# Applying Relativity to Earth Climate Data
# The Damhsa Theory
# Signs of the Inflationary Universe

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**Abstract**(1) Multi-million year climate data through proxies have recently been published that point to a clear trend of temperature differentials through time. In the past theories have been used to explain the broad ice ages by orbital forcing using Newtonian physics. The Damhsa (Gaelic for Dance) Theory is formulated by analyzing climate data and applying the General Relativity Theory and orbital forcing to the time series and proposes a solution to the variable data. This solution is gravitational waves. New theories on the inflation of the universe predict gravitational waves also. This change is extremely slow and not perceptible to human scale time but can explain the complex interactions of large-scale climate change and time. The climate fluctuations in time can be explained by gravitational waves of the expanding universe. The Earth's position in space changes as the effects of gravitational waves as predicted by Einstein. Recent climate data shows wave patterns of a non-linear nature, which would correspond with a large mass in space, such as Earth, exhibiting the effects of gravitational waves by slight changes in the position of Earth to the Sun, which would slowly affect climate over large timescales. Oscillating gravitational waves are the signature of the universe expanding.

## 1. Introduction:

When a satellite is put into space and then correlated to other satellites and a fixed point on earth to form a GPS co-ordinate, the GPS physics calculations based on Newton will break down in about two hours unless extra microseconds are added to the calculations using complex field equations to account for Einstein's Relativity for the outer gravity layer. When 38 microseconds are added to a GPS unit every day it can accurately pinpoint where you are anywhere on earth. This example shows how Einstein's perception of how physics really worked in space-time changed the understanding of our universe.

Also for two centuries, ever since the understanding of glaciations began, theories have been proposed to solve the riddle of what causes the ice ages. The leading theory, the Milankovitch Orbital Theory, solves a number of complex relationships, but does not provide complete understanding or resolution. *

By applying the General Relativity Theory, gravitational waves and orbital forcing to time series climate data, and the peculiar velocities of the Milky Way and Andromeda, related to the Great Attractor, and slight Sun mass loss over time, the Damhsa Theory proposes a solution to the ice ages riddle.

## 2. Current Ice Age Theories

It is reported that Aristarchus of Samos, an ancient Greek astronomer first proposed the Earth revolved around the Sun, an idea that was to be discounted by his peers. Nicolaus Copernicus first realized that the Sun was at the center of our system in 1514 but, it is said, did not see the first printing of his revolutionary treaty "De revolutionibus orbium coelestium" until 1543 on his deathbed, the idea was so against common human perception and the powers at the time which believed the Earth the center of the universe, and Rome the center of the Earth.

Later, Johannes Kepler who lived from 1571 – 1630, in what is now Germany, was first to come to the conclusion about planets revolving around the Sun, not in a perfect circle, but an ellipse. He based his work by using his jealous mentor's, Tyco Brahe, meticulous records of the position of the planets and stars.

He published three laws, the Kepler Planetary Motion Laws. The first two were published in 1609 and the third law published in 1621.

1. The orbits of the planets are ellipses, with the Sun at one focus of the ellipse.

2. The line joining the planet to the Sun sweeps out equal areas in equal times as the planet travels around the ellipse.
3. The ratio of the squares of the revolutionary periods for two planets is equal to the ratio of the cubes of their semi-major axes.

This work laid the basis for understanding of planetary motion, but even Kepler advised to check real data with the math because there would be anomalies.

Isaac Newton, who lived from 1642 to 1727 in Britain, expounded on Kepler's law with his brilliant thinking. He introduced the theory of gravity and correlated it to the mass and motion of planets in his opus "Philosophiae Naturalis Principia Mathematica" (now known as the Principia) written from 1685-1686. In it he stated, "all matter attracts all other matter with a force proportional to the product of their masses and inversely proportional to the square of the distance between them" which is now known as the inverse square law.

He also developed a general theory of radiation, where the heat of the Sun can be described by two geometrical factors: the angle at which the Sun's rays strike the Earth and the distance from the Sun.

