Plasma Tectonics and Electric Geology:
Some Context on Geoplasma Research of Global Electric Circuits

Bruce Leybourne – Research Director
Geoplasma Research Institute *www.GeoplasmaResearchInstitute.org*
Aurora, CO 80014, USA

ABSTRACT

Has anyone ever wondered why tornado outbreaks generally occur in the Spring, while hurricane season is in the Fall? The tilting of the Earth's North Pole towards the Sun in the Spring activates the northern global circuits connected to North America, while the tilting of the Earth's South Pole towards the Sun in the Fall activates the southern global circuits connected to the ocean basins. Tornados spawn on the North American continent, hurricanes spawn in the oceans. This simple relationship belies the significant effects of the global electric circuits on our planet. Many earthquakes are linked to this circuit switching mechanism, especially when active solar induction affects from sweeping coronal hole Birkeland currents occur in conjunction with the switch. The Geoplasma Research Institute's goal is to bring this research to the forefront of scientific discussions assisting NCGT-Journal and IMCSI in unraveling the relationships between our worst natural disasters and global electric circuits. The, March 2020 – Invited Session – "Plasma Tectonics and Electric Geology" provided the opportunity to open this discussion. Many thanks to the organizers of the International Multi-Conference on Society Cybernetics and Informatics (IMSCI)! This paper relates surprising geophysical evidence within an electrodynamic framework that provides context for integrating the wide-ranging contributions by many authors in this invited session.

Keywords: *Plasma Tectonics, Electric Geology, Solar Induction, Sweeping Coronal Hole Birkeland Currents, Natural Disaster, Hurricanes, Tornadoes, Earthquakes, Global Electrical Circuit*

1. INTRODUCTION

Geoplasma Research Institute
The mission is to integrate space weather and terrestrial data into global weather and natural disaster forecasting models, by mapping Earth's circuits with geophysical intelligence. This is implemented with a new electrodynamic Stellar Transformer Earth-Sun model which accounts for solar induction effects on Earth. These effects can be extreme from events such as solar electromagnetic pulse, effect daily weather and long term climate from solar flares and sun spots, intensify hurricanes and tornados from sweeping coronal hole Birkeland currents, trigger earthquakes and volcanic activity from electromagnetic tidal effects, and spark wildfires from coronal mass ejections. Much of this research over the years, since 1996, was published in the New Concepts in Global Tectonics - Journal. We have recently shifted our focus to geoplasma tectonics and electric geology and have renamed the NCGT - Journal replacing "Global" with the term, "Geoplasma".
See: https://GeoplasmaResearchInstitute.org/

New Concepts in Geoplasma Tectonics – Journal
For over two decades the NCGT - Journal, under the leadership of founder and former Chief Editor, Dr. Dong Choi, became a beacon of light for researchers that needed a voice and platform to publish their research, offering new concepts that pushed boundaries and challenged conventional tectonic thought. Over these years an evolution to a "new" NCGT - Journal still committed to pushing the boundaries, although with an increased focus on other fields as they are related to electrodynamics, geoplasma tectonics and electric geology manifestations. For example: studies on climatology, seismology, oceanography, solar and solar system plasma physics, in addition to the earth sciences are all encouraged. It is our fondest hope that those who want a source for innovation in these and other fields of research, will continue to support the NCGT Journal as it creates the commercial base to become a lasting pillar of knowledge for tomorrow's "evidence-based" science. Louis A. G. Hissink is the present Chief Editor of the journal and runs the Geoplasma Research Institute with Research Director and CEO, Bruce Leybourne. See: http://www.ncgtjournal.com/

International Multi-Conference on Society Cybernetics and Informatics (IMSCI)
In 2004 a group of authors involved with NCGT published, *Electrical wildfire propagation along geomagnetic anomalies*, at the 8th World Multi-Conference on Systemics, Cybernetics and Informatics. New theories were being explored to explain the anomalous wildfire propagation amongst a host of natural disasters that needed a coherent framework of understanding. After many years of struggle, in 2018, 2019 and 2020 a series of papers were released with IMSCI from the NCGT group using a new electrodynamic model that began to piece the evidence together. This collection of papers with IMSCI is presented with some (Extended, Updated, and Revisited) papers of similar interest for this Special Issue Of "Plasma Tectonics and Electric Geology". These papers are discussed and organized under topics to assist the reader in assimilating the broader relationships of Stellar Transformer concepts to our natural world. Many mysteries existing on Earth for years are being slowly uncovered by understanding the electromagnetic induction interactions between our solar system, indeed the larger galaxy / universe and earth.

