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1466 Lysaker
Norway
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Correspondence:
epitrchoidkjx@gmail.com

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The Earth's Variable Rotation: A Climate Regulator

Richard Mackey

Independent Scholar

Abstract

Over the past fifty years geophysicists have established that the planet experiences global warming and cooling episodes that are repeated about every 60 years; that these cycles are driven by decadal variations in the rate of rotation of the Earth; that these variations result from oscillations of the Earth's inner core; and that these oscillations have their origins in the celestial mechanics of the solar system documented by Laplace in 1799. Laplace showed that the motion of the rotation axis of the Earth is determined fully by both gravitational potentials and kinetic moments. Laplace showed that only the gravitational forces and kinetic moments from other celestial bodies influence the rotation of any one of them.

Throughout the 25-year existence of the Intergovernmental Panel on Climate Change (IPCC), it has refused to mention in any of its many reports the vast body of research published over the last 50 years about the role of the Earth's variable rotation as a determinant of climate dynamics.

As a result, the IPCC has practiced egregious scientific misconduct (as defined by US and European authorities) since it was established in 1988. The IPCC should be terminated immediately.

Keywords: Earth variable rotation; climate system, global temperature; topological analysis; scientific method; independent and dependent variables; Ockham's Razor; Isaac Newton; Laplace; atmospheric/oceanic equatorial/inertial waves; scientific misconduct; earthquakes; IPCC.

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1. Introduction

This presentation is about an established relationship between variations in the Earth's rate of rotation that occurs every six or ten years and global temperature.[4] It is, therefore, about one facet of the complex climate system of planet Earth.

The relationship has been established for almost fifty years by observation and reported in the world's major scientific journals. It does not depend on computer simulations or quantitative models.

There is, no doubt, that the planet's climate system is exceedingly complex and that the dynamics of the system depend on many factors Cook (2005) Bonan (2024).[5]

[4] The ambiguity about 6 or 10 years is a result of the quality of data used by the scientists. For example, Lambeck and Cazenave (1976) could use only the historical data available at that time, whereas Pfeffer, Cazenave et al (2023) used high quality, precise satellite data.

[5] See also the full Bretherton diagram of the Earth System, available here: Next Generation Earth Systems Science at the National Science Foundation | The National Academies Press

2. Scientific Method

The best way to understand climate dynamics as a complex system is the use of the canonical scientific method. The core of the scientific method is the idea that observed variations in phenomena can be explained fully using the concepts of independent and dependent variables in relation to theoretical and analytic systems of understanding. The dependent variable is the phenomena whose variations we seek to explain; the independent variables are those phenomena we consider in order to explain the variations under examination.[6]

The scientific method guides us to explain observed variations of a dependent variable by means of observed variations of relevant independent variables. The scientific method requires that the two classes of variables are connected by means of theoretical and analytic systems of understanding.[7] These systems of understanding are corroborated by evidence that supports the system or refuted (weakened, disproved, contradicted) by evidence that does not support the system.

Sometimes the explanation is timeless; sometimes it is in relation to specified time frames. The scientific method requires that we consider fully all relevant independent variables systematically using the null hypothesis to test the scope for each independent variable to contribute to observed variations in the behaviour of the dependent variable.

At the core of the scientific method is the requirement that hypothesised relationships between dependent and independent variables be verifiable or falsifiable and that those who support competing hypotheses can specify and agree what would constitute corroboration and falsification of their preferred hypothesis. The scientific method says find an explanation and test it thoroughly: science depends on the relentless comparison of hypotheses with reality.

Sir Harold Jeffreys FRS (1891 to 1989) pointed (Jeffreys (1974)) out that the confirmation of a theory is always a statement of a high degree of probability.[8] He showed that the probability of a theory has nothing to do with the number of persons who believe in the theory and is not proof in the sense that a mathematical theorem is proved. He explained that a person who states that some hypothesis is universally accepted or proved demonstrates only that they do not understand the scientific method.

The scientific method, which evolved from the ideas of Francis Bacon and Galileo Galileo, amongst others, is based on Sir Isaac Newton's **Rules for the Study of Natural Philosophy**.

He presented four such rules in his *Principia Mathematica*, Newton (1687).

The rigorous application Newton's Rules 1 and 2 is a universal feature of the scientific method.

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[6] It is customary in all areas of science to make graphs with the independent variable on the horizontal axis and the dependent variable on the vertical axis. In the teaching of science from elementary levels onwards this helps show hypothesised relationships between the cause (the independent variable) and the effect (the dependent variable). In the fields of health and pharmacy, the graphs are called dose-response curves. Those who have done experimental science at secondary or tertiary level would have made similar graphs.