Newton's Universe was static, and even though the planets changed in their positions around the Sun, the principal motions remained the same. Through Newton there developed a greater understating of celestial motions and physics. Gravity was a force of unknown origin according to Newton. He did hint at the future though with his quote "Are not gross bodies and light convertible into one another; and may not bodies receive much of their activity from the particles of light which enter into their composition? The changing of bodies into light, and light into bodies, is very conformable to the course of Nature, which seems delighted with transmutations."

A century later in the Jura area of Switzerland 1787, the Rev. Bernard Kuhn, out on his walks, interpreted neighborhood boulders to be caused by ancient glaciers. During the next fifty years various naturalists and scientists came to the same view of past glaciations, but it wasn't until the eminent scientist Louis Agassiz first made public his glacial theories in Neuchâtel, Switzerland on July 24th, 1837 at an address to the Société Helvétique de Sciences Naturelles. He shocked the audience by saying he thought the Earth was once covered in ice from the North Pole to the Mediterranean. The great debates about ice ages and glaciers began.

Five years after Agassiz's lecture on glaciers, in 1842 a French mathematician living in Paris, Joseph Adhemar published a book called "Revolutions de la Mer" (Revolutions of the Sea) in which he expounded on fantastical relationships between the northern hemisphere and southern hemisphere, most of the ideas discredited. But he was the first to write about the notion that the ice ages might be caused by the variations of the earth's rotation around the Sun.

The concept was not explored further until twenty-five years later when a paper on glaciation by astronomical forcing was accepted by Philosophical Magazine. The unlikely author was a janitor at Andersonian College and Museum in Glasgow, Scotland, Thomas Croll. Croll was born into a working class life and was largely self-educated. After many professions he found he could read all he wanted at the college. He published his brilliant work, "Climate and Time" in 1875, and a year later was made a Fellow of the Royal Society of London.

Croll's research was later discounted by geologists who stated that his timing of ice ages was not matching the geological evidence, and the notion of astronomical forcing of ice ages was lost as a concept until a Serbian mathematician, Milutin Milankovitch picked up the idea in 1911 as a lifelong pursuit using mathematics to show the relationships of the planets and the influence on long term climate. Milankovitch did enormous amounts of calculations by hand to show that when the orbit of the Earth was at particular positions it affected the long-term climate. He based his calculations on three factors:

1. Earth's orbital eccentricity—the shape of the orbit around the sun. About 100,000 year cycles.
2. Changes in obliquity—changes in the angle that Earth's axis makes with the plane of Earth's orbit. This cycle takes about 40,000 years.
3. Precession—the change in the direction of the Earth's axis of rotation, the axis of rotation behaves like the spin axis of a top that is winding down; therefore it traces a circle on the celestial sphere over a period of time. About 19-22 year cycles.

By combining these three cycles and looking at different latitudes of solar radiation Milankovitch could see that ice ages could be caused by continued seasons without sufficient warmth to melt previous seasons ice caps.

From the NASA Earth Observatory web site-

"*But, for about 50 years, Milankovitch's theory was largely ignored. Then, in 1976, a study published in the journal Science examined deep-sea sediment cores and found that Milankovitch's theory did in fact correspond to periods of climate change (Hays et al. 1976). Specifically, the authors were able to extract the record of temperature change going back 450,000 years and found that major variations in climate were closely associated with changes in the geometry (eccentricity, obliquity, and precession) of Earth's orbit. Indeed, ice ages had occurred when the Earth was going through different stages of orbital variation.*

*Since this study, the National Research Council of the U.S. National Academy of Sciences has embraced the Milankovitch Cycle model.*

*...orbital variations remain the most thoroughly examined mechanism of climatic change on time scales of tens of thousands of years and are by far the clearest case of a direct effect of changing insolation on the lower atmosphere of Earth (National Research Council, 1982). "*