2. PAPERS ORGANIZED BY TOPICS

The 20 papers organized here by topic are highlighted:

Plasma Tectonics – Stellar Transformer
Plasma tectonics or more specifically geoplasma tectonics discusses the electrical nature and structure of our Earth. We find mappable vectors of the axial, radial and vertical components of Earth as a Stellar Transformer and discover the most active circuits. Lightning data confirms a diurnal mid-ocean ridge induction effect along axial circuits when solar alignment occurs at noon and midnight. Various solar activity

affects the intensity of this induction effect differently. Especially noticeable are sweeping coronal hole Birkeland currents that activate radial and axial induction effects.

1.) ***Plasma Tectonics and Electric Geology: Some Context on Geoplasma Research of Global Electric Circuits.*** This is this paper you are currently reading to provide overall context.

2.) Introduction to Plasma Tectonics & Electric Geology: Solar Wind Coupling to Planetary Circuits Lightning Tells the Stellar Transformer Story [1]. This was first published in the March 2020 IMCIC Proceedings and summarizes the "State of the Art" of mapping Stellar Transformer electronics.

3.) Orthogonal Megatrend Intersections: "Coils" of a Stellar Transformer (Extended) [2]. This is an extended paper from the March 2020 IMCIC Proceedings focused on mapping the toroidal component or "Coils" of the Stellar Transformer.

4.) The Paleo Dutton Plateau: A Geomorphologic Conundrum. This is an additional new paper presenting past tectonic interpretation conundrums, as impetus for a new model.

Electric Geology

These papers discuss the history and field work done by Electric Universe Pioneers [3] of Electric Geology Research exhibiting numerous examples and explaining how to develop "Electric Eyes" that notice the voluminous electrical field evidence especially in the western U.S. A focus on controversy of origins of Upheaval Dome in Canyonlands National Park, sparks a new electronic explanation that warrants serious consideration.

5.) History of Electric Geology [4]. This paper is from the March 2020 IMCIC Proceedings focused on Electric Universe original Electric Geology explorers, who were not in fact geologist, but were able to harness "Electric Eyes" that became aware of the telltale signs of electrical geologic impacts.

6.) Electric Discharge - Not an Impact Caused Formation of Upheaval Dome, Canyonlands National Park, Utah (Extended) [5]. This paper was originally published in the March 2020 IMCIC Proceedings, it was then extended for the regular IMSCI Journal, and is now extended even more for this Special Issue. It explains the electrical signature of Upheaval Dome and surrounding geomorphology and how it is tied to the larger global circuits of the Stellar Transformer. It provides ample evidence of the enigma "Obsession Stone" found solidified as vitrified clay ejecta (Analcime) on the surrounding surface lands. It hypothesizes the timing of the electrical event to be coincident with the end of the last Ice Age, the North American Megafaunal extinction and the formation of the Carolina Bays. This is a landmark study of Electric Geology!

Electric Earthquakes

These papers discuss research into the electrical nature of earthquakes, indicating precursor signals released before earthquakes and their interpretations.

7.) Electric Earthquakes? The case of Hyogo Ken Nambu (Japan) [6]. This was first published in the March 2020 IMCIC Proceedings and investigates electrical phenomena that could trigger, accompany, and follow an actual seismic event. The results showed that electrical phenomena play an important role in triggering Earthquakes, especially around the 10 km transition depth for Olivine release of electric charges and heat. Where strong earthquakes were linked to the Length of Day (LOD) and explained as phenomena of electron transport and dielectric barrier discharge.

