Climate of the Past, Present and Future
Javier Vinos

Truth and wisdom about the climate – a long, complex book finds justifiably wide acceptance

Claiming that carbon dioxide causes global warming is like saying racism caused the civil war. It is wrong, irrelevant, and at least three orders of magnitude too simple of an explanation for a very complex situation.

This 740-page book is a tour de force from a surprising source. Javier Vinos spent decades researching neurobiology and cancer, earning more than 1200 citations for his work in this field. The climate change dispute caught his attention in 2015. He thought there was something fishy about the supposed consensus and decided to find out for himself. He has made himself an expert, especially in paleoclimatology. This book reflects a deep commitment to the scientific method combined with the fresh vision of someone coming into the field from the outside.

Another way to put it, he is a highly talented everyman, tired of being lied to by the establishment and determined to find and spread the truth. Which he does, in an erudite, low-key fashion that contrasts sharply with the harsh rhetoric of the global warming crowd.

The book is not an easy read. Paleoclimate is not an easy topic. It has its own extensive lexicon, primarily abbreviations, commonly used by scientists, such as LIA for Little Ice Age, MGW for modern global warming, SLR for sea level rise. The reader would be well advised to print his page of abbreviations for quick and frequent reference. In addition, there is an extensive glossary and 50 dense pages of bibliography. This is an authoritative work. Recognizing that many readers are not prepared for such a heavy slog, this review attempts to summarize the main points.

There have been a vast number of books written about climate change. Despite all the propaganda coming from the government and the media, most books have been skeptical. The book which best parallels Vinos', shorter and easier to read, is [[ASIN:0691145555 Paleoclimate (Princeton Primers in Climate Book 10)]]. Twain wrote that "A lie can travel halfway around the world before the truth can get its boots on." With Vinos, the boots are firmly on. He is not the first – see a list of related books at the end of this review. He joins other skeptical voices, such as those in the CO2 Coalition and Climate Depot. Maybe as many as 97% of real climate scientists agree that global warming fear is bunkum.

Science is a matter of collecting evidence to support theories, and the kinds of evidence collected to make deductions about past climate are varied and fascinating. Several of the many graphs in Vinos' work refer to "Global temperature reconstruction from 73 proxies." Isotopes of common elements play a role. The isotopes of an element behave identically in chemical reactions but differ in their origin, weight, and half-life. Carbon-14 we know about. Beryllium 10, with a half-life of 139,000 years, is created by and serves as a proxy for cosmic radiation. The percentages of heavy hydrogen (deuterium) and oxygen 18 provide a clue about movements of water and other molecules.

Different life forms flourish at different temperatures. Fossilized shells, pollen and other traces of their existence provide clues about past climate. Past warming can be inferred from ice shelves breaking up into icebergs that, when they melted, dropped detritus to the ocean floor. Oxygen and CO2 can be measured in fossil air from ice cores drilled in Greenland and Antarctica. Benthic (deep ocean) sedimentary rock cores show the record of plankton another life in ancient oceans. Tree rings and record seasonal climates as much as 10,000 years back. Search on "USGS paleoclimate proxies" for a thorough list and explanation.

Many natural phenomena occur in cycles. The most obvious are the seasons and the movement of the moon. Others include sunspots, tides and ice ages. The book mentions 30 or 40 cycles, each with a different effect on climate and each with a different periodicity. Teasing out their individual effects, and predicting how they compound one another, is a complex operation. Every chapter book concerns itself with cycles, evidence of cycles, and theories to explain them.

Chapter 2, The Glacial Cycle, starts with a description of three major cycles affecting the Earth's climate. The first is eccentricity - the varying extent to which the earth's elliptical orbit around the sun departs from being purely circular. The farther from the sun, the less sunlight we get. The second is obliquity, the tilt of the earth's axis. It varies from 22.1 to 24.3 degrees from the plane of rotation around the sun over a 41,000-year cycle. The more the tilt, the more sun in the higher latitudes. The third is precession, the wobble of the direction in which the earth's axis of rotation is pointed. It now points at Polaris, the north star. At the dawn of agriculture, it pointed at Vega in the constellation of Lyra.

Around 1920 Serbian Milutin Milenkovic adopted and improved the notion originally proposed by Scotsman James Croll about 1860 that these solar cycles have an effect on climate. Much of Vinos' book addresses the apparent inconsistencies between the strength of causes and effects. For instance, precession, the movement of the Earth's axis, has a far bigger effect on insolation – the amount of radiation received from the sun – than the eccentricity of the Earth's orbit around the sun. However, observations supporting the Milankovitch Theory are better correlated with eccentricity than precession.

A bigger disconnect has to do with the fact that the total amount of energy received from the sun has been quite constant, rising very gradually, over the Earth's history. However, the temperature record shows great variability, from an average of 25°C in the early Eocene (time of mammals and birds, after the dinosaurs) down to 10°C in recent times. A broad statement of Vinos' explanation is that the earth captures solar energy around the equator, from which it is transported by a system called meridional transport up to the poles, from which it escapes out into space. The heat transport system of Hadley, Ferrell and Polar cells of air circulation has long been well known. Vinos' contribution is the observation that the frigid polar air cannot contain enough greenhouse gases, chiefly water vapor, to hold heat. Vast amounts of heat transferred from the tropics escape into space. Thus, ironically, when the poles are warmer, less heat can escape.

Ignoring the voices of scientists such as Fred Singer, the IPCC global warming models have long downplayed Milankovitch cycles, which are central to Vinos' arguments throughout the book. The chain of causality linking these three cycles with observed climate phenomena is complex, and there are many other factors at work, among them levels of solar activity.