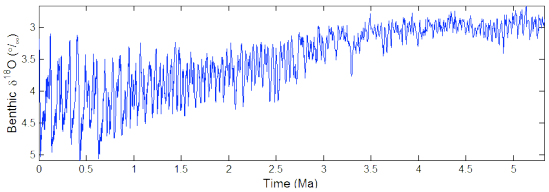
A few years earlier than when Milankovitch was doing his orbital calculations in 1911, a young physics graduate who was working as a patent clerk in Bern, Switzerland, forever changed the world of physics. Albert Einstein, more than one hundred years ago, in 1905, submitted four papers. His thinking about time, space, light, gravity, atomic motion, mass, and energy solved puzzles that had riddled Newtonian physics, and opened a mind expanding number of fields including cosmology, nuclear physics, and quantum physics. His famous equation, E =mc2, in it's simplicity and revolutionary thought forever changed how we look at the universe. He had the brilliant insight that gravity is not a force but rather a manifestation of curved space and time. In his thinking about General Relativity in 1915 his complex field equations led to a Universe that was either expanding or contracting. He added a constant, the Greek symbol lambda, λ, to his equations in order to regulate what he thought was impossible, after consulting with astronomers of the day, that the universe might be expanding.

In 1908, Henrietta Swan Leavitt, an astronomer at the Harvard College Observatory, published a paper on Cepheid variable stars and their differing brightness that made it possible for to plot the distance of stars and their velocities using spectrometry. Stars in the red spectrum would be moving away from us. The great astronomer Edwin Hubble used this information at Mt. Wilson Observatory in California to report in 1923 that distant galaxies existed and in 1929 that these galaxies were moving away from us in a constant relation between speed and distance now known as Hubble's Law. He observed the expansion of the universe and that led Albert Einstein to remove the lambda from his equations and call it his "biggest blunder".

In 1979 Alan Guth at Stanford, looking into the obscure science of magnetic monopoles, calculated with mathematics the notion of the inflationary universe. The Russian Andrei Linde further resolved the math, which accounted for the process of expansion of the universe after the Big Bang. Rather than expanding slowly, there is now concurrence that the universe is expanding faster.

Today scientists are adding lambda back into the equations of the universe to account for the unknowns of dark energy and dark matter, which are not well understood. But it is now certain the universe is expanding and at a faster rate by the analysis of the supernovae spectrums in the universe. Climate studies have continued with increasing emphasis on our current predicament; global warming. But Science magazine has recently listed among its' top science quandaries that are unresolved: What causes the ice ages?

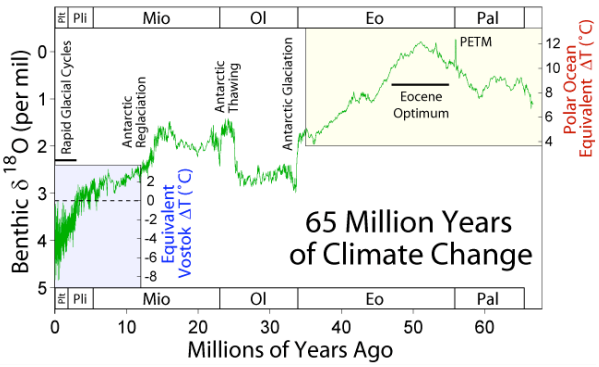
Charts outlining the ice ages have used data from a number of sources; ice cores, ancient marine sediments and soil layers. All of the data has spawned a wealth of information about past climate cycles. The following chart is from the compilation of ice cores going back almost five million years:




Lisiecki and Raymo (2005)

The data was tabulated using an ice core and then chemically analyzing the isotopes of oxygen during the layering of ice in each time scale. This chart shows the temperature proxies during time. We are currently on earth in what is known as an interglacial period at the top of the left hand side of the chart. Each top point is a "warm" climate and each trough towards the left is a glacial period. What is noticeable is the increasing amplitude of the variations.