8.) Atmospheric Plasmas that Precede Earthquakes in Seismically Active Areas [7]. This was first published in the March 2020 IMCIC Proceedings where relationships are explored between earthquakes and precursor formation of Ball Lightning (BL) or plasmoids with orientation to faults, magnetic anomalies, and hydrocarbon deposits in tectonically active areas.

Geophysical Forecasting

These papers discuss forecasting techniques that have been successful and others that may prove useful.

9.) Using Jet Stream's Precursors to Make Earthquake Forecast [8]. This was first published in the March 2020 IMCIC Proceedings and uses Jet streams to identify impending seismic locations from an interruption of the velocity flowlines just above the epicenter prior to Earthquakes. Lithosphere-Atmosphere-Ionosphere Coupling (LAIC) [9], by the release of radioactive material (ionized gases and plasmoids) to the atmosphere, is hypothesized to cause a series of physical and chemical reactions, resulting in temperature and pressure changes in the atmosphere, Jet streams, and electric field effects in the ionosphere. Solar induction as a driver is explored with the Stellar Transformer plasma tectonics model.

10.) Global Disaster Forecasting with Space Weather and Geophysical Intelligence [10]. This was first published in the March 2020 IMCIC Proceedings and explores links between space weather events and geomagnetism to improve natural disaster forecasting within a Stellar Transformer framework. Case studies for earthquakes, wildfires and hurricanes are presented.

11.) Multi-parametric Earthquake Forecasting the New Madrid From Electromagnetic Coupling between Solar Corona and Earth System Precursors [11]. This paper is from the July 2019 IMSCI Proceedings. An expanded version of this paper was previously published in New Concepts in Global Tectonics Journal v.7, no.1, pp.3-25, March 2019. The paper determines forecasting large earthquakes $M \geq 6.0$ with satellite monitoring and Radio Direction Finding techniques of Electro-Magnetic (EM) precursors associated with earthquakes are possible. Application to forecasting catastrophic earthquakes repeatedly striking the New Madrid Seismic Zone during the last 4 major solar hibernation cycles since 1400 AD is recommended.

Geophysical Detection Methods

These papers discuss proposed detection networks for increased forecasting capabilities and other useful geophysical detection and analytic methods.

12.) North American Solar Electro-Magnetic Induction Detection Network [12]. This paper was introduced as an abstract for a Plenary Keynote Address at the 13th World Multi-Conference on Society, Cybernetics, and Informatics (WMSCI) July 08, 2019 Orlando, Florida. This expanded abstract into a paper, proposes a Radio Finding Detection Network to detect Solar Electro-Magnetic (EM) Induction effects producing an electromotive force, or voltage, across ancient electrical conducting volcanic rock complexes underlying North America.

13.) Earthquakes Linked to 2003 European Heat Wave: Implications for Global Warming - Evidence in the Adriatic

and Mediterranean Basins (Revisited) [13]**.** This paper was originally presented as, *Four elements of coupled climate: Evidence of an electromagnetic driver for global warming, 23-28 Aug. 2004, 32nd Inter. Geological Congres*s, Florence, Italy. It was originally published as, *Tectonic forcing function of climate, New Concepts in Global Tectonics Newsletter*, p. 27 no. 40, Sept 2006. The revisited paper reveals clustered earthquake patterns at the base of the lithosphere/upper mantle concentrated within the ocean basins are sometimes followed by Sea Surface Temperature (SST) anomalies from increased hydrothermal venting during the 2003 European heat wave.

14.) Tectonic Spiral Structures of the Tethyan Vortex Street (Revisited) GRACE Geoid Interpretations and African Lightning Teleconnections [14]. This paper was originally an abstract published at the *33rd International Geological Congress, 2008 Oslo, Norway*. It describes the Tethyan Vortex Street (TVS) as spiral structures exemplified by counter-clockwise spirals along the world-encircling vortex street. The 6 spirals have associated gravity highs in GRACE geoid data and may be associated with active or dormant joule spikes. Monthly geoid/*mgal* values are data mined from GRACE missions between Feb. 2003 to Nov. 2005 and thermal expansion indicators are examined for each tectonic spiral, while external teleconnections to other gravitational and electrical indicators are sought.

