II. Climate Change as a Case Study: Categories of Causality

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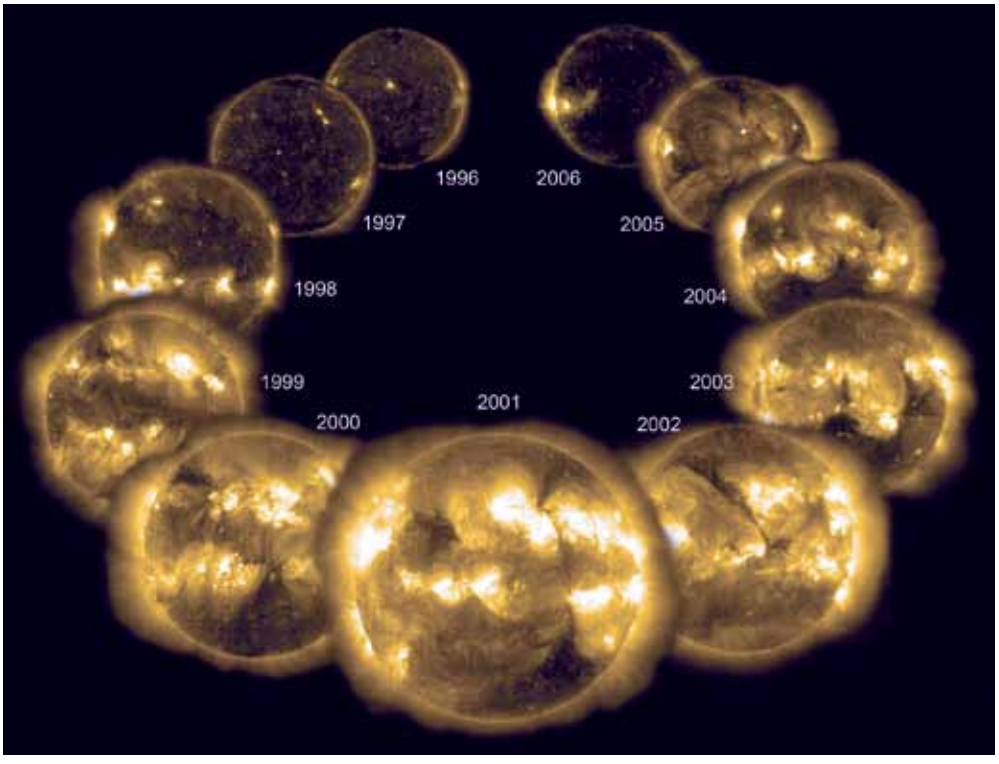


Steele Hill, SOHO, NASA/ESA

Year by year X-ray images of the Sun as it progresses through an eleven year cycle (starting weak in 1996, peaking in 2001, and ending weak in 2006).

This is a brief examination of the distinction between the different cosmic principles shaping our Earth's climate, water, and weather systems. Other studies has demonstrated that the Sun and the Galaxy act to shape these processes on Earth,[16] but here we will step back and investigate the categorical structure of causality. What is the hierarchy of active principles, and what are the successive boundaries of their respective expressions?

As cited in the opening article to this report, Cusa initiated the needed framework of scientific thought for this top-down investigation. Another, more recent reference point in this approach is the thesis developed in the November 2014 article, "Time for a Solar Noösphere".[17]

In short: space, time, and material substance—as modern science tends to understand them from an epistemologically sense-perceptual basis—are varying shadows, cast by the actions of principles. As developed in "Time for a Solar Noösphere," we can associate certain boundaries in the scales of temporal, spacial, energetic, and material action associated with certain principles—and perhaps most importantly, we can define coherence in an anti-sense-perceptual unification of seemingly separate boundaries in the very small and the very short, with boundaries in the very large and the very long.

But these interconnected boundaries—appearing in the shadows of temporal, spacial, energetic, and material expressions—are the effects, not the cause.

Starting from the discoveries of Cusa enables the delusional conceptions of self-defined objects floating in empty space through absolute time to fall away, and provides, instead, a conception of the hierarchical nesting of supra-sense-perceptual principles of development, expressing their distinction (subjugation or sub-

