CONFIRMING THAT MODERN GLOBAL WARMING IS PREDOMINANTLY GEOMAGNETICALLY DRIVEN AND SEEKING OTHER DRIVERS BY EMPLOYING LATITUDINAL BANDS.

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Confirming that Modern Global Warming is Predominantly Geomagnetically Driven and Seeking other Drivers by Employing Latitudinal bands.

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Abstract

The hypothesis that most of modern warming is geomagnetically driven is tested and shown to be correct. Models employing single and multiple geomagnetic parameters including both North and South Dip Pole positions, Tilt and Dipole Strength are developed and tested. Pole movement with accompanying changs in Tilt and Dipole strength changes particle precipitation, changes cloud, lowers albedo and causes some 250 mK of warming per decade since 1958 in Northern mid-latitudes and double that in Polar regions. Evidence of the same has been obtained independently here wherein the CERES Absorbed Solar Radiation Map shows a massive 7.5-10.5 W/m^2/decade trend, exactly of the order of magnitude predicted by EEP hypothesis. It is also confirmed how decreasing Dipole Moment counters EEP effects in the SAA where the geomagnetic field is weakest. Residuals of unaccounted warming from the 2 Pole model are correlated against known anthropogenic and natural climate drivers to investigate their strength and relevance. SO2 is shown to have the most statistically relevant and a cooling effect. A breakdown of this unexplained warming has been sought. Although mainly statistically of very weak or no relevance these sources are in order of intensity; Aviation +45mK/decade, Electrical Power via PLHR ionosphere effects +28mK/decade, Solar cycle +18mK/decade (7.2%) and CO2 2mK/decade (32mK in Polar regions). This totals 75mK/decade anthropogenic and 18mK/decade natural solar cycle. This is offset by SO2 which except in the polar regions has a cooling effect of approximately 50 mK/decade. Very surprisingly CO2 is found to have weakest and most statistically irrelevant effect of all known drivers, and it is estimated here to have caused only some 34 mK of warming in mid latitudes since pre-industrial times. This is discussed at length. The dangers of Geoengineering/ SRM are also briefly discussed in relation to these findings. The findings here add to the growing body of evidence that there is something desperately wrong with present climate models and with traditional CO2 heat trapping hypotheses. Because these results are in line with satellite studies and confirm the author's previous work, there now needs to be an urgent paradigm shift in Climate Science.

Keywords - Albedo, Climate model, Climate change, Global warming, Modern Warming, Pole shift, GHG, EEP, GCR, South Atlantic Anomaly, SAA, Forcing, Clouds, Geomagnetism, Geomagnetic tilt, Dipole moment.

1. Introduction

1.1 Climate and climate change

Earth's climate system runs on an incredibly complex interplay of the solid earth, its oceans, atmosphere at all levels, solar and other extra-terrestrial inputs. Thermodynamically the earth is unique. Not only does radiation pass all the interfaces in the above system but also other wave energies and particulate matter in all four states. Undeniably the climate is changing, one aspect of which is global warming. Global warming of late appears to have proceeded at an alarming rate [1] which cannot readily be accounted for by existing models.

1.2 Causation recent surprises

Very recently indeed it has been shown by Nikolov and Zeller (2024) [2] that 100% of all increases of earth's surface air temperatures for the last 24 years has been caused by albedo changes due to primarily due to disappearance of low cloud and increased penetration of solar radiation. The degree of warming also exceeds all warming alleged to be due to CO2 over the past 17 decades. Although this result seems to defy earlier scientific consensus, it cannot be denied because it is based on real CERES satellite data. It cannot be denied that earth's climate is strongly aligned with both cloud amounts and cloud types, see Dim et al (2011) [3]. Reasons advanced for low cloud disappearance include natural climate variability, see Yuan et al (2018) [4], and fewer polluting aerosols, see Filioglou et al (2019) [5].

The present author has also very recently indeed discussed Northern Dip Pole shift as a climate driver and a strong reason for cloud disappearance because of attendant changes in energetic particle precipitation EEP, see Barnes (2025) [6]. The paper uniquely addressed both historic and modern warming and explained almost 90% of all post-industrial warming as seen in the GISTEMP v4 global average data set and it also simultaneously, seamlessly and successfully hindcast previous temperature changes for some 2000 years all without the need to involve CO2 or other GHGS in the model. Warming which fell beyond that accounted for by the regressive fits was ascribed to CO2 and other possible anthropogenic drivers and in any event appeared to be held at under 10%. In more detail, the theory advanced for most of the change was that as the pole moves northwards, energetic particle interactions (EEP) also change which has knock-on effects on polar stratospheric chemistry, the global electric circuit and hence global clouds and earth albedo.