Tectonic Vortex Mantle Modeling

These papers discuss fundamentals of tectonic vortex mantle modeling concepts, even before the underlying electrical nature was realized revealing an important new tectonic paradigm.

15.) The Australian-Antarctic Discordance (Revisited) Pressurized vs. Non-Pressurized Ridge System [15]. This paper was originally published in, *Marine Technology Society, Oceans 2000, Conference Proceedings*, Providence, RI, Sept. 2000. It discusses dramatic changes along the axial morphology of the Southeast Indian Ridge (SEIR) between Australia and Antarctica. Comparing sections of this ridge to sections globally we find an exceptionally unique geomorphology.

16.) Modeling Mantle Dynamics in the Banda Sea Triple Junction (Revisited) Exploring a Possible Link To El Niño Southern Oscillation [16]. This paper was originally published in, Marine *Technology Society Oceans '99 Conference Proceedings*, Seattle, Washington, Sept. 13-16, 1999. Upwelling mantle within the Banda Sea Triple Junction is modeled using computer visualization techniques as a tectonic vortex. Evaluation of mantle depths from gravity and seismic studies indicates upwelling of mantle from approximately 30-40 km under the continental shelf of Australia to 21 km in the Banda Arc. From here the mantle rises to 14 km within the Weber Deep and finally reaches a depth of 7 km in the North Banda Sea. Seismic epicenter data delineate spatial boundaries of flow regimes and define magmatic migration routes. Conceptual animation portrays upwelling and divergence of mantle flow structures (geostreams) underlying the tectonic trends of the region and the resulting counterflow within the volcanic arcs based on the surge tectonic hypothesis. This phenomenon is explored to determine the coupling effects with the atmospheric pressure flux of the southern oscillation, which modulates El Nino.

Climate Change and Tectonic Drivers

These papers discuss links to climate, hurricanes, and earthquakes.

17.) El Niño Tectonic Modulation in the Pacific Basin (Revisited) [17]**.** This paper was originally published in, *Marine Technology Society Oceans '01 Conference Proceedings,* Honolulu, Hawaii, Nov. 2001. The Easter and Juan Fernandez microplates are modeled as twin counterclockwise-rotating microplates along the East Pacific Rise driven by downwelling tectonic vortices. These twin microplates underlie the high-pressure cell of the Southern Oscillation associated with El Nino. The Central Pacific Megatrend connects planetary-scale tectonic vortices underlying the El Nino Southern Oscillation (ENSO) pressure cells. It connects the East Pacific Rise across basin to the Banda Sea tectonic vortex.

18.) Hurricane Irma 2017: Relationships with Lightning, Gravity, and Earthquakes: Update – Coronal Holes and Hurricane Dorian 2019 [18]**.** This paper originated from Letters to the Editor: *New Concepts in Global Tectonics Journal*, v. 5, no. 3, September 2017 and was first published in, *Journal of Systemics, Cybernetics and Informatics*, Orlando, FL, V. 16, N. 5, pp. 7-13, ISSN: 1690-4524, 2018. An update has been provided for this version correlating storm intensity with lightning data and coronal hole analysis that solves the mystery of why hurricanes intensify and stall out. Concluding that solar magnetic space weather activates Stellar Transformer mantle induction circuits during large variations in magnetism. This episodic activation modulates hurricane frequency, lightning hotspot activity influences earthquake and volcanic activity and has links to certain types of wildfire outbreaks.

Space Weather Wildfire Propagation

These papers discuss coronal mass ejection links to wildfire outbreak, along California Pacific Fracture Zone orthogonal megatrend intersections with the North American continent.