Chapter 3. Introduces the Dansgaard-Oeschger cycle. Analysis of plant remains in peat bog cores showed frequent, dramatic warmings of up to nine degrees centigrade over a few decades, followed by a slow return to a cooler state. The D-O events recur periodically. Their presence in the record refuted the notion that climate change is a slow and steady process. Vinos presents several theories as to why D-O events appear. Whatever the cause, it is not carbon dioxide – a blow to the theory of anthropogenic carbon dioxide as a driver of global warming.

In Chapter 4. - Holocene Climatic Variability – we encounter the fact that the current warm period started abruptly, with temperatures rising almost six degrees Celsius between 11,000 and 9,000 years ago. After that they gradually fell back three degrees before the Modern Global Warming period, which began in the 18th century, brought it back up by one. Once again, significant changes in temperature occurred long before greenhouse gases rose with the Industrial Revolution. The Holocene has been interrupted by several abrupt climatic events, the most significant called Bray and Bond events, on cycles of roughly 2500 and 1000 years.

Paleoclimate students divide the past 11,500 years into two major periods, the Climate Optimum and the Neoglacial. These are further subdivided, three and two. The five periods, separated by Bray events, are characterized by different types of climates:
Pre-Boreal, 11,500– 10,500 years before present (yr BP). - Cool and sub-arctic
Boreal, 10,500– 7,800 yr BP. - Warm and dry
Atlantic, 7,800– 5,700 yr BP.- Warmest and wet Among other things, the Sahara Desert was a savannah with extensive human habitation.
Sub-Boreal, 5,700– 2,600 yr BP - Warm and dry
Sub-Atlantic, 2,600– 0 yr BP - Cool and wet. Where we are today.

Chapter 5. describes The 2500-Year Bray Cycle in more depth, going into supporting evidence in biology (plant and animal life), glacier activity, atmospheric changes, oceanic changes, hydrological changes, temperature changes and solar variability. Though there are problems reconciling all of the evidence into a single consistent history, and there is conflicting evidence to support a 2300-year Hallstatt cycle, the general trend is fairly clear. There is a relationship between solar activity, including the amount and especially the angle at which sunlight is received on account of precession and obliquity (viz, more at higher latitudes), and climate.

Chapter 6. The Effect of Abrupt Climate Change describes in detail the five rather abrupt, but periodic climate changes dividing the five periods listed above, from Pre-Boreal to Sub-Atlantic, with a special section on the Little Ice Age of 500 years ago. It concludes with a section on the climatic effects of solar grand minima - periods of time in which the sun's activity is reduced to its lowest level and there are very few sunspots – that demarcate the boundaries between these periods. Roughly corresponding with the Bray cycle, they result in significantly cooler winters and somewhat cooler summers.

Vinos writes “This climate cycle correlates in period and phase with a c. 2500-yr cycle in the production of cosmogenic isotopes, that corresponds with clusters of solar grand minima at times of abrupt cooling and climate deterioration. The abrupt cooling events usually coincide with times of human societal stress. The relationship between solar activity and cosmogenic isotope production during the past centuries confirms the c. 2500-yr solar cycle as the origin of the climate cycle.” In plainer terms, more cosmic rays produce a greater abundance of rare isotopes, among them beryllium 10, carbon 14 and chlorine 36, which serve as markers for the Bray cycle.

Chapter 7. The Elusive 1500-Year Holocene Cycle describes another cycle, similar in length to the 1500 or so years of the Dansgaard-Oeschger cycle. This cycle gave its name to the 2006 book by Fred Singer, cited below, “Unstoppable Global Warming – Every 1500 Years.” The chapter discusses evidence for such a cycle in the oceans and the atmosphere. Singer was not wrong; he was simply working with incomplete data. Though the data that Vinos presents in his book is far more complete, he goes out of his way to point out the places where it is missing and inconsistent. Perhaps the strongest message in the book is that anybody who pretends to understand exactly how climate works is mistaken. As we continue to refine our knowledge, it becomes increasingly clear that the earth is not facing an immediate catastrophe, but that is not to say that scientists will not make surprising discoveries in the future.

Chapter 8. Centennial To Millennial Solar Cycles describes several other solar periodicities, with lengths of 1000, 210, 88, 100, and 50 years. As always, as these cycles overlap, they can reinforce or nullify one another. The major takeaway point from this chapter is that it is complex and good minds are working on it. Once again, there are no simple solutions, and anybody claiming to have one should be avoided.

Chapter 9. Greenhouse Gases And Climate Change describes the awkward fit between what is known about paleoclimate and the theory that greenhouse gases are primarily responsible for global warming. Vinos writes “In the 30 years since the IPCC was created [in 1988] a strong scientific consensus has developed about the CO2 hypothesis. This is despite a disappointing lack of advance in quantifying the effect of CO2 changes on global temperature. There is clear evidence for the observed warming, clear evidence for the human-caused increase in CO2, and abundant evidence of the CO2 effects on the biosphere. Most climatic changes detected can be clearly tied, at least in part, to the warming observed, although internal variability is often underestimated as a factor for climate change. What is crucially missing is clear indisputable evidence that the warming observed is the result of the measured increase in CO2, which the IPCC believes to be unequivocal.”

The most obvious refutation is that while the amount of carbon dioxide in the atmosphere dropped from perhaps 5,000 to 225 parts per million in the 550 million years of multicellular life, temperature has not changed much at all.

Chapter 10. Meridional Transport, A Solar-Modulated Fundamental Climate Property, describes the balance between the energy received by the earth and the energy reflected and radiated back into space. An imbalance over any substantial period results in global heating or cooling.

The surface of the earth’s outer atmosphere perpendicular to incoming sunlight receives 1361 watts/m2. The amount decreases with the angle of incidence. Albedo immediately reflects a fair percentage back out into space from clouds and the earth’s surface. What is not reflected heats things up – earth, water and atmosphere.