1.3 Rationale for present study

Clearly, Northern Dip Pole Shift has been shown to be a powerful modulator and amplifier of solar and cosmic changes. However, the possibility of geometric changes was not entirely ruled out. Moreover, the need to examine effects of the Magnetic South Pole was also highlighted. This present paper addresses that gap and additionally given that in order to move the poles, Earth's magnetic field is both decaying and rotating so the paper also considers how the positions of both Northern and Southern Dip Poles and other related magnetic parameters such as dipole tilt and dipole moment relate to temperature change in more detailed locations defined by latitude bands on the earth's surface. This latter notion is important given firstly that strictly speaking there is no such thing as a 'global average' temperature, see Essex et al (2007) [7] and secondly that modern satellite data is able to highlight highly regionalised areas or cooling, warming and albedo change, some of which will be explored in detail in the context of the proposed study.

Following the apparent lack of a CO2 contribution of late [2] and the author's previous findings of CO2 as a very minor driver [6] especially in relation to the smooth forecasting and hindcasting produced, it is proposed also in this present work to make regression studies and multiple regression studies not including CO2 as a main variable but rather instead it will be investigated for causation of model residuals along with a number of other natural and anthropogenic drivers.

1.4 Rationale for date range of present study

The date range of the present study is 1958 -2020. The starting date has been chosen because daily CO2 monitoring began in Mauna Loa in 1958. The end date of 2020 was chosen because some have shown that large reductions of up to 80% SO2 aerosols from shipping because of the changed The International Maritime Organization (IMO) regulations has caused measurable warming since the 2020 change, especially in the North Atlantic as a result the removal of very reflective marine clouds known as ship tracks. For example, Yoshioka (2024)[8] has suggested the IMO changes may help explain part of the rapid jump in global temperatures over the 12 months from 2023 to 2024. They also find consistent with other aerosol perturbation simulations, that warming is greatest in the Arctic, around 0.15 K and is 0.3 K in the Atlantic sector of the Arctic i.e. some 10 % increase in the total anthropogenic warming since pre-industrial times. Watson-Parris et al (2025)[9] find using various Earth System models that overall, the IMO regulations may contribute up to 0.16 °C to the global mean surface temperature in individual years during this decade but is unlikely to have been found beyond internal variability. At their time of writing, neither author was of course aware of the present author's previous observations of magnetic pole shift, warming and clouds. Nevertheless, from 2020 -2025 it is the present author's opinion that both processes could contribute to warming via cloud dissolution and albedo reduction. Thus, for the purposes of the present study and to avoid that additional potential complication the study has been given a cut-off point of 2020. One other important reason for the 2020 cut-off is it avoids possible complications due to the Hunga Tonga volcanic eruption in 2022.

1.5 Following organisation of this manuscript

Section 2 contains the related work on climate change and earth's poles, albedo and clouds and energetic particles**.** Section 3 contains theory pertinent to specific poles and regions. Section 4 contains information on datasets, regression and plotting methodologies and preparation of algorithms. Extensive section 5 contains results and discussion including theoretical and practical explanations of latitudinal variations and unaccounted residual warming in terms of both anthropogenic and natural phenomena. Section 6 includes conclusions and proposals for further work and briefly mentions the dangers of geoengineering/SRM in the context of the present findings.

2. Related Work

In 2009, Kerton[10] speculated on a possible connection between Climate Change and Earth's magnetic Poles. It was shown that there was less than 1% probability of such a connection happening by chance. Three possible mechanisms were proposed, namely,

1. The Earth's magnetic field affects the energy transfer rates from solar wind to Earth atmosphere which in turn affects the North Atlantic Oscillation.

2. Movement of the poles changes the geographic distribution of galactic and solar cosmic rays, moving them to particularly climate sensitive areas.

3. Changes in distribution of ultraviolet rays resulting from the movement of the magnetic field, may result in increases in the death rates of carbon sinking oceanic plant life such as phytoplankton.

Indeed, there have already been recent such UV increases, see Herman (2010) [11] and further with regard to (3) above, Li et al (2013) [12] showed that UVA and UVB significantly reduce carbon fixation with the maximum of 22.4 and 15.3% in phytoplankton.