[7] The theoretical and analytic systems explain the behaviour of the dependent variable in terms of the independent variable(s). This understanding is best expressed by deriving a dynamical mathematical model from the theoretical and analytic systems of explanatory understanding. Mathematical models without theories lack explanatory authority, but theories without mathematical models are insufficient to advance understanding as they lack adequate predictive capacity.

[8] Sir Harold Jeffreys FRS (1891 to 1989) was the leading geophysicist of the early 20th century, and in 1924, published a book that became the bible of geophysics, *The Earth: Its Origin, History, and Physical Constitution*. He was reader in geophysics at Cambridge (1932–46) and was the Plumian chair of Astronomy and Experimental Philosophy (1945–58). He was the author of two significant books on the scientific method and the theory of probability – *Scientific Inference* Cambridge University Press (Second Edition) 1957 and the *Theory of Probability*, Clarendon Press, Oxford (Third Edition) 1961. Harold Jeffreys was knighted in 1953.

As stated by Sir Isaac Newton, these are:[9]

"**Rule 1.** ***No more causes of natural things should be admitted than are both true and sufficient to explain their phenomena.***

> *As the philosopher's say: Nature does nothing in vain, and more causes are in vain when fewer suffice.*[10] *For nature is simple and does not indulge in the luxury of superfluous causes.*

Rule 2. ***Therefore, the causes assigned to natural effects of the same kind must be, so far as possible, the same.***

> *Examples are the cause of respiration in man and beast, or the falling of stones in Europe and America, or the light of a kitchen fire and the sun, or the reflection of light on our earth and the planets*."

Two highly regarded Newtonian scholars, Dan Densmore and William Donahue, explain the significance of Newton's rules in this way (Densmore, Dana and Donahue, William, 2003):[11]

> "*Newton sees these rules as principles that describe the way we actually think if we are thinking philosophically. Applied to natural philosophy, they are standards of sound reasoning about phenomena, causes, and properties of matter. They describe the working of the mind of a careful thinker – in this application, the working of the mind of a natural philosopher, what we would call scientific thinking.*"

3. Canonical Framework for the Climate System

In this canonical framework, the climate system is the dependent variable, and the set of independent variables includes the:

1) Sun's:
   - output of radiation and matter;
   - electromagnetic and gravitational fields;
2) epitrochoid motion about the solar system barycentre; and
3) topological structure of the heliosphere.

The dependent variable, the climate system, consists of a number of subsystems, principally the Earth's:

1. atmospheric systems;
2. ocean systems;
3. coupled atmospheric-oceanic systems;
4. near-surface atmospheric partial pressure
5. near-surface atmospheric density
6. clouds;
7. Rossby and Kelvin waves;
8. rotation;

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[9] Newton, I., (1687) pages 794-795.

[10] Newton is referring to the 14th-century English logician, theologian and Franciscan friar William of Ockham who introduced the principle now known as Ockham's razor. It is also known as the principle of parsimony or the law of parsimony (Latin: lex parsimoniae). Attributed to William of Ockham, a 14th-century English philosopher and theologian, it is frequently cited as *Entia non sunt multiplicanda praeter necessitatem*, which translates as *Entities must not be multiplied beyond necessity*, although Occam never used these exact words. Popularly, the principle is sometimes paraphrased as *The simplest explanation is usually the best one*. Occam's razor - Wikipedia

[11] Densmore, Dana and Donahue, William, (2003) page 303.

9. atmospheric angular momentum;
10. dynamo;
11. electromagnetic field; and
12. global electric circuit.

Some of these subsystems consist of further subsystems, for example: the Earth's atmosphere contains several major oscillating atmospheric/oceanic systems that have a key role in the regulation of the Earth's weather and climate. They include the Madden-Julian Oscillation (MJO); the El Niño/Southern Oscillation (ENSO); Quasi-Biennial Oscillation (QBO); the Pacific Decadal Oscillation (PDO); the Interdecadal Pacific Oscillation (IPO); the North Atlantic Oscillation (NAO); the Atlantic Multidecadal Oscillation (AMO); the Indian Ocean Dipole (IOD); and the Arctic Oscillation (AO); and the northern and southern polar vortices, which are two permanent cyclones at the poles.[12]

4. The Earth's variable rotation and global temperature

Depending on the variable the variations of which are to be explained, any variable can be either an independent or dependent variable. For example, to examine if the Earth's rotation contributes to the Earth's climate dynamics, means considering the Earth's rotation as an independent variable and the Earth's climate system as the dependent variable.

If examining the extent to which the Sun, the Moon, and/or the planets of the solar system regulate the rotation of the Earth is the task, the Earth's rotation would then become the dependent variable; the Sun, Moon and planets would become the independent variables.

Over the last fifty years, geophysicists have established that the 6- or 10-year variation in the Earth's rotation is a key determinant of climate dynamics. This has been established empirically over this period by more than a dozen scientists who have had their work published in the world's leading scientific journals.