Hot air rises and cool air sinks. In what are called Hadley cells, air rises over the equator, heads towards the poles, and sinks at about 30 degrees latitude. In Ferrell Cells, between 30 and 60 degrees from the poles, it travels towards the poles along the surface and returns at altitude. Then, at about 60 degrees, it rises again and heads towards the pole in a polar cell. Circulation within the cells means that the direction of surface winds is opposite that of winds at altitude.

Due to the rotation of the earth, the winds are oblique rather than directly north south. The combination of north-south circulation in cells and the earth’s spin results in easterly trade winds in the tropics and prevailing westerlies in the mid-latitudes. And, pertinent to this discussion, the continual movement of warm air from the tropics to the poles. Among the related phenomena are the El Niño / La Niña effects,

Chapter 11. Meridional Transport And Solar Variability Role In Climate Change

“Between 1995 and 2005 a big shift took place in climate. The changes that took place became evident around the year 2000 and were of a global scale.” The upshot was that the global warming that had been used to stir up so much worldwide concern slowed down dramatically. The reasons, addressed in previous chapters, were predictable.

Chapter 12. Modern Global Warming contends that by most measures the warming we have seen over the past century is normal. “The recent scientific discussion over the existence of a global warming hiatus is easily settled, as the hiatus can be mathematically defined as a 17.5-year period between February 1998 and July 2015 when the accumulated monthly rate of warming was below zero. If the rate of global warming continues decreasing over the next decades, we may expect more such periods without warming in the future. Some researchers are already warning about this possibility.”

He concludes by driving a stake into the heart of the global warming monster, making these four points.

1. The world has continued warming as before. The warming during the 1975– 1998 (or 1975– 2009) period is not statistically significantly different from the warming during the 1910– 1940 period.

2. The temperature increase since 1950 shows no discernible acceleration and can be fitted to a linear increase. The logarithm of the CO2 increase, however, displays a very clear acceleration. A linear relation between supposed cause and effect cannot be established.
3. Sea level has continued rising as before. Its acceleration is not responding perceptibly to the increase in anthropogenic forcing.
4. [Glaciers and ice cover] shows a non-cyclical retreat in glacier extent with evidence of acceleration. The reduction of the size of ice shelves is also unusual. We cannot distinguish if the cryosphere is responding mainly to the CO2 increase, the temperature increase, or to the increase in light-absorbing particles.

"Despite CO2 levels that are almost double the Late Pleistocene average, the climatic response is subdued, still within Holocene variability, below the Holocene Climatic Optimum and below warmer interglacials. Lack of support for the CO2 hypothesis from Antarctic ice cores and from results 1-3 above has forced the proponents of the hypothesis to make numerous new unsupported assumptions. They assume that:

1. All warming since 1950 is anthropogenic in nature.
2. Past recorded temperatures must be cooler than previously thought.
3. The oceans, and volcanic eruptions, are delaying the surface warming and sea level rise.
4. More time is required to observe the warming and SLR acceleration.

All these might be true, but the simplest explanation (Occam's favorite) is that an important part of the warming is due to natural causes, and CO2 only has a weak effect on temperature. If after 70 years of extremely unusual CO2 levels, a lot more time is required to see substantive effects, then the hypothesis needs to be changed."

Chapter 13. 21st Century Climate Change is a look into the future. We cannot make straight-line projections for CO2 emissions. Populations are falling, we are getting more energy-efficient, and we are switching away from coal. We can expect no dramatic changes in solar activity. Arctic sea ice has not disappeared, and will not, despite the shrill warnings prior to 2005. Sea levels will rise as they have been rising, maybe 34 cm by 2100. Nobody will drown.

Chapter 14. The Next Glaciation. This conclusion is an anticlimax. "Without human intervention the next glaciation should start in just 1500-4500 years. The question that we cannot answer with any degree of certainty is how high CO2 levels would have to be to prevent glacial inception."

That ends the review of a challenging book. Testimony to its value is the fact that it is in a second edition, has been widely translated, and has so many reviews prior to this one. Absolutely five stars.

See reviews also of the following, some supporting but most, like Vinos, challenging the Global Warming narrative:
[[ASIN:0143118285 Whole Earth Discipline]],
[[ASIN:0262518635 A Vast Machine]],
[[ASIN:B004YPJ8ZU Global Warming Gridlock]],
[[ASIN:B002ECE99A Climate Change Reconsidered]],
[[ASIN:B00YW3GQAE The Neglected Sun – Why the Sun Precludes Climate Catastrophe]],
[[ASIN:B07Y8FHFQ7 Apocalypse Never]],
[[ASIN:0742551245 Unstoppable Global Warming: Every 1,500 Years]].

Notes

Notes and highlights for

Climate of the Past, Present and Future: A scientific debate, 2nd ed.

Vinós, Javier

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2. THE GLACIAL CYCLE

Highlight (yellow) - 2.2 Milankovitch Theory > Page 39 · Location 636

Milankovitch Theory is based on the complex changes that the orbit and orientation of the Earth suffers due to the slowly changing gravitational pull from other bodies in the Solar System. There are three types of orbital changes that affect Earth's insolation over the long term (Fig. 2.1).