2.1 Albedo and Clouds

In addition to the above, almost all recent warming can be shown to be due to a fall in Earth's albedo and changed cloud distributions. See for example, Goessling et al. (2024)[13], Wu et al.[14], and especially Nikolov and Zeller [2]. With reduced albedo, solar forcing often comes into play. For example, its effect in Nigeria has been discussed in detail by Chibuogwu1 & Obiekezie [15].

2.2 Energetic Particles

Although the total electron count depends highly on the sun [16], the author had also made private unpublished observations of a component of anthropogenic warming somehow linked to Earth's power systems and had previously ascribed their influence on the Van Allen Belts and energetic particles, especially electrons (EEP) but also solar protons (SPP). Since the auroral oval is centred around the North Dip Pole, where field lines are perpendicular to the surface and not the North Pole per se, any shift in energetic particle interactions brought about either anthropogenically or by movement of the magnetic pole itself ought to change the polar electrojet, the stratospheric polar vortex (SPV), jet streams, and clouds in general, especially lower ones, see Lam et al [17], hence also changing the weather and climate. Similar effects ought to be noted for the Southern Pole.

3. Theory

3.1 Factors linked to the Poles

The interplanetary magnetic field (IMF) also varies and interacts with our wandering magnetic Poles. The Pole's have hence both an IMF and EEP connection, and also change Earth's tilt, sphericity, and rotation, known about since the 1950s, see for example Vestine [18] causing amplification or modulation effects on TSI and on atmospheric angular momentum pressure, see for example Lam et al.[17] Thus, the hypothesis here is that the position of the magnetic Poles through a combination of these factors, to be very highly correlated with temperature and climate change on Earth. Bucha [19] explored first correlations between geomagnetic, climatic, and meteorological phenomena, and attempted to demonstrate how the function of the geomagnetic pole and changes of its position might control the climate and weather. It was not until 2009 that Kerton [10] speculated on a possible connection but was still unable to establish the full causes.

3.2 Climactic theory and ocean circulation

Goralski [20] advanced a new climatic theory, explaining how the effects of Earth's coating movement result in magnetic pole movement. There are also known weak influences of Earth's field on ocean circulations, but with longer timescales than those considered here, see Tyler[21].

3.3 The Magnetic North Pole

Earth's North Magnetic Pole is constantly moving around and has always done so over both recent and geologic timescales. Gellibrand unravelled this puzzle by looking at stone walls from colonial New England in the USA built along North/South 'property' lines surveyed by compass in the 1760s are perfectly straight, but when a modern compass is employed to take their bearing, the impact of 250 years of polar wandering comes to light and the walls are seen to be oriented nearly 7 degrees west of today's magnetic north. In 1860, after moving southward for more than 200 years, the Northern dip pole turned sharply North and continued moving along a straight Northward path, averaging about 15 km/yr throughout most of the last century. In 1990, it speed up significantly, traveling 1,000 km in just 28 years. It passed the International Date Line in 2017 on its way from Canada to Siberia and is currently moving past the Geographic North Pole at a rate of about 55 km/yr or 150 m per day. The implications of this movement for climate and climate prediction were discussed at length previously by the present author [6].

3.4 The Magnetic South Pole

The South Dip Pole is moving slower and is moving away from the Southern auroral oval. Climate scientists have long struggled to understand why Antarctica shows less warming than the Arctic. Clearly, following the narrative developed above, there would be expected to be more mid- and low-level cloud in the Southern Hemisphere, hence more cloud albedo and less warming. This is exactly what is seen, see Radenz et al [22]. They contrasted two sites in the Northern Hemisphere, namely Leipzig, Germany and a polluted and strongly dust-influenced east Mediterranean site, namely Limassol, Cyprus with a clean marine site in the southern mid-latitudes Punta Arenas, Chile. At all three sites they made investigations of shallow stratiform liquid clouds. After taking into account boundary layer and gravity wave influences, it was shown that Punta Arenas' clouds had lower fractions of ice-containing clouds by 0.1 to 0.4 absolute difference at temperatures ranging from -24C to -8°C. These differences were ascribed as being caused by the altered ice-nucleating particle (INP) reservoir between the different sites. Following Barnes[6] and this present work, it can be argued this difference is linked directly to magnetic EEP modulation and Punta Arenas is far closer to the South Atlantic Geomagnetic anomaly where energetic particles can plunge in lower especially with the present decreasing dipole moment. This only serves to strengthen the author's earlier point that the direction of climate science now needs urgently to shift. "Opposing temperature trends of the Medieval Climate Anomaly (MCA) in Antarctica", see Luning [23] and Steig (2016) [24] showed that Antarctica has always behaved differently from the Northern Hemisphere. McCracken [25] has studied cosmogenic isotopes, especially 10Be. They point out that due to the geomagnetic modulation 10Be precipitation in the southern polar cap will be strong. Clearly differences in North and South dip-pole movements as the driver of this Antarctic phenomenon demands further and urgent investigation. The present paper also provides such an investigation.