Furthermore, careful observation has established that there is a time lag of about eight years between changes in the Earth's rotational speed and surface temperature, and a time lag of about eight years between the electromagnetic event that results in Earth rotation variations and the rotation variations happening.

Overlaying the causative relation between rotation variations and climate dynamics are the processes that originate with the Sun and the Moon (gravitational fields); the Sun (electromagnetic field; output of radiation and matter); the Sun's epitrochoid motion about the solar system barycentre; the topological structure of the heliosphere; the dynamic processes of the atmospheric/oceanic systems; and the interaction of all processes.

The 6- or 10-year variable rotation arises from the interaction of the above-mentioned processes with the Earth's inner cores. These processes also give rise to longer cycles, including those of sixty years and one hundred and eighty years.

Sidorenkov (2009) concluded that because long-term variations in the Earth's rotation can now be determined with great accuracy, the many-year findings he and others have documented show that the long-term variations in the Earth's rotation present a unique, nature-born integral index of global climate changes.

Lopes et al (2021) showed that there are four causal processes that determine changes to the rate

[12] Note that Fagan (1999), (2000) and (2004) has shown how the changes of the climate rendered by these global atmospheric systems have resulted in major historic changes to cultures and societies throughout the world since the dawn of history.

and inclination of the Earth's rotation in accordance with Laplace's equations:[13]

- The planets, particularly the Jovian planets, acting on the Earth/Moon system.
- The Sun acting on the Earth/Moon system (and on the rest of the solar system).
- All the planets of the solar system acting on the Sun.
- The Sun, having been activated by the third process, proceeds to the second process.

Lopes et al (2021) confirmed Laplace's 1799 analysis that the motion of the rotation axis of the Earth is determined fully by both gravitational potentials and kinetic moments of the solar system.

Laplace showed that only the gravitational forces and kinetic moments from other celestial bodies influence the rotation of any one of them.

Throughout the 25-year existence of the Intergovernmental Panel on Climate Change (IPCC), it has refused to mention in any of its many reports the vast body of research published over the last 50 years about the role of the Earth's variable rotation as a determinant of climate dynamics.

Not representing in the research record accurately by the deliberate omission of scientific results, constitutes the falsification of science and is scientific misconduct.[14]

The IPCC may well continue its characteristic unscientific egregious obduracy in respect of the topological analysis applied to the behaviour of atmospheric/oceanic equatorial/inertial waves. However, if the IPCC attempts to incorporate the elegant theories and findings of topological analysis, it will have to accept the central role of the Earth's variable rotation in climate dynamics. Once that is accepted, the IPCC will find that there is no role for Carbon Dioxide that is additional to already well-known determinants of climate dynamics.

The IPCC has, therefore, practiced egregious scientific misconduct since it was established. Accordingly, the IPCC should be terminated immediately.

The unscientific way in which the IPCC deals with those who show the IPCC flaws, parallels the unscientific way in which, between the 1920s and 1967, established geologists tried to stifle the theory of continental drift.

However, the adverse impact of the IPCC's chimerical theory in comparison to the adverse impact of the false theory of fixed continents, is considerably worse. The IPCC has succeeded in inflicting economic and financial hardship on most of the world and creating the secular religion of Climatism.

The theory of continental drift triumphed because of the careful and thorough scientific work of physicists and mathematicians outside of the discipline of Geology. A similar development is now happening in Climate Science as a result of recently published, high quality scientific work by physicists and mathematicians. They have applied topological analysis to the atmospheric/oceanic equatorial/inertial waves that drive massive systems such as the El Nino Southern Oscillation (ENSO) and the Madden-Julian Oscillation (MJO). These major global atmospheric/oceanic systems drive climate dynamics in significant ways.

ENSO is the primary driver of global climate and the associated patterns of precipitation, productivity and forest mortality. There is a strong relationship between ENSO and seasonal rainfall variability in eastern Australia. The impact of ENSO on Australian rainfall has been known for

[13] https://en.wikipedia.org/wiki/Pierre-Simon_Laplace

[14] According to the U.S. Office of Science and Technology Policy (National Academy of Sciences), the US National Academy of Engineering and the US Institute of Medicine Committee on Science, Engineering, and Public Policy (National Academy of Sciences (2009)), and endorsed by the Organisation for Economic Co-operation and Development (OECD Secretariat (2022)).

decades. ENSO is an important climate phenomenon, especially influencing tropical and sub-tropical regions, with significant impact on much of Australia's climate. The MJO is a major source of intraseasonal rainfall variability, especially in the tropical Indo-Pacific region. Its impact has long been known to extend into northern Australia during summer.

5. Ockham Rules

The elegant simplicity that results from the application of Sir Isaac Newton's Rules, means that there should be one theory of climate dynamics for the solar system; or more precisely, one theory of climate dynamics for any solar system!

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