Highlight (yellow) - 2.2 Milankovitch Theory > Page 40 · Location 642

2.2.1 Eccentricity

Highlight (yellow) - 2.2 Milankovitch Theory > Page 40 · Location 643

only

Highlight (yellow) - 2.2 Milankovitch Theory > Page 41 · Location 657

2.2.2 Obliquity

Highlight (yellow) - 2.2 Milankovitch Theory > Page 42 · Location 668

2.2.3 Precession

3. THE DANSGAARD–OESCHGER CYCLE

Highlight (yellow) - 3.2 Dansgaard–Oeschger oscillations > Page 96 · Location 1381

D– O oscillations are the most dramatic and frequent abrupt climatic change in the geological record. They helped define the concept of abrupt climate change, as prior to their discovery it was assumed that climate changed slowly over time from a human perspective. In Greenland, D– O oscillations are characterized by an abrupt warming of c. 9 ° C in annual average temperature from a cold stadial to a warm interstadial phase within a few decades, followed by slower gradual cooling before a more rapid return to stadial conditions. Initially

Highlight (yellow) - 3.2 Dansgaard–Oeschger oscillations > Page 97 · Location 1396

D– O oscillations are not the only climate change taking place during the last glacial period. Temperature variability is very high (Fig. 3.3b & c), and the changes have different shapes, durations and spacing. They are sometimes separated by other intense climate changes of a different nature called Heinrich events (HEs). Lets describe those changes starting with Greenland. With an irregular periodicity of c. 6,000 years (Fig. 3.3 vertical bars) 1– 4 kyr long HEs took place in the northern Atlantic region, causing a drop of 1– 2 ° C from the already cold glacial climate. Sea surface temperatures in the North Atlantic fell to what are now Arctic conditions as far south as 45 ° N, and were probably covered by sea-ice during the winter. Global methane levels decreased during HEs (Fig. 3.3e). HEs are also characterized by a greatly enhanced iceberg production from the Laurentide ice sheet, or less often from the Fennoscandian one, carrying with them big amounts of eroded material that, when the

Highlight (yellow) - 3.2 Dansgaard–Oeschger oscillations > Page 98 · Location 1404

icebergs melted, were deposited on the sea bed as ice- rafted debris (IRD). HEs are labeled H0 to H6 (Fig. 3.3a), with the most recent coinciding with the YD.

4. HOLOCENE CLIMATIC VARIABILITY

Highlight (yellow) - 4.1 Introduction > Page 144 · Location 1978

The Blytt– Sernander sequence fell out of fashion in the 1970s when new techniques allowed a more quantitative reconstruction of past climates. However, it captures the essence of Holocene climate as four periods of roughly 2500 years each. Every period shows a characteristic vegetation pattern in Scandinavia, indicative of relatively stable climatic conditions, separated from other periods by rapid vegetation changes suggestive of abrupt climatic changes. The dates and conditions generally accepted (Ammann & Fyfe 2014) are: • Pre-Boreal, 11,500– 10,500 yr BP. Cool and sub-arctic • Boreal, 10,500– 7,800 yr BP. Warm and dry • Atlantic, 7,800– 5,700 yr BP. Warmest and wet

Highlight (yellow) - 4.1 Introduction > Page 145 · Location 1985

• Sub-Boreal, 5,700– 2,600 yr BP. Warm and dry • Sub-Atlantic, 2,600– 0 yr BP. Cool and wet The transition from Sub-Boreal to Sub-Atlantic took place in Scandinavia at the end of the Bronze Age. Rutger Sernander proposed that this climatic change was abrupt, even a catastrophe that he identified with the Fimbulwinter, or great winter of the Sagas. At the time other scientists believed in a more gradual climatic change, but recent studies on the 2.8 kyr abrupt climatic event (ACE; Kobashi et al. 2013) agree with Sernander. Another classification divides the Holocene climatically into two periods: the Holocene Climatic Optimum (HCO, also known as Hypsithermal, Altithermal or Holocene Thermal Maximum), between 9,000 and 5,500 yr BP (although some authors only consider it from 7,500 yr BP after the 8.2 kyr ACE), and the Neoglacial period, between 5,000 and 100 yr BP, separated by the Mid-Holocene Transition (MHT) that roughly coincides with the start of the Bronze Age. They would be preceded by a warming phase at the early Holocene (Anathermal). The most popular

Highlight (yellow) - 4.7 Holocene climate variability > Page 180 · Location 2404

73

5. THE 2500-YEAR BRAY CYCLE

Highlight (yellow) - 5.1 Introduction > Page 193 · Location 2578

Stuiver's 1961 discovery that atmospheric 14C and solar activity were inversely correlated. He reconstructed a 2600-year solar activity index from sunspot and auroral observations that could correlate to glacier re-advances and realized that it constituted a single very long oscillation that had repeated several times through the Holocene, with major glacier advances at multiples of c. 2600 years. As the glaciological cycle was based on biological and geological data and agreed well with climatological periods worked out by Scandinavian palynologists, Bray related the 2500-yr climate cycle to an equal-period solar activity cycle even before there was sufficient evidence to demonstrate the existence of the 2500-yr solar cycle. The 2500-yr Bray climatic cycle is supported by abundant evidence from vegetation changes, glacier re-advances, atmospheric changes reflected in alterations in wind patterns, oceanic temperature and salinity changes, drift ice abundance, and changes in precipitation and temperature. It is established with proxy records from many parts of the world. This climate cycle correlates in period and phase with a c. 2500-yr cycle in the production of cosmogenic isotopes, that corresponds with clusters of solar grand minima at times of abrupt cooling and climate deterioration. The abrupt cooling events usually coincide with times of human societal stress. The relationship between solar activity and cosmogenic isotope production during the past centuries confirms the c. 2500-yr solar cycle as the origin of the climate cycle.

Note - 5.1 Introduction > Page 193 · Location 2580

Mention the isotopes. C14, O18, Be10. Benthic life forms. Mention Paleoclimate book.