4. Experimental Method and Procedure

4.1 Proposed analysis

To consider both interacting particle zones and the possibility of geometric effects it was decided to make multiple regression analyses of both latitudinal and longitudinal positions of both magnetic poles against each temperature data point per given year per given earth latitudinal climate band. The epoch of the study was chosen as 1958-2020 because pre-1958 CO2 was assessed by ice core records. Also, there have been a couple or recent criticisms of the ice core method, see for example Ato (2025) [26].

Regarding the Dip Pole positions, each regression will be expected to show the weighting of each polar attribute. To make fair tests and to consider the possibility that geomagnetic forcings over and above shift of EEP height could occur it was decided to regress the following chosen geomagnetic parameters against temperature in each band, being namely; North Dip Pole latitude alone, Magnetic tilt angle alone, Dipole moment alone, and finally both the latitude and longitude of both the North and South Dip Poles together. Further in line with the arguments in the author's previous work[6] making the assumption that these magnetic parameters are the main drivers of climate via a combination of solar and cosmic amplification factors i.e. precipitating energetic particle changes

(EEP) causing cloud modulation and corresponding albedo changes. It is expected that there will be some latitudinal bands where albedo reduction will be less than others due to asymmetries in the field structure such as the South Atlantic Anomaly and existing cloud distributions. Based on the large body of evidence that CO2 must also somehow be involved as a climate driver and the lab experiments which suggest under certain circumstances it being capable of producing between 11-35% of possible temperature change, it is tempting to assign any unaccounted-for changes in the magnetic regressions as being entirely due to CO2. It should be noted that this would provide a worst-case scenario to calculate climate sensitivity accordingly. This is because it must be borne in mind, however, that because there is a strong multi-correlation of CO2 with magnetic parameters there could be either another simultaneous pollutant or force field produced at the same time as CO2 emission which equally dilutes/dissolves low level cloud. In the latter respect Vares et al [27] have discussed how magnetic energy release into the oceans during field diminishment can release CO2 which lags said magnetic change and which explains the high multicollinearity observed. It should be noted that attempts to include C02 directly in any of the models throw up totally unrealistic results and warming values which are not practically observable. This is presumably because of the high multicollinearity or parallel processes suggested above and also the latter to be discussed later.

4.2 Datasets

For temperature, the NASA Goddard Institute for Space Studies (GISS) Surface Temperature Analysis (GISTEMP) dataset, v4 across several earth latitude bands was employed. For the position of the magnetic Poles, data from NOAA[IGRF] was employed.

4.3 Plotting methodologies

Regressions were plotted using the calculator at https://www.statskingdom.com/410multi_linear_regression.html.

4.3.1 Single parameter regressions

The single regressions for Northern Dip Pole Latitude, Dipole Tilt and Dipole Magnitude are of course all the general form for simple linear equations. No attempt was made to force them through the origin and the 'constant' is different for each latitudinal band. In order to calculate the temperature difference across the chosen time epoch, the difference in each chosen variable is simply substituted as coefficient multiplier in each algorithm in turn and the constant of course cancels in the subtraction.

4.3.2 Multiple Parameter Regressions

To plot the two-pole data the algorithm arising is of the form given by equation 1.

Y= C+ D*X1+E*X2+F*X3+G*X4 ……(1)

Where X1 is the Northern Dip Pole Latitude, X2 is the Northern Dip Pole Latitude, X3 is the Southern Dip Pole Latitude, where X4 is the Southern Dip Pole Longitude and where C-G are the corresponding model 'constant' and coefficients. It should be noted that all of C-G differ for each latitudinal climate band and that C cancels in the wash when precited temperature differences for the time epoch are evaluated by substitution. Since C-G are all individual functions of Latitude, it follows that a more general equation expressing temperature difference at any latitude, L, can be derived by individually fitting C-G to separate cubic functions C = f1(L), D=f2(L), E=f3(L), F=f4(L) and G= f5(L) where f1-f5 are said functions, see equations 2-6 with attendant regression values also listed and L = any earth latitude.