19.) Electrical Wildfire Propagation Along Geomagnetic Anomalies Update – 2018 Wildfire in Paradise Lost [19]**.** This paper was originally published in, *Proceedings The 8th World Multi-Conference on Systemics, Cybernetics and Informatics*, Orlando, FL., pp. 298, 2004. It discusses wildfire outbreaks during geomagnetic storms linked to coronal mass ejections in San Bernardino in October 2003 and in the Paradise wildfire outbreak in Nov 2018. These wildfires may be linked to electrical emanations from within the earth from solar Electro-Magnetic Pulse (EMP) associated with induction coupling from the coronal mass ejections.

20.) Gulf of California Electrical Hot-Spot Hypothesis Climate and Wildfire Teleconnections (Revisited) [20]**.** This paper was originally published in, *New Concepts in Global Tectonics Newsletter*, p. 3-8, No. 38, March 2006. The prevailing view that radioactive decay is the major thermal source for the interior of the planet may create limitations in geophysical modeling efforts. New theoretical insights by Gregori 2002 [21] provide for an electrical source from the core-mantle-boundary (CMB) by a tide-driven (TD) geodynamo which is enhanced by various solar induction processes. Joule heating at density boundaries within the upper mantle and base of the lithosphere from CMB electrical emanations may provide some of the hotspot energy for upper mantle melts and associated magmatism driving seafloor spreading and lithospheric rupture.

3. FURTHER CONTEXT

Geomagnetic effects are inevitable, given the electromagnetic output of the Sun and the fact that earth's core is magnetic and spinning. These effects may interact with and/or account for many well-known electric phenomena, such as aurora borealis and St. Elmo's Fire. Geomagnetic effects may also affect the weather, through increasing or reducing the frequency and magnitude of lightning in a local area. This could also lead to potential relationships between geomagnetic effects and lightning-induced phenomena, such as wildfires. It is also plausible that the large forces associated with geomagnetic phenomena can impact or trigger phenomena such as earthquakes and volcanoes. Since we know a lot about the physical structure of the earth and can measure electromagnetic output of the sun, with an improved model it may be possible to predict localized events (e.g., lightning, earthquakes, volcanos, wildfires).

Over the past 2 decades an ever-growing group of internationally networked scientist, along with an even larger group of layman, have diligently worked toward a new more inter-disciplinary understanding of our planets Endogenous Energy [21] and it's link to solar drivers. The Stellar Transformer [22, 23] concept can be considered as part of the scientific abstraction process that is at the basis of the exploratory analysis, as emphasized by John Tukey in 1977 [24]. This is preliminary to complete science, i.e. before the confirmatory analysis that must be carried out to check the inferred consequences by means of observations. The progress of science cannot really rely on a seemingly almost obsessive search for confirmation of the "generally agreed" upon paradigms. Real progress is more likely attained by searching for new and unprecedented ways. Whether correct or not, the discussion of new ways and new arguments are essential for new achievements. This rule has always applied during the whole history of science, as an ensemble of ideas aiming to improve understanding by means of different, unprecedented, and more detailed schemes to be tentatively checked by observations.

The path of discovery for Stellar Transformer solar induction was naturally inter-disciplinary. Uncovering this solar induction phenomenon began in 1995 when a curious relationship exposed by Daniel Walker at the University of Hawaii, documented a 6-month earthquake precursor to the El Niño over repeated events [25, 26, 27]. This relationship was not explained by Plate Tectonics within the literature. Possibly it was an oceanographic affect from warmer water and a stacking affect with additional weight as some scientist hypothesized. Possibly the pressure changes between the Banda Sea Low, north of Australia and the Easter Island High off the west coast of Chile known as the Southern Oscillation (SO) had something to do with it? So, what causes the warm water and the pressure oscillation? And why would earthquakes precede the climate change of El Niño Southern Oscillation (ENSO)?