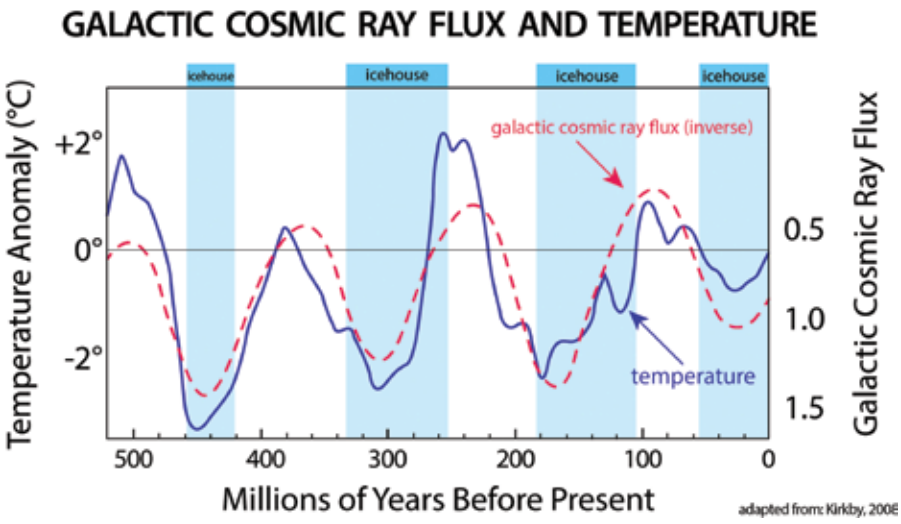
16. See the LaRouche PAC show, A New Paradigm for Mankind, for May 6, 2015; also published in *EIR*, May 15, 2015 ("Galactic Man: Shadow versus Principle").
17. November 28, 2014 issue of *EIR*; and LaRouche PAC.

summation) in the effects cast as the boundaries in the scale of spacial and temporal actions.

Climate as a Case Study

With respect to astronomical drivers of the changing climate on Earth, we can define three successive categories of causality—defined by their different strength of influence and by the timescale associated with each process.

Solar Variations—Cycles in solar activity spanning decades to centuries dominate climate variations over scales of thousands of years.[18] However, these variations are subsumed by more influential activity.



Spiral Arms, GCR, and Ice Ages.

Solar System Variations—For the past hundreds of thousands to millions of years, climate change was dominated by variations in the structure of the Solar System (rather than just the Sun alone). Cyclical variations in the Earth's orbital elements and the tilt in the Earth's axis (with periods measured in tens of thousands of years) give rise to the phenomenon referred to as the Milankovitch cycles.[19]

Galactic Variations—The travels of our Solar System through the Galaxy are measured in tens and hundreds of millions of years. Passages into and out of the Galaxy's spiral arms (approximately every 140 million years) are thought to govern the largest climate changes measured over this time, the major swings from ice house to hot house modes over the past hundreds of millions of years.[20]

This general framework indicates a hierarchical ordering of causality for cosmic drivers of the Earth's climate—the activity of the Sun (alone), subsumed by the activity of the Solar System (as an entirety), subsumed by the activity of the Galaxy. Each lower level is overtaken, in timescale and in the strength of influence, by the higher-order system.

This case study points to the dominating role of the Galactic System (that from which the Solar System was formed and created), providing an important reference point for considerations of causality in the following articles in this report on the galactic principle.

18. For example, see the presentation by Professor Carl-Otto Weiss, "Climate Change Is Due To Natural Cycles," at the June 2015 international conference of the Schiller Institute, held in Paris, France.

19. An interesting anomaly arises here—one which could require a return to Kepler's work on the harmonic organization of the Solar System. According to the basic idea of the Milankovitch cycles, different variations in the Earth's orbit (and tilt and precession) change the amount of Sunlight hitting the Earth (and at which times and which locations). It is generally accepted that the periodicities in these orbital variations match climate variations quite well (over the past three million years).

However, when scientists calculate the variation in incident Sunlight which would be caused by these orbital variations they run into a paradox. The factors which are expected by the calculations to have the largest effect on climate, are the changes in the tilt of the Earth and the precession of the equinox, which are cycles of 41,000 and 26,000 years, respectively. But, in the climate records for the past one million years the strongest cycle is neither of these, it is 100,000 years, which corresponds to the changes in the eccentricity of the Earth's orbit.

This is a paradox, since the variation in the amount of Sunlight reaching the Earth attributable to orbital eccentricity changes—according to the referenced calculations—should not be enough to drive the amount of climate variation which is observed in these 100,000 year cycles. Yet the strongest climate variations correspond with the eccentricity changes, not the tilt or precession changes (for the past one million years). This is referred to as the "100,000-year problem."

This anomaly becomes quite interesting when seen from standpoint of Kepler's work, because the eccentricity is the key factor in Kepler's harmonic hypothesis, and, by his investigation, is connected to the organization of the entire Solar System as a unity. This points in an interesting direction; perhaps the climate variations are a response to changes in the harmonic organization of the entire system (rather than just solar irradiance).

20. "Celestial driver of Phanerozoic climate?" Nir Shaviv and Ján Veizer, GSA Today, July 2003.