f1(L) = -1E-05L^3-0.0013L^2-.0356L-1.1697 and where R^2 =.98 ……(2)

f2(L) = -1E-07L^3-1E-05L^2+.0006L+.0321 and where R^2 = .86 ……(3)

f3(L) = -7E-08L^3+9E-08L^2+.0002L-.0053 and where R^2 = .95 ……(4)

f4(L) = -2E-06L^3-2E-05L^2-.0039L+.1345 and where R^2 = .95 ……(5)

f5(L) = -1E-06L^3-6E-06L^2-0.0021L+.0599 and where R^2 = .97……..(6)

5. Results and Discussion

5.1 Northern Dip Pole and other studies

The first question to be answered is that does the simple single parameter model developed by the author previously [4] and based on Northern Dip Pole latitude account for warming in all earth's latitudinal climate bands? Figure 1 shows the output of the Northern Dip Pole latitude only model as developed by the author in reference [4] compared with actual temperature changes across earth's latitudinal bands +/- 0-24, 24-44, 44-64, 64-90 degrees using the GISTEM 4 dataset.

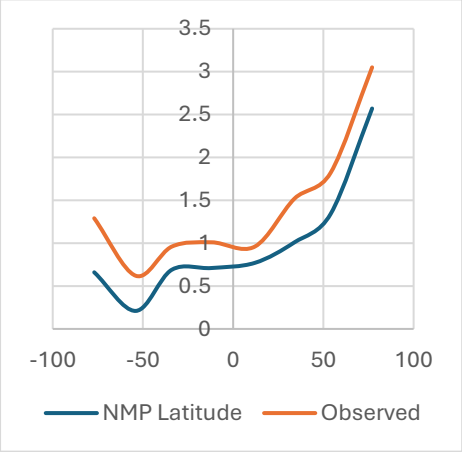

Figure 1 : Model and observed temperature changes

The model generally produces a result which tracks earth temperature across all latitudinal bands accounting for between 70-85% of the observed changes except at extreme Southern Latitudes where there is more divergence. Unexplained warming according to this model is no more than about 80mK per decade, even its entirety were due to GHG, for another doubling of present C02 this would be far less than any of the present IPCC estimates.

From this result, it is expected that EEP changes in Northern Latitudes do not exert as much influence over the South. Possibly counter effects come into play because of the falling Dipole Moment. This and the other direct magnetic parameter, the Dipole Tilt relative to earth's N/S axis were also explored in single and multiple regression studies as were the latitudes and longitudes of both the North and South Dip Poles together. The results obtained are summarised in the combination chart shown in Figure 2.

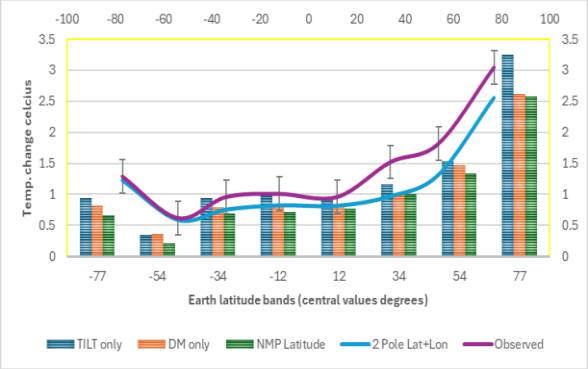

Figure 2: Combination chart showing outputs of regression models built on Tilt only, Dipole Moment (DM) only, original North Dip Pole model (NMP) and 2 Pole Lat/Lon model compared with actual temperature changes 1958-2020.

The best fit is produced by the 2 Pole model. From 34 degrees North to the South Pole the model accounts for between 80-100% of all warming in the period. From 44 degrees North to the North Pole the model accounts for 87% of all warming. Unexplained warming is thus in the region of 48mK/decade. From circa 40 degrees South to the South Pole, the two Pole model accounts for all warming.

The Dipole Moment change mirrors the warming trend from 44 degrees South Northwards. The Tilt only model approximately matches the 2 Pole model from 44S Northwards and progressively accounts for all warming at the North Pole. All models fail from 44S Southwards except for the 2 Pole model.

It is instructive to consider the 2 Pole model in more detail. By normalising the individual regression coefficients and plotting against Latitude the relative weighting of each process in each climatic latitude band may be considered, see Figure 3.