In addition, the relationship to earthquakes and sunspot activity did not go unnoticed. The question remained… Why? John Quinn developed the World Magnetic Model for the Navy to determine Earth's magnetic field drift over time. Consulting with John was key in advancing the concept of an electromagnetic climate driver linked to changes in solar magnetism [28]. John Quinn not only introduced us to Gregori's Earth Endogenous Energy theory [21], he sent us a magnetic moment decay chart for the 19th century (Fig. 1) that we found showed direct correlations to ENSO and the warming (discharging) and cooling (charging) phases of the Pacific Decadal Oscillation (PDO). These climate oscillations are linked to solar magnetic variations (Fig. 1) charging and discharging the plasma core of the Stellar Transformer [22, 23] in rhythm with the climate cycles (Fig. 1).

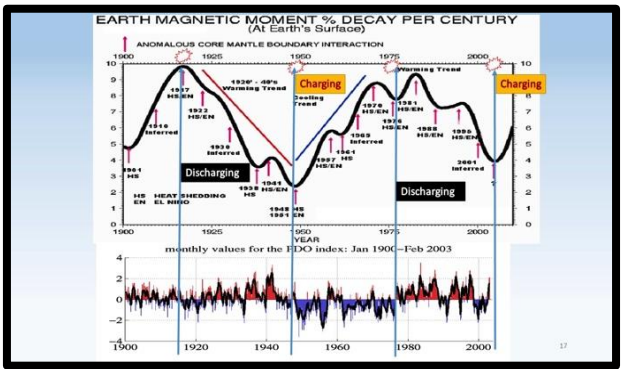

Fig. 1. Magnetic Moment Decay (Top - John Quinn [22, 28]) & PDO Climate Index (Bottom) are compared. Top figure reflects past century of Earth's magnetic moment decay field changes. Large curve trends correspond to global warming and cooling trends reflected in the Pacific Decadal Oscillation (PDO – Bottom) the largest global temperature proxy. While smaller inflections are associated with El Niño Southern Oscillation (ENSO). Bottom figure shows Pacific Decadal Oscillation (PDO) warming trends in red, cooling in blue moving in approximate 36-year rhythm with the magnetic field changes.

4. CONCLUSIONS
PREPONDERANCE OF THE EVIDENCE

There are many opportunities to integrate *Space Weather* data into global weather and *Natural Disaster Forecasting* models. The Earth as a *Stellar Transformer Hypothesis* builds on the *Global Electrical Circuit* model. Understanding space weather links to our planets Endogenous Energy [21] and plasma core circuitry with geophysical intelligence appears to have become paramount for progress of the natural sciences. The science works toward unified solutions under Stellar Transformer [22, 23] concepts within an Electric Universe [3] paradigm. Inter-disciplinary efforts in unraveling these relationships should become a national priority as part of our "Space Force" development.

Persistence with a preponderance of the evidence, and some most excellent international collaboration with like-minded scientist are what really made the advances in this interdisciplinary scientific investigation possible. When scientific problems seem to have no solution, new ways of looking at things, i.e. theories, frameworks, hypothesis etc., are an absolute necessity and becomes an advantageous scientific skill. After looking at enough observational data, the relationships begin to emerge from repeated pattern recognition. Ample historical databases exist that can be analysed for the purpose of detecting other correlations like those that we have observed. Moreover, the model that we proposed differs from existing models (that do not incorporate solar induction effects) in that it can be tied to specific geographical locations and observed solar phenomena. Consequently, it would seem to offer considerable advantages in predictive power at the local level should these relationships be confirmed. Some very compelling evidence is in, the jury is still out. How long will it take to investigate? The clock is ticking…. the next natural disaster is always just around the corner. The challenge is to have a better understanding of what is coming!

5. REFERENCES

[1] Leybourne, B.A. and G.P. Gregori, 2020, **Introduction to Plasma Tectonics & Electric Geology: Solar Wind Coupling to Planetary Circuits Lightning Tells The *Stellar Transformer* Story,** *Proc. 11th International Multi-Conference on Complexity, Informatics, Cybernetics, (IMCIC 2020),* Orlando, FL, March 2020, pp. 48-54.