Highlight (yellow) - 5.11 Solar variability effect on climate > Page 246 · Location 3220

Fig. 5.18 Pole-to-pole temperature gradients for the planet Latitude versus temperature (° C) Pole-to-pole curves representative of climatic conditions ranging from Extreme Hothouse to Severe Icehouse. The numbers along the right side indicate the corresponding global Mean Annual

Highlight (yellow) - 5.11 Solar variability effect on climate > Page 246 · Location 3222

Temperature for each curve (modern MAT is 14.3 ° C). Polar temperatures for each of the seven pole-to-pole temperature curves are also listed (modern Antarctica is –55 ° C). The average temperature at the Equator has also changed through time, but a lot less than the rest of the planet. The curves for each hemisphere are independent. Current climate is described by curve 7 for the Southern Hemisphere and curve 6 for the Northern Hemisphere (thick curves). We are now in icehouse conditions. After Scotese (2016).

Note - 5.11 Solar variability effect on climate > Page 246 · Location 3226

https://www.academia.edu/12082909/Some_thoughts_on_Global_Climate_Change_The_Transition_from_Icehouse_to_Hothouse We are in icehouse. Copy graph for Substack piece. Downloaded.

6. THE EFFECT OF ABRUPT CLIMATE CHANGE ON HUMAN SOCIETIES OF THE PAST

Highlight (yellow) - 6.1 Introduction > Page 249 · Location 3268

In this chapter we will review the evidence for the effect of the c. 2500-yr Bray cycle on climate and

Highlight (yellow) - 6.1 Introduction > Page 249 · Location 3269

people during the Holocene. It is important to highlight two things. First, that solar variability, even if an important factor affecting climate change, is neither the main one, nor the only one. At the multi-millennial timescale, Earth's temperature appears to depend mainly on orbital changes, firstly obliquity, but also precession and eccentricity. Other factors like oceanic cycles, and volcanic activity also play an important role at times. Therefore, solar variability only partially explains climatic changes. Also, solar cycles are irregular in nature. The

Highlight (yellow) - 6.2 The solar minima of the 2500-yr Bray cycle > Page 251 · Location 3292

The Holocene can be climatically subdivided in different ways (Fig. 6.1). The biological subdivision (Blytt– Sernander sequence), and the temperature subdivision, initially proposed by Ernst Antevs in 1948, display transitions related to the lows of the Bray cycle. Let's now review what has happened to the planet and people at those times during the Holocene. These have taken place around the following dates: • B1. 0.5 kyr BP. Little Ice Age • B2. 2.7 kyr BP. Sub-Boreal/ Sub-Atlantic Minimum

Highlight (yellow) - 6.2 The solar minima of the 2500-yr Bray cycle > Page 251 · Location 3297

• B3. 5.2 kyr BP. Mid-Holocene Transition. Ötzi buried in ice. Start of Neoglacial period • B4. 7.7 kyr BP. Boreal/ Atlantic transition and precipitation regime change • B5. 10.3 kyr BP. Early Holocene Boreal Oscillation • B6. 12.7 kyr BP. Younger Dryas cooling onset

Highlight (yellow) - 6.6 The 5.2 kyr event. The Mid-Holocene Transition and the start of the Neoglacial period > Page 274 · Location 3537

proxies

11. MERIDIONAL TRANSPORT AND SOLAR VARIABILITY ROLE IN CLIMATE CHANGE

Highlight (yellow) - 11.2 Volcanic effects on meridional transport > Page 486 · Location 6234

global temperature reconstruction

Note - 11.2 Volcanic effects on meridional transport > Page 486 · Location 6234

https://www.usgs.gov/programs/climate-research-and-development-program/science/paleoclimate-proxies

Highlight (yellow) - 11.2 Volcanic effects on meridional transport > Page 487 · Location 6251

They built an extensive dataset of 408 tephra (volcanic ejecta) layer dates for the past million years from multiple coring sites down-stratospheric-wind from volcanic areas along the Pacific Ring of Fire. Frequency analysis of volcanic eruption activity shows a significant peak at the 41-kyr period with non-significant peaks also at the 23-, 82-, and 100-kyr Milankovitch frequencies.

Highlight (yellow) - 11.3 The circa 65-year oscillation and the stadium-wave hypothesis > Page 489 · Location 6278

The existence

Note - 11.3 The circa 65-year oscillation and the stadium-wave hypothesis > Page 489 · Location 6279

Search on "usgs paleoclimate proxies" Note that search engines bring you to Clive Best, a strong advocate of the narrative. He offers critiques of Marcott's methodology. It is not a fair comparison. Marcott is not an advocate. He admits that the 73 proxies are inconsistent and more work needs to be done. Best's argument is that they are not perfect, sometimes self-contradictory, and therefore should be ignored. Which one represents the way science should be done?

Highlight (yellow) - 11.3 The circa 65-year oscillation and the stadium-wave hypothesis > Page 490 · Location 6291

It is generally believed that the c. 65-year oscillation originates from internal ocean-atmosphere variability, rather than being externally forced or randomly generated (Dai et al. 2015). An alternative explanation is that the c. 65-year oscillation reflects global MT system variability.

Note - 11.3 The circa 65-year oscillation and the stadium-wave hypothesis > Page 490 · Location 6292

Meridional Transport: The transfer of heat from the tropics to the poles by weather events such as storms, winds, etc. Gain at the equator balanced by energy loss at the poles. Effect is to heat the upper lattitudes.