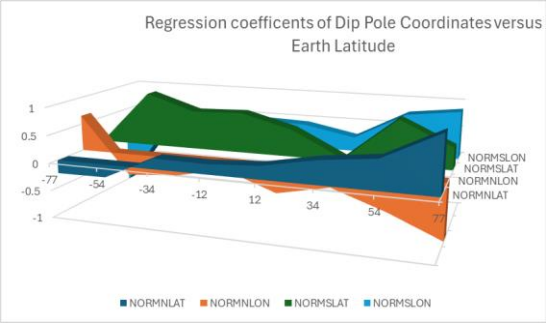

Figure 3: Normalised regression coefficients, Northern Dip Pole Latitude +Longitude (NORMNLAT + NORMNLON), likewise for Southern Dip Pole (NORMSLAT + NORMSLON) plotted against latitude bands central values shown.

A complex interplay between the four coefficients can clearly be seen. The influence of the Northern Latitude coefficient peaks in the Northern Hemisphere especially at Polar latitudes. All four coefficients show sharp reversal type transitions at about 40 degrees south. This is the region of the South Atlantic Geomagnetic Anomaly (SAA). In the Northern Hemisphere only the North Dip Pole Longitude has a cooling influence. Throughout the equatorial and tropical regions, the South Pole Latitude appears to exert strongest influence peaking Southwards at the SAA. The strongest single warming influence at the South Pole appears to be the North Pole longitude. The latitudinal effects suggest that the EEP influence as previously proposed by the author [6] extends equatorward from both Polar zones and peaks further from the South Pole than the North as expected by the present positions of the two dip poles. For the Northern Dip Pole Latitude effect, warming would be expected to be greatest over Siberia in line as EEP heights increase in line with the observation of Srivastava et al (2025) [28] and hence low cooling cloud nucleation is reduced. Evidence of the same is available, see Figure 4 wherein the CERES Absorbed Solar Radiation Map shows a massive 7.5-10.5 W/m^2/decade trend.

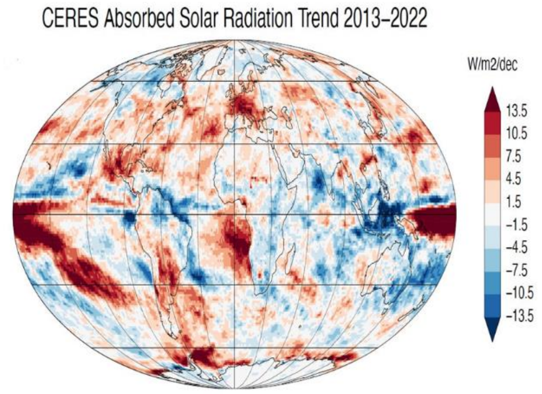

Figure 4: CERES trend 2013-2022.

The maximum observed forcing per decade anywhere on earth, figure 4 of 13.5 W/m^2 /decade is in very good agreement with the theoretical maximum for EEP shift developed in the author's earlier Barnes 2025 work [6].

5.2 Tilt Angle and Dipole Strength

Some authors have attempted to directly link either tilt angle theta or magnetic dipole strength to climate [29-31]. Of course it must not be forgotten that the polar dip pole coordinates can be used to mathematically derive the tilt angle Theta between the apparent earth magnetic dipole and the earth's rotational axis and since the Dipole Moment is also interrelated, it is instructive to consider these two parameters, see Figure 5, since decreasing Dipole Moment will be expected to counter EEP effects, especially in the SAA where the geomagnetic field is weakest.

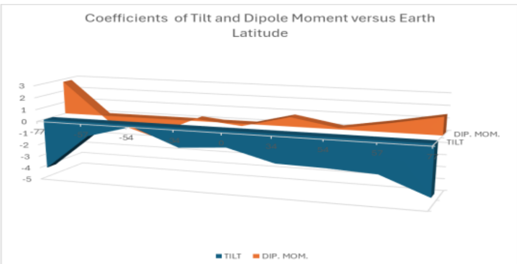

Figure 5: Multiplier coefficients of Tilt and Dipole Moment Model versus Latitude

The Tilt response has extremely high multicollinearity with the 2 Pole response as expected since the Tilt may be derived directly and trigonometrically from the Polar coordinates, and the Dipole Moment calculation has been developed by Koochak and Fraser-Smith [32].