[2] Smoot, N.C. and B.A. Leybourne, **Orthogonal Megatrend Intersections: "Coils" of a Stellar Transformer,** *Proc. 11th International Multi-Conference on Complexity, Informatics, Cybernetics, (IMCIC 2020),* Orlando, FL, March 2020, pp. 61-66.

[3] Thornhill, W. and D. Talbott, ***The Electric Universe,*** Mikamar Publishing, 132p, 2007.

[4] White, L. and Hawthorne, R. Jr., 2020, **History of Electric Geology,** *Proc. 11th International Multi-Conference on Complexity, Informatics, Cybernetics, (IMCIC 2020),* Orlando, FL, March 2020, p. 78 -83.

[5] Hawthorne, R. Jr., 2020, **Electric Discharge – Not Impact Caused Formation Of Upheaval Dome, Canyonlands National Park, Utah,** *Proc. 11th International Multi-Conference on Complexity, Informatics, Cybernetics, (IMCIC 2020),* Orlando, FL, March 2020, pp. 42-47.

[6] Straser, V. and K. Miura, **Electric Earthquakes? The Case of Hyogo Ken Nambu (Japan),** *Proc. 11th International Multi-Conference on Complexity, Informatics, Cybernetics, (IMCIC 2020),* Orlando, FL, March 2020, pp. 67-71.

[7] Straser, V., **Atmospheric Plasmas that Precede Earthquakes in Seismically Active Areas,** *Proc. 11th International Multi-Conference on Complexity, Informatics, Cybernetics, (IMCIC 2020),* Orlando, FL, March 2020, pp. 72-77.

[8] Wu, H.C. and B.A. Leybourne, **Using Jetstream's Precursors to Make Earthquake Forecast,** *Proc. 11th International Multi-Conference on Complexity, Informatics, Cybernetics, (IMCIC 2020),* Orlando, FL, March 2020, pp. 84-87.

[9] Pulinets, D. Ouzounov, **Lithosphere-atomosphere-iono-sphere coupling (LAIC) model- An unified concept for earthquake precursor validation.** *Journal of Asia Earth Science*, 41(4-5), pp.371, 2011.

[10] Leybourne, B.A. and Orr, D., 2020, **Global Disaster Forecasting with Space Weather and Geophysical Intelligence,** *Proc. 11th International Multi-Conference on Complexity, Informatics, Cybernetics, (IMCIC 2020),* Orlando, FL, March 2020, pp. 55-60.

[11] Leybourne, B.A., Straser, V., Wu, H.C., Gregori, G.P., Bapat, A., Venkatanathan, Z., & Hissink, L., **Multi-parametric Earthquake Forecasting the New Madrid From Electromagnetic Coupling between Solar Corona and Earth System Precursors**, *New Concepts in Global Tectonics Journal*, v. 7, no. 1, pp. 3-25, March. 2019. http://users.neo.registeredsite.com/3/4/0/21850043/assets/NCGTJV7N1S.pdf

[12] Leybourne, B.A., **Plenary Keynote Address: North American Solar Electro-Magnetic Induction Detection Network,** *The 12th International Multi-Conference on Society, Cybernetics, and Informatics (IMSCI) Conference Program*, Orlando, FL, p. 47, 10 July 2019.

[13] Leybourne, Bruce A., Bill Orr, Andy Hass, Giovanni P. Gregori, N. Christian Smoot, and Ismail Bhat, 2006. **Tectonic Forcing Function of Climate-Revisited: Four Elements of Coupled Climate Evidence of an Electromagnetic Driver for Global Warming.** *New Concepts Global Tectonics Newsletter*, (40), p. 27-34.

[14] Leybourne, B. A., N.C. Smoot, G. P. Gregori, G. Paparo, I. Bhat, 2008 **Tectonic Spiral Structures of the Tethyan Vortex Street: GRACE Geoid Interpretations and African Lightning Teleconnections**. *33rd International Geological Congress*, 2008 Oslo, Norway.