Highlight (yellow) - 11.3 The circa 65-year oscillation and the stadium-wave hypothesis > Page 492 · Location 6314

Divine and Dick (2006), in their study of the historical variability of sea ice edge position in the Nordic Seas, correctly identified the effect of the c. 65-year oscillation over any putative anthropogenic effect and ended with the conclusion that “during decades to come, as the negative phase of the thermohaline circulation evolves, the retreat of ice cover may change to an expansion.” It must have taken courage to predict a sea ice expansion in 2006, when essentially everybody else was predicting a sea ice collapse, yet since 2007 Arctic sea ice has

Highlight (yellow) - 11.3 The circa 65-year oscillation and the stadium-wave hypothesis > Page 492 · Location 6319

been showing a, still non-significant, modest growth in September extent that contrasts with the previous strong decline. In her dissertation, Marcia Wyatt (2012)

Note - 11.3 The circa 65-year oscillation and the stadium-wave hypothesis > Page 492 · Location 6321

Javier Vinós Author Logo About the author Dr. Javier Vinós has spent decades researching neurobiology and cancer at the Howard Hughes Medical Institute, the University of California, UK's Medical Research Council, and the Spanish Scientific Research Council. His scientific publications have been cited over 1,200 times by his peers. In 2015 concerns over the effects of the indisputable climate change that is taking place led him to study climate science. Since then he has consulted thousands of scientific articles, and analyzed data for dozens of climate variables and hundreds of climate proxies, becoming an expert in natural climate change.

Highlight (yellow) - 11.4 The Climatic Shift of 1997–98 > Page 500 · Location 6433

The cold season (October to April) > 80 ° N surface temperature increased greatly, while summer (JJA) temperature remained unchanged

Note - 11.4 The Climatic Shift of 1997–98 > Page 500 · Location 6434

Find graph showing that polar temperatures vary much more widely.

Highlight (yellow) - 11.4 The Climatic Shift of 1997–98 > Page 503 · Location 6481

The climate undergoes multidecadal shifts that cannot be explained, reproduced, or predicted by climate models. These climate shifts not only affect the internal variability of the climate system, but also the Earth radiative properties and thus they constitute a source for global climate change that is not accounted for in the IPCC list of natural and anthropogenic forcings that have contributed to observed surface temperature change over the period 1951– 2010 (IPCC AR5 Synthesis report 2014).

Highlight (yellow) - 11.5 Meridional transport modulation of global climate > Page 504 · Location 6491

Additionally, in the distant past (e.g. the early Eocene, see Fig 10.1) the planet experienced at times warm, equable climate conditions, with reduced LTG and seasonality, characterized by the absence of year-round freezing conditions at the poles, when CO2 levels were perhaps only twice current levels. Current climate models cannot reproduce those changes and conditions without resorting to unrealistic settings.

Highlight (yellow) - 11.5 Meridional transport modulation of global climate > Page 504 · Location 6497

The riddle that makes climate models choke on the equable climate problem is known as the equable climate paradox. Energy is moved to the poles along the LTG to keep them warmer than they would be otherwise, yet the warmer they are the less energy should move along the gradient and the colder they should be. The answer to the riddle is counterintuitive. The more energy that is moved to the poles in winter, the more energy the planet loses and the colder it becomes. The equable climate poles were kept warm through the winter not because of more heat transported there, but because the most abundant GHG in the planet, water vapor, must have created a permanent fog and cloud cover at the poles in winter that greatly reduced heat loss.

Highlight (yellow) - 11.5 Meridional transport modulation of global climate > Page 505 · Location 6507

It is then evident that part of the warming that took place in the 1976– 97 period, erroneously attributed to anthropogenic factors (see Fig. 9.12), was due to a reduction in MT. Also, Arctic amplification is a completely misunderstood phenomenon. Arctic amplification, especially in winter, results in planetary cooling, not warming. The more winter Arctic amplification, the less the planet will warm.

Highlight (yellow) - 11.5 Meridional transport modulation of global climate > Page 516 · Location 6647

11.11). Solar variability is clearly involved in MT variability (see Sect. 10.4 to 10.6). The effect that solar variability has on MT, and the effect that MT has on the planet's energy imbalance

Highlight (yellow) - 11.6 The search for a controversial sun-climate connection > Page 519 · Location 6697

Just those three articles have 50 authors who are among the most respected in paleoclimatology.

Highlight (yellow) - 11.6 The search for a controversial sun-climate connection > Page 519 · Location 6697

The sun-climate connection is a common understanding among many paleoclimatologists, just not discussed and often ignored outside the subfield to avoid supporting a hypothesis that competes with the dominant one.

Highlight (yellow) - 11.7 The Winter Gatekeeper hypothesis > Page 525 · Location 6787

The winter asymmetric effect of solar activity on climate establishes solar variability as the most important long-term gatekeeper of the great amount of heat that leaves the planet at the poles every cold season, the main heat sink for the planet (see

Note - 11.8 An outline for planetary climatology > Page 539 · Location 6979

https://www.academia.edu/12082909/Some_thoughts_on_Global_Climate_Change_The_Transition_from_Icehouse_to_Hothouse

12. MODERN GLOBAL WARMING

Highlight (yellow) - 12.5 Modern Global Warming displays an unusual cryosphere response > Page 562 · Location 7252

Global glacier retreat is probably the only climate-associated phenomenon that shows a clear acceleration over the past decades. The World Glacier Monitoring Service, an organization participated by 32 countries, holds a dataset of 42,000 glacier front variations since 1600, that show that the rates of early 21st-century glacier

Highlight (yellow) - 12.5 Modern Global Warming displays an unusual cryosphere response > Page 562 · Location 7254

mass loss are without precedent on a global scale, at least since 1850 (Zemp et al. 2015).

Highlight (yellow) - 12.6 Extremely unusual CO2 levels during the last quarter of Modern Global Warming > Page 568 · Location 7328

The only place where we can measure both past temperature and past CO_2 levels with confidence shows no temperature response to the huge increase in CO_2 over for the last two centuries.

Highlight (yellow) - 12.6 Extremely unusual CO2 levels during the last quarter of Modern Global Warming > Page 568 · Location 7332

It also raises doubts over the proposed role of CO_2 over glacial terminations and during MGW.