Equation (7) gives the general form of the combined tilt and dipole moment algorithm from the multiple regression analysis for a fixed latitude band is

$Y = a + b*d + c*t$ ……………………………………………………………………………………….(7)

Where a is constant, b the multiplier coefficient for dipole moment and c= the multiplier coefficient for tilt derived for each latitude band, see Figure 5.

Since both tilt angle Theta and Dipole Moment (A.m^2) have fallen during the observation period, a negative coefficient is tantamount to a warming effect and a positive coefficient a cooling effect.

Following a similar argument to 4.3.2 above, it follows that a more general equation expressing temperature difference at any latitude can be derived by individually fitting a, b and c to separate polynomial functions a = g1(L), b=g2(L) and c=g3(L) where g1-g3 are said functions and L = any earth latitude.

Best fits achieved are given in equations 8-10 below.

g1(L) = .0021L^2 + .0797L+ 15.241 with R^2 =.92 ……..(8)

g2(L) = -2E-07L^4 +7E-06L^3+.0007l^2-0.0443L-1.6146 with R^2= .95 ……(9)

g3(L) = -3E-09L^5+2E-07L^4+2E-05L^3-0.0007L^2+.0092L+.415 with R^2 = .84 …….(10)

It is abundantly apparent that tilt causes warming across the entire globe, especially in the Northern hemisphere. This is exactly as seen in climatological records. The warming effect of tilt is much less pronounced in the SAA. The decreased dipole moment produces cooling across all latitudes except the SAA its cooling effect is especially pronounced in Southern Polar regions, again exactly as observed climatologically.

Presently, the dipole tilt is reducing, i.e. titling towards higher latitudes. Courtillot et al (2007) [29] enquired if there were connections between earth's magnetic field and climate. Their proposed mechanism involved variations in the geometry of the geomagnetic field, and they proposed that if the tilt of the dipole moved to lower latitudes this would result in enhanced cosmic ray induced nucleation of clouds, i.e. cooling. Hence the results seen in this present work strongly supports their hypothesis.

Referring to Figure 2, most unexplained warming appears to be in a narrow Sub Tropical band South of the Equator from 12 degrees South to 34 degrees South and in a broader band in the Northern Hemisphere from about 20-60 degrees North. Since the increase in warming across this latitude band runs in parallel with that predicted by Tilt and Polar EEP effects it is not possible to separate it out on the CERES map which shows a continuous warm 'band'. In the Southern Hemisphere the CERES data is very different and most likely reflects ENSO/IOD. The warming seen also appears to run counter to theory for CO2 warming, see Liu et al 2005 [33] See also sections 5.5 and 5.9 below.

5.3 Accounting for unexplained warming, theoretical considerations

If the unexplained warming in both hemispheres was entirely due to 'well mixed' [Wofsy et al 1972[34] anthropogenic CO2 it is difficult to account for the large observed hemispheric and geographic differences, see for example Figure 4. It is pertinent to enquire if any parallel processes could cause warming either by initiating additional EEP shifts or cloud disappearance by whatever mechanism or by initiating other warming types of clouds.

A possible process which can cause marine cloud in the form of ship tracks to disappear has been outlined above [8]. However, this initiated after the termination date of the present study. Nevertheless, general SO2 levels have decreased in some parts of the world since 1990. There are huge numbers of references on SO2, but the upshot is that decrease of about 60% in the USA have occurred and about 40% in the UK. Whereas in other parts of the world such as China, they have generally continued to increase.

Aviation is another potential cause of cloud changes due to aerosol and contrails. Unfortunately, even though there are literally thousands of publications, few if any seem to provide consistent results of even results of the sign regarding radiative forcing and to try and consider them here would detract from rather than add to the present work.