[15] Leybourne, B.A., and M.B. Adams, **"The Australian Antarctic Discordance: Pressurized vs. Non-pressurized Ridge System"**, *Marine Technology Society Oceans 2000 Conference Proceedings, Providence*, RI, Sept. 2000.

[16] Leybourne, B.A., and M.B. Adams, **Modeling mantle dynamics in the Banda Sea triple junction: Exploring a possible link to El Nino Southern Oscillation**. *Marine Technology Society Oceans '99 Conference Proceedings, Seattle*, Washington, pp. 955-966, Sept. 1999.

[17] Leybourne, B.A., and M.B. Adams, **El Nino tectonic modulation in the Pacific Basin**. *Marine Technology Society Oceans '01 Conference Proceedings,* Honolulu, Hawaii, Nov. 2001.

[18] Leybourne, B.A., **Hurricane Irma 2017: Relationships with Lightning, Gravity, and Earthquakes,** *Journal of Systemics, Cybernetics and Informatics*, Orlando, FL, V. 16, N. 5, pp. 7-13, ISSN: 1690-4524, 2018. http://www.iiisci.org/journal/sci/Contents.asp?var=&next=IS S1805 Leybourne, B.A., **Hurricane Irma 2017: Relationships with Lightning, Gravity, and Earthquakes**, **Letters to the Editor:** *New Concepts in Global Tectonics Journal*, v. 5, no. 3, Sept. 2017.

[19] Leybourne, B.A., A. Haas, B. Orr, N.S. Smoot, I. Bhat, D. Lewis, G. Gregori, **Electrical wildfire propagation along geomagnetic anomalies**, *The 8th World Multi-Conference on Systemics, Cybernetics and Informatics*, Orlando, FL, July, 2004, pp. 298.

[20] Leybourne, B.A., et. al., **Gulf of California Electrical Hot-Spot Hypothesis: Climate and Wildfire Teleconnections,** *New Concepts in Global Tectonics Newsletter*, no. 38, March 2006.

[21] Gregori, G.P., ***Galaxy-Sun-Earth Relations: The origins of the magnetic field and of the endogenous energy of the Earth***, *Arbeitskreis Geschichte Geophysik, ISSN: 1615-2824*, Science Edition, W. Schroder, Germany, 2002.

[22] Leybourne, B.A., James 'Mick' Davis, Giovanni P. Gregori, John M. Quinn, and N. Christian Smoot, **Evolution of Earth as a Stellar Transformer,** New Concepts in Global

Tectonics Journal, V. 5, No. 1, March 2017, pp. 144-155. See: www.iascc.org/the-science.

[23] Leybourne, B. A., **Stellar Transformer Concepts: Solar Induction Driver of Natural Disasters - Forecasting with Geophysical Intelligence**, *Journal of Systemics, Cybernetics and Informatics*, Orlando, FL, V. 16, N. 4, pp. 26-37, ISSN: 1690-4524, 2018. http://www.iiisci.org/journal/sci/FullText.asp?var=&id=IP053LL18

[24] Tukey, John W., ***Exploratory data analysis*.** Addison-Wesley Publ. Co., Reading, Mass. – Menlo Park, Cal., London, Amsterdsm, Don Mills, Ontario, Sidney, XVI, 688 pp., 1977.

[25] Walker, D.A., 1988. **Seismicity of the East Pacific: correlations with the Southern Oscillation Index?** *EOS Trans. AGU*. V. 69, p. 857.

[26] Walker, D.A., **More evidence indicates link between El Ninos and seismicity**. *EOS Trans. AGU*. **76** (33) 1995.

[27] Walker, D.A., 1999. **Seismic Predictors of El Nino Revisited.** *EOS Trans. AGU*, v. 80, no. 25.

[28] Quinn, J.M., ***Global Warming – Geophysical Counterpoints to the Enhanced Greenhouse Theory***, Dorrance Publishing, Pittsburgh, PA. 118p. 2010. ISBN: 978-1-4349-0581-9.