 3000 Excess Winter Deaths per winter due to unheated homes. Britain’s Parliament has conducted hearings on this topic and have resolved nothing. The suggestion that man’s emissions of CO₂ and other trace gases drive changes in climate and weather is merely a device to impoverish and control humanity. Current Environmentalism has been co-opted by malign Socialist forces.

10) THE WATER CYCLE

For any planet to control its surface temperature and have weather which redistributes heat, it must have a condensable vapor. Earth has water. Venus has sulfuric acid in clouds and rain. Neptune and Saturn have methane. Jupiter has an atmosphere of ammonia compounds. The vast cooling mechanism of the water cycle is grossly misrepresented or misunderstood in the heat balance of the planet.

If Earth’s surface heats, for whatever reason, more water is evaporated, convects upwards to form clouds, condenses to rain and freezes to snow, with the Heat of Evaporation and the Heat of Crystallization thrown off into outer space by means of Long Wave Infrared Radiation from cloud tops. Moreover, snow, ice, and deserts provide reflective albedo. Earth does not exist inside an enclosure of glass panes (a greenhouse). More correctly, we live beneath a patchy blanket of clouds with warm moist air below and cold dry air above. Low clouds control Earth’s temperature (68 Kauppinen & Malmi). Earth’s oceans and clouds act as a simple evaporative cooler.

S. Arrhenius (1) held global absolute humidity at a fixed 10 gm per cubic meter. G. Plass (6) ignored the radiative cooling from the water cycle entirely. After introducing his thoughts on CO₂'s Effective Climate Sensitivity (ECS), the final sentence in Plass' abstract states: "Absent any other radiative effects....". Plass does not even mention water in his treatise. Even without understanding the effects of Tidal Pumping and the contributions of geothermal heat, the "greenhouse gas effect" has been essentially debunked by Nobel Prize winners Richard Feynman and John Clauser, Freeman Dyson, as well as R. Holmes, N. Nikolov, K. Zeller, amongst many others.

Dyson's quotes on this topic are particularly memorable.

11) FORMATION OF CONTINENTAL LAND MASSES

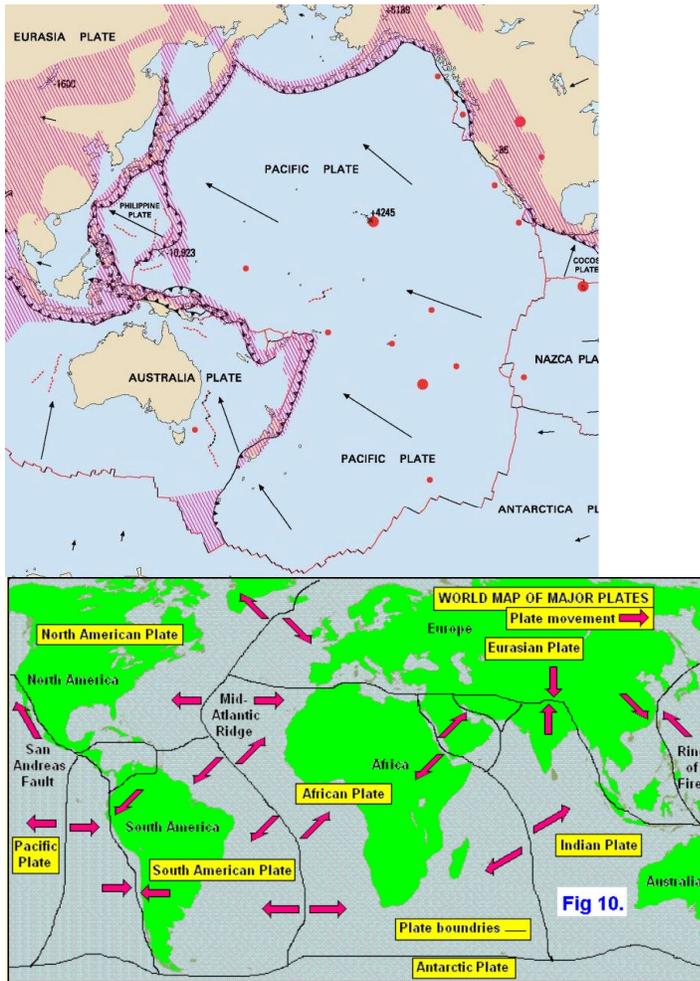
The Pacific plate is Earth's largest tectonic plate, followed by the North American plate. Combining the Earth's inclination during the Winter Solstice (+/- Dec. 21) with the Perihelion (+/- Jan. 4) as well as the Earth's rotation, the Pacific plate is dragged from southeast to northwest. The East Pacific Rise is a divergent seam. A magma plume is formed at the Galapagoes. New crustal material pushes the Nazca plate eastward to subduct beneath the South American plate. Similar new upwelling crust pushes the Cocos plate northeastward to subduct beneath the Caribbean plate. Further north, faulting extends through the Gulf of California and the San Andreas fault. Off the U.S. West Coast, the Pacific plate pushes the Gorda plate, Juan de Fuca plate and Explorer plate eastward to subduct beneath the North American plate. The Pacific plate pushes northward, driving into the Alaska-Yukon Orogeny. The North American plate extends above the Aleutian arc, continuously pushed northward into the Okhotsk plate.