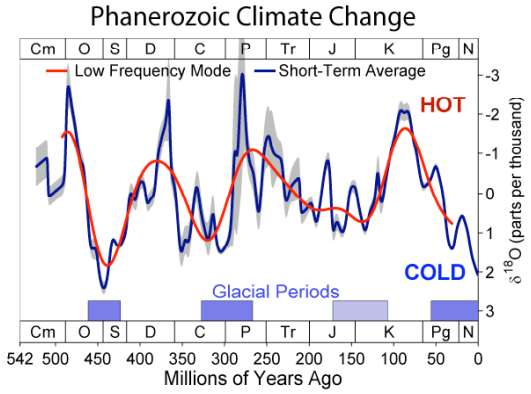
This next chart shows reconstructed climate over a longer time distance, sixty five million years. The chart shows continued temperature differentials on earth and probably the traces of some pretty dramatic events on earth such as the breakup of Australia and changing of world ocean patterns about 35 million years ago and the PETM, the Paleocene-Eocene Thermal Maximum' at ~56 million years ago which is believed to be a major burst of methane from the earth's crust.




Robert A. Rohde

What is also noticeable is the continued oscillation of climate variations even under changing earth geology scenarios.

The next chart shows the longest time scale of climate variations, 540 million years, the span of all multi-cellular organisms. Oscillations are obvious even over the longest time period.

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## 2. The Damhsa Theory

The Damhsa Theory proposes that these oscillations are actually gravitational waves from the continued ramifications of the expanding universe and that ice ages and inter-glacials such as our current Holocene are a result of theses waves.

"The nonlinearity of the Einstein field equations stems from the fact that masses affect the very geometry of the space in which they dwell. And this is the fundamental insight of (1): mass curves the geometry of space-time, and the geometry of space-time in turn tells masses how to move" * Oscillating gravitational waves are the signature of the universe expanding.

The Earth is moving around the Sun in the Milky Way moving with other galaxies in an expanding universe. Each galaxy has its own "peculiar velocity" which is affected, as Newton pointed out, by the mass of the nearby planets, systems, and galaxies. Astronomers and astrophysicists compute the point of planetary location using ephemera of nearby planets. The peculiar velocities of the Milky Way and Andromeda, related to the Great Attractor, and slight Sun mass loss over time affect where the position of the earth will be over time. But we do not live in a Newtonian world. The effect of our planet moving around a star in space is also subject to the Einstein Field equations and relativity. A signature of all this is gravitational waves, and this theory proposes that our earth's long term climate data are oscillating wave patterns that show the position of earth relative to the Sun and it's heat source and the space-time continuum of gravitational waves effecting the relationship of the Earth to the Sun.

"Gravitational waves are distortions or the warping of the very fabric of space-time, which Einstein described as different aspects of reality itself. As a fabric, space-time can be measured either in terms of distance or time. However, large amounts of mass or energy …can curve space-time, resulting in the warping of the fabric that can be observed as gravitational shifts."*

The Andromeda Galaxy and the Milky Way are approaching each other at about 100 km/sec. between 2.4 and 2.9 million light years away, and a farther galaxy, M31 is also approaching.
The motion has a speed of the Milky Way is 540 kilometers per second in the direction of the Hydra-Centaurus supercluster on the sky. Actual telescopic observation of the universe expanding by measurements of redshift distances only work beyond 100Mpc. At shorter distances, the local `peculiar' velocities dominate. But what the Damsha theory poses is that long-term climate data is also a source of relativistic data. Gravitational waves can be seen in long term climate data as the Earth changes it's position around the Sun due to the long term implications of the expanding Universe and the effect of gravitational waves on the planetary position to the Sun.