Highlight (yellow) - 12.7 Relationship between CO2 levels and temperature during Modern Global Warming > Page 568 · Location 7335

Physics shows that adding carbon dioxide leads to warming under laboratory conditions. It is generally assumed that a doubling of CO_2 should produce a direct forcing of 3.7 W/ m2 (IPCC– Third Assessment Report, Ramaswamy et al. 2001), that translates to a warming of 1 ° C (by differentiating the Stefan–Boltzmann equation) to 1.2 ° C (by models taking into account latitude and season). But that is a maximum value valid only if total energy outflow is the same as radiative outflow.

Highlight (yellow) - 12.7 Relationship between CO2 levels and temperature during Modern Global Warming > Page 569 · Location 7341

For some of the feedbacks, like cloud cover we don't even know the sign of their contribution. And they are huge, a 1% change in albedo has a radiative effect of 3.4 W/ m2 (Farmer & Cook 2013), almost equivalent to a full doubling of CO_2. So, we cannot measure how much the Earth has warmed in response to the increase in CO_2 for the past 70 years, and how much for other causes.

Highlight (yellow) - 12.7 Relationship between CO2 levels and temperature during Modern Global Warming > Page 570 · Location 7367

What can be seen in the warming rate record is that cooling periods have become less intense, from –0.4 ° C/ decade in the late 19th century, to –0.2 ° C/ decade in the mid-20th century, to zero in the 21st century pause. This decrease in cooling rate over time is a feature of MGW. The world is warming because it cools less during cooling periods, not because it warms more during warming periods. The reasons for this are unclear, and not discussed often in the scientific literature. There is a coincidental reduction in periods of very low solar activity, that also usually coincide with cooling periods (see Sect. 12.10 below), but other factors cannot be ruled out, including an effect from increased CO_2 levels at reducing the severity of cooling periods, or a reduction in volcanic activity.

Highlight (yellow) - 12.7 Relationship between CO2 levels and temperature during Modern Global Warming > Page 572 · Location 7388

The recent scientific discussion over the existence of a global warming hiatus (Karl et al. 2015; Fyfe et al. 2016) is easily settled, as the hiatus can be mathematically defined as a 17.5 year period between February 1998 and July 2015 when the accumulated monthly rate of warming was below zero (HadCRUT4; Fig. 12.11b, circle). If the rate of global warming continues decreasing over the next decades we may expect more such periods without warming in the future. Some researchers are already warning about this possibility (Maher et al. 2020).

Highlight (yellow) - 12.7 Relationship between CO2 levels and temperature during Modern Global Warming > Page 576 · Location 7414

The second explanation requires only an insufficient knowledge of the response of the climatic system to CO_2, and an insufficient knowledge of natural forcings and climate feedbacks. That our knowledge is insufficient is clear and demonstrated every time the “argumentum ad ignorantiam” that “we don't know of anything else that could cause the observed warming” is used. New research into solar variability mechanisms (see Sects. 10.4 to 10.6 & Chap. 11) has produced hypotheses that indicate that solar forcing is probably not adequately represented in models. The response from the hydrological cycle to the warming constitutes another area of great uncertainty.

Highlight (yellow) - 12.8 Uniform variation in sea level during Modern Global Warming > Page 576 · Location 7427

The recent period of satellite altimetry (since 1993) coincides with the crest of the oscillation, and thus shows a higher rate of SLR, c. 3 mm/ yr, but no acceleration, to the surprise of some authors (Fasullo et al. 2016).

Highlight (yellow) - 12.8 Uniform variation in sea level during Modern Global Warming > Page 578 · Location 7440

The evidence shows that the big increase in anthropogenic forcing, has not provoked any perceptible effect on SLR acceleration. The belief that a decrease in our emissions should affect the rate of SLR has no basis in the evidence. A projection of the observed SLR and acceleration for the past 120 years gives a value of c. 300 mm more in 2100 than in 2021.

Note - 12.8 Uniform variation in sea level during Modern Global Warming > Page 578 · Location 7442

SLR here estimated 30 cm by 2100. Compare with expert opinions up to 1m.

Highlight (yellow) - 12.8 Uniform variation in sea level during Modern Global Warming > Page 578 · Location 7443

Cryosphere melting is considered the main factor driving SLR, followed by ocean temperature increase. SLR displays a small acceleration of c. 0.01 mm/ yr2 over the past two centuries (Fig. 12.13), while global temperature shows a linear increase over the past century, and the ocean is warming a lot less than the surface. It has been recently estimated from changes in atmospheric noble gases, that the ocean has warmed + 0.1 ° C for the past 50 years (Bereiter et al. 2018). The best candidate for causing the observed SLR acceleration is therefore the observed increase in cryosphere melting since c. 1850.

Highlight (yellow) - 12.9 Modern Global Warming and the CO2 hypothesis > Page 579 · Location 7461

Another problem with the hypothesis is that it is generally accepted that a progressive decrease in CO_2 levels has taken place for the past 550 million years (the Phanerozoic Eon), from c. 5000 ppm in the Cambrian to c. 225 ppm in the Late Pleistocene (Berner & Kothavala 2001; Fig. 12.14b). This decrease does not appear to have produced a progressive decrease in temperature, that displays a cyclical range-bound oscillation (Frakes et al. 1992; Scotese 2018; Veizer et al. 2000; Fig. 12.14d), alternating between icehouse and hothouse conditions over the entire Phanerozoic.