In the western Pacific, the Pacific plate serves as a plow, pushing aside the Australian plate. The Tidal Pumping force drives the Australian plate northward and pushes the Indian plate beneath the Eurasian plate, pushing up the Himalayas. The movement of the Pacific plate explains the Hawaiian and Emperor Island chains. The plate is moving over mantle plumes.

Tidal Pumping has driven the concentration of continental land masses into the Northern Hemisphere. We can also observe that there has been a torquing motion exerted by the planet's rotation.

The spreading Mid-Atlantic and Mid-Indian Ridges are explained by Expansion Tectonics (31,36,40,61,66,86,88,97,100,119) also called Whole Earth Decompression Dynamics (Herndon, 109). Jan van Mestran describes the Expanding Earth as a Chthonian planet. As described by Herndon, Earth's original gas/liquid proto-atmosphere exerted 300 earth-masses onto the rocky inner core, compressing it into a rocky inner "kernel" approximately 2/3rds of Earth's current dimension. The thermonuclear detonation of the Sun ripped off the overburden, initiating terrestrial expansion.

In the southeast Pacific, the Earth is being pulled apart by the Sun's Tidal Pumping forces. In the Mid-Atlantic and Central Indian, the Earth is being pushed apart by Expansion Tectonics.



12) ICE AGES - SOLAR SYSTEM AND GALACTIC PHENOMENA -- FURTHER STUDY

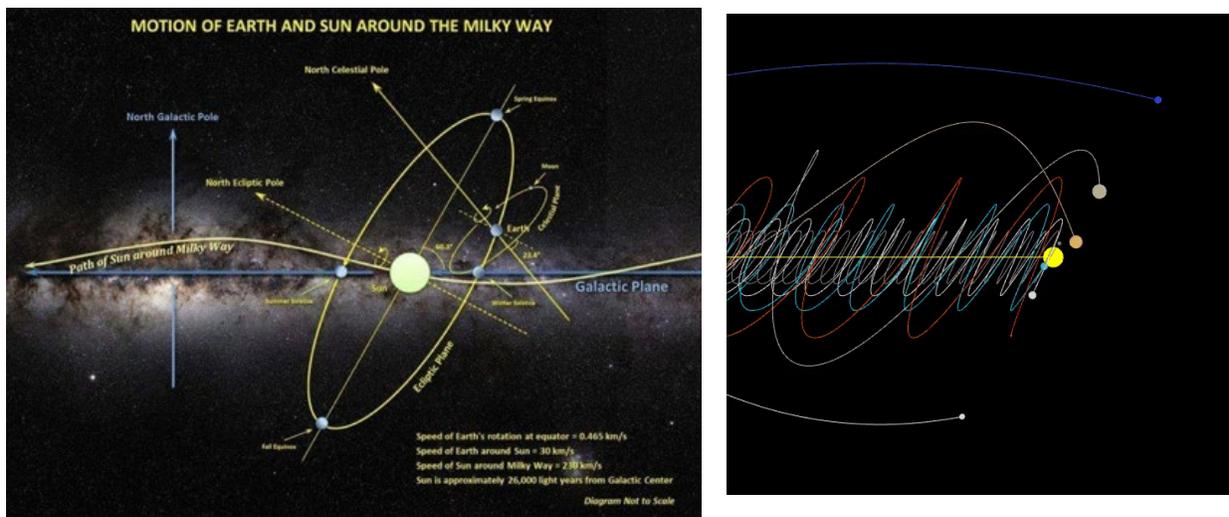
Multiple sources describe that Ice Ages are accompanied by significant volcanism (129 – Miller, et al 2012). Water evaporated from the southern oceans provided snow across the Northern Hemisphere to form glaciers. Again, Tidal Pumping by the Sun on the Earth is dominant, ergo, stresses and volcanism in the South Pacific. The Equatorial regions were a vast cold desert.