Bullough et al (1976) [35] have showed that using the Ariel III and IV satellites man-made electromagnetic emissions, both power-line harmonics generated in the industrialised regions of North America and, also, v.l.f. transmissions at 17.8 kHz (NAA) and 16.0 kHz (GBR) in the longitude sector which encompasses the South Atlantic Anomaly, are partly for the formation of the electron slot (2<L<3) between the inner and outer radiation belts in the magnetosphere. Vampola et al (1977) [36] made a study of electrons in the drift and bounce loss cones of the magnetospheric slot region. Discrete events were thought to account for the arrival of most electrons in the 100-400 keV range in the drift loss cone. A high-power level VLF transmitter was cited as the cause. Calculations of the loss rate caused by the events showed the electron flux could vary by 50% per day. It is likely that wave-particle interaction occurs low on the field line due to the particle energies and wave frequencies. They also concluded that to transport particles to the lower interaction region, additional near-equator scattering, via power-line harmonic emissions or ELF hiss, may be required. Hua et al (2020) [37] showed that VLF radio signals radially bifurcate the energetic electron belt in near-earth space. The dynamics of the inner magnetosphere is strongly governed by the interactions between different plasma populations that are coupled through large-scale electric and magnetic fields, currents, and wave-particle interactions. The precipitating inner magnetospheric particles influence the ionosphere and upper atmospheric chemistry and affect climate. Natural VLF signals are related to variations of electron density in the ionospheric D-region, hence have been used to identify the processes that influence the behaviour of the upper atmosphere, see Cruz and Liliana (2020) [38]. Xu et al (2025)[39] has shown that VLF waves at 0.8–2 kHz created by both the SURA and HAARP facilities can influence electrons in the 100–250 keV energy range, mostly via pitch-angle diffusion Power line harmonics (PLHR) are also found in this same critical frequency range, see Nemec et al (2006)[40]. DEMETER was a low orbiting satellite (660 km) used to study ionospheric perturbations in relation with seismic and anthropogenic activities. Wave and plasma parameters all around the Earth (except in the auroral zones) at two different local times (10.30 and 22.30 LT) were recorded by Parrot et al (2011) [41] who noted strange MLR (Magnetospheric Line Radiation) which have frequency lines close to the PLHR (Power Line Harmonic Radiation) at the harmonics of 50 (60) Hz but which are drifting in frequency, waves such as hiss, chorus, QP (Quasi Periodic) emissions, triggered emissions, EMIC (Electromagnetic Ion Cyclotron) waves in the equatorial region and emissions at the lower hybrid frequency, and also specific waves were recorded at times of very intense magnetic activities or in particular regions (e.g. the SAA and sub-auroral zones). Pronenko et al (2014) [42] also describe PLHR as parasitic EM radiation from the power supply lines which enters the ionosphere-magnetosphere system and impacts on the electron population in the radiation belt. As with the other authors, it is stated that its interaction with trapped particles will change their energy and pitch angles; as a result, particle precipitations, might occur. Further they made observations of EM emission by multiple low orbiting satellites and confirmed a significant increase in their intensity of PLHR over the populated areas of Europe and Asia. Central frequencies of 1.5-3KHz were observed containing 50/60 Hz harmonics and even frequencies up to as high as 15 KHz were also observed. In terms of precipitation electrons, the keV ranges discussed above are classed as within the medium energy range. Arsenovic et al (2019) [43] discuss reactive nitrogen (NOy) and ozone responses to energetic electron precipitation during the Southern Hemisphere winter. When they compared a year with high electron precipitation with a quiescent period, they found large ozone depletion in the mesosphere moreover as the anomaly propagated downward, they found 15 % less ozone in the stratosphere during winter confirmed by satellite observations. Only The ozone anomaly was produced with both low- and middle-energy electrons. Andersson et al (2014) [44] showed that EEP events strongly affect ozone at 60–80 km heights, leading to extremely large (up to 90%) short-term ozone depletion and is even comparable to that of large, but much less frequent, solar proton events. On average, across solar cycle timescales they also showed that EEP causes ozone variations of up to 34% at 70–80 km. With such large magnitudes of ozone change the present author asserts it is reasonable to suspect that EEP caused anthropogenically could as with natural EEP have very important, if not crucial effect on earth's climate system. In full support of this notion, Seppala et al (2014) [45] conclude that EEP has 'Strong indirect effects on the stratosphere with further potential impacts on the troposphere.'

5.4 Accounting for unexplained warming, experimental considerations

Referring to figure 2 it was noted that the best fit across all geographic latitudes was the '2 pole model'. By generating a best fit equation for each latitude band, the yearly data can then be used to generate a yearly temperature which is subtracted from the actual temperature in the appropriate dataset to provide residuals which represent unaccounted for warming/cooling. This difference albeit very small, may then be placed in single or multiple regression against factor(s) which may potentially be causing it, e.g. CO2, SO2, Aviation, Energy Density in Power Grid and Sunspot number. The largest differences for the 2 Pole model occur in the latitude band 44-64N, probably because this is the band associated with most industrial pollution. An idea of the fit before subtracting out unexplained differences may be gleaned by a direct inspection of the algorithm for this latitude band, see figure 6.