Highlight (yellow) - 12.9 Modern Global Warming and the CO2 hypothesis > Page 581 · Location 7484

After 70 years with CO_2 levels increasing faster than ever recorded, and above any previously recorded level for the Pleistocene, it is time to analyze the results. The world has continued warming as before. The warming during the 1975– 1998 (or 1975– 2009) period is not statistically significantly different from the warming during the 1910– 1940 period (Jones 2010) The temperature increase since 1950 shows no discernible acceleration (Fig. 12.11b) and can be fitted to a linear increase (Fig. 12.9). The logarithm of the CO_2 increase, however, displays a very clear acceleration (Fig. 12.9). A linear relation between supposed cause and effect cannot be established Sea level has continued rising as before. Its acceleration is not responding perceptibly to the increase in anthropogenic forcing (Fig. 12.13) The cryosphere shows a non-cyclical retreat in glacier extent with evidence of acceleration (Fig. 12.6; Zemp et al. 2015). The reduction of the size of ice shelves is also

Highlight (yellow) - 12.9 Modern Global Warming and the CO2 hypothesis > Page 581 · Location 7494

unusual. We cannot distinguish if the cryosphere is responding mainly to the CO_2 increase, the temperature increase, or to the increase in light-absorbing particles

Highlight (yellow) - 12.9 Modern Global Warming and the CO2 hypothesis > Page 582 · Location 7498

Lack of support for the CO_2 hypothesis from Antarctic ice cores (Fig. 12.8), and from results 1– 3 has forced the proponents of the hypothesis to make numerous new unsupported assumptions. They assume that all warming since 1950 is anthropogenic in nature (IPCC– AR5, Myhre et al. 2013; Fig. 12.12). That past recorded temperatures must be cooler than previously thought (Karl et al. 2015). That the oceans (Chen & Tung 2014), and volcanic eruptions (Fasullo et al. 2016), are delaying the surface warming and SLR. And essentially concluding that more time is required to observe the warming and SLR acceleration. All these might be true, but the simplest explanation (Occam's favorite) is that an important part of the warming is due to natural causes, and CO_2 only has a weak effect on temperature.

Highlight (yellow) - 12.10 Modern Global Warming attribution > Page 584 · Location 7546

Unless the ETCW can be satisfactorily explained we cannot have confidence on our recent warming attribution. The ETCW, that took place between 1910 and 1945, was of comparable magnitude (0.5 °C versus 0.6 °C) to the Late Twentieth Century Warming (LTCW) between 1975– 2000, yet CO_2 emissions were several times lower during the ETCW. Between

13. 21ST CENTURY CLIMATE CHANGE

Highlight (yellow) - 13.2 Changes in CO2 emissions and atmospheric levels > Page 598 · Location 7737

However, if we stabilize our CO_2 emissions, after just 10 years it should become apparent that the airborne fraction of fossil fuel CO_2 is decreasing and the rate of increase in total atmospheric CO_2 is slowing down. Once more we are poised for another positive surprise by carbon sinks. Fossil fuel CO_2 emissions are growing more slowly now (Fig. 13.2) and there is the possibility that they will decrease in a few decades.

Highlight (yellow) - 13.3 Fossil fuel changes > Page 599 · Location 7755

We cannot discard the possibility that Peak Coal has already taken place.

Highlight (yellow) - 13.3 Fossil fuel changes > Page 602 · Location 7777

The conservative forecast for oil production proposed here is in stark contrast to every single official projection by the International Energy Agency, the U.S. Energy Information Administration, British Petroleum Statistical Review of World Energy, or ExxonMobil Outlook for Energy, as none of them projects a decline in world oil production for the next decades.

Highlight (yellow) - 13.4 Changes in solar activity > Page 606 · Location 7833

This level of solar activity corresponds to the Holocene highest 25%, and no doubt is contributing to the present warm period. Lower than average solar activity should only take place in the 2006– 2035 period. The Sun should promote warming during the 2035– 2100 period but should reach maximal millennial activity during the 2050– 2080 period.

Highlight (yellow) - 13.7 Consequences for Arctic sea ice > Page 617 · Location 7973

The 30% decline in Arctic sea-ice extent that took place between 1995 and 2007 led to numerous radical forecasts, predicting in some cases a summer ice-free Arctic by 2016 (Maslowski et al. 2012) due mainly to albedo feedback leading sea-ice into a “death spiral” (Serreze 2008). Of course, radical forecasts are seldom true, and the albedo effect on sea-ice has turned out to be lower than expected, because summer Arctic sea ice extent has refused to decline any further for the past 14 years. Green and Armstrong (2007) are proven correct in their assessment that experts' predictions are not useful in situations involving uncertainty and complexity, when biases tend to go unchecked.

Highlight (yellow) - 13.8 Consequences for sea-level rise > Page 620 · Location 8016

This intermediate scenario derived from Horton et al. (2014) projects a rise of c. 800 mm for 2000– 2100. In 2017 NOAA published their updated global sea-level rise scenarios where the intermediate scenario, that is most consistent with RCP 4.5, forecasts one meter of sea-level rise for 2000– 2100 (Sweet et al. 2017; Fig. 13.12). Surprisingly, and despite lack of acceleration in sea-level rise since 1993 (28 years), projections are becoming significantly more pessimistic with time.

14. THE NEXT GLACIATION

Highlight (yellow) - 14.1 Introduction > Page 626 · Location 8105

the IPCC expresses virtual certainty that a new glacial inception is not possible for the next 50 kyr if CO_2 levels remain above 300 ppm (IPCC– AR5, Masson– Delmotte et al. 2013, p 435). This claim expressed on so certain terms is in stark contrast with the lack of precedent for any interglacial spanning over two obliquity oscillations.

Highlight (yellow) - 14.2 Interglacial evolution > Page 629 · Location 8133

The majority of interglacials of the past 800 kyr are the product of very similar orbital and ice-volume conditions and present a common pattern (Fig. 14.2). The Holocene interglacial is the result of similar conditions, and belongs to this group. Nearly