Some of the hypotheses for extended Ice Ages and warming events include those presented by D. Kaiser et al, Dark Matter causing planetary orbit wobble, (125), A. Cazanave (130), A. Rizzo (131). Radcliffe Waves, the pre-formation of a stellar system, with no observable radiation, passing by our solar system (122). Extended Tidal Pumping driven by the Solar System passing by a Black Dwarf or Dark Matter (124 - A. Göttel, et al, 2024) or a hypothesized “Quasi Black Hole” which is only detectable by its gravity. Another hypothesis is that of gravity waves originating from the core of the Milky Way from Neutron Star Mergers (NSMs) and pushing clouds of cosmic dust ahead of them — (126 - P. LaViolette, 2005). Any major, sustained gravitational influence will induce volcanism.

Another cause of Ice Ages is the Instability of the Solar System. The current stable configuration in planetary tilt and orbits is not fixed. Scientists currently use chaos theory to assess the solar system's configuration, which has varied broadly. Conduct a word search for "Stability of the Solar System". Many other variable conditions have not been examined.

Even though the solar system orbits the Milky Way at 830,000 km/hr, that speed is a snail's pace over galactic distances which assures that Tidal Pumping/Tectonic Activity is sustained for much greater durations. The Sun can be seen as a football thrown in a tight spiral, with the planets extending out from the surface of the football, experiencing massive crustal stresses.

Phil Plait and Rhys Taylor challenge the popular YouTube animation provided by DJ Sadhu. Sadhu's presentation of the solar system as a vortex does not preserve the heliocentric model -- the ecliptic. Rather, Plait and Taylor provide another image of the solar system inclined at 60 degrees to its forward motion, thus preserving the ecliptic and the heliocentric model.



Conduct a Internet search to note the animation of Solar System with the ecliptic (plane of the planetary orbits) which lies at approx. 60 degrees to the Solar System's line of travel. We can readily see how the planets are flung about and the stresses involved.

See [physicsforum orientation of the earth sun and solar system in the Milky Way](#) (Fig. 1)

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- 32 - "Spin-driven tidal pumping: Tidally driven changes in planetary spin coupled with secular interactions between planets." R. Greenburg et al, Feb. 2013
- 33 - "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
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- 35 - "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')
- 36 - "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
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K. Unemoto et al, *Geophysical Research Letters*, 14-Sept. - 2014
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—> Most coal, oil, and gas are NOT produced from biomass. Fischer-Tropsch (F/T) and Sabatier reactions produce oil and gas on all planets in prodigious quantities.

—> There are only two true “fossil fuels” -

—> (1) 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).

—> (2) Kerogens, light sweet oil formed from algae and phytoplankton wedged into shales such as the Bakken Formation

—> 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.

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49 - “Resilience of the Asian atmospheric circulation shown by Paleocene dust provenance” A. Licht, 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.”

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51 - “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 CO₂ by acidic attack from sulfur compounds (SO₂, etc) produced in the Lower Mantle. CO and CO₂ 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.

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53 - “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

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

55 - "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.")

56 - "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 (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 with CO_2 instead of CO catalysts of Nickel and Alumina. CO_2 methanation. Alumina is contained in sandstone.

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61 - "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)."

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- 66 - "The Ability of Significant Tidal Stress to Initiate Plate Tectonics" by Zanazzi & Triaud, ICARUS, Science Direct, June-2019
- 67 - "Seismic monitoring reveals tidal stresses in the Earth's crust", C. Sens-Schönfelder, et al, Physics World, 15-April-2019
- 68 - "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."
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- 71 - "Earth's Orbital Shifts may have triggered Ancient Global Warming", Scientific American, Sept. 3. 2019
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—> 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))
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