There is also evidence that Earth and Mars might have been closer to the Sun, which would be explained by gravitational waves affecting the position of the planets. Dinosaur fossils have been found in the Artic. The following is from "Our Sun" by Juliana Sackmann and Arnold I. Boothroyd - "In fact, there is evidence not only that liquid water existed on the early Earth, but also that Earth was considerably warmer in the past than it is today. To start with, there is no evidence of glaciations before 2.7 Gyr ago (Kasting 1989), and it has been suggested that tillites prior to 2 Gyr ago are actually due to impacts rather than glaciers (Oberbeck et al. 1993). Archaeobacteria exhibit extreme thermophilictrends (Woese 1987). High ocean temperatures of _ 40. C in the period 2.6 to 3.5 Gyr ago are suggested by sulphur isotope measurements (Ohmotu & Felder 1987). Average surface temperatures of tens of degrees Celsius in the period 2.5 to 3.5 Gyr ago are indicated by deuterium to 18O ratios (Knauth & Epstein 1976).Temperatures as high as 80. C in the period _ 3.8 Gyr ago are suggested by differences in 18O isotopicdata between coexisting cherts and phosphates (Karhu & Epstein 1986), although the results are subject to interpretation."*

There are some that believe Mars might have had water on the planet in the past, as recent views of the landscape of Mars shows evidence of water erosion. If Mars was closer to the Sun in a range of our current favorable position of Earth this might explain it.

There are some that say that peculiar velocities only apply within our Solar System yet some data proves otherwise. Einstein's relativistic data definitely applies within our solar system as witnessed by Global Positioning Data, but also by Mars orbit around the Sun. Since almost two centuries earlier astronomers had been aware of a small flaw in Mercury's orbit around the Sun, as predicted by Newton's laws. As the closest planet to the Sun, Mercury orbits a region in the solar system where space-time is disturbed by the Sun's mass. Mercury's elliptical path around the Sun shifts slightly

with each orbit such that its closest point to the Sun (or "perihelion") shifts forward with each pass. Newton's theory had predicted an advance only half as large as the one actually observed. Einstein's predictions exactly matched the observation.

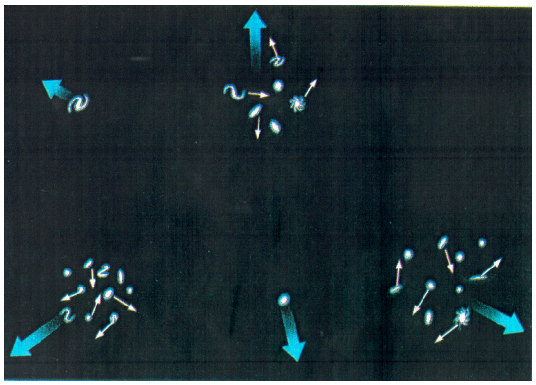

Diagram showing peculiar velocities of galaxies with overall expansion of the Universe

In conclusion the Damsha Theory (Gaelic for dance) proposes that our long term climate is affected by Earths relationship to the Sun, and that that relationship is not necessarily Newtonian or Keplarian, although their theories explain most of the visible world, but that the General Theory of Relativity has to be applied to Earths relationship to the Sun over time. A signature of this is gravitational waves in space-time and long-term climate data is a manifestation of those gravitational waves. The reason there are not consistent years found for glaciations is that the expanding universe and gravitational waves of mass objects in space vary as the universe expands and there is a non-linear amplification.

Orbital forcing is the most correct theory of long-term climate change, but offers no reason why these changes happen, except that it affects northern summer insolation. The Damsha Theory proposes that long term climate variations are a reflection of the expanding universe and gravitational waves oscillating the Earths position to the Sun in very long time scales that are not apparent to human scale time but can be read in the long term climate data of earth.

Geologic upheavals such as the breaking up of Pangaea, large geologic methane releases, and human induced global warming can also have large-scale effects on climate.

This hypothesis should be reviewed by experts in the astrophysics of relativity and others involved in long-term climate data for the rigorous review of scientific process.

*Cycles, Cycles Everywhere
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*Andrew Bridges, Gravitational Waves: Einstein's Elusive Children, space.com, 16 November 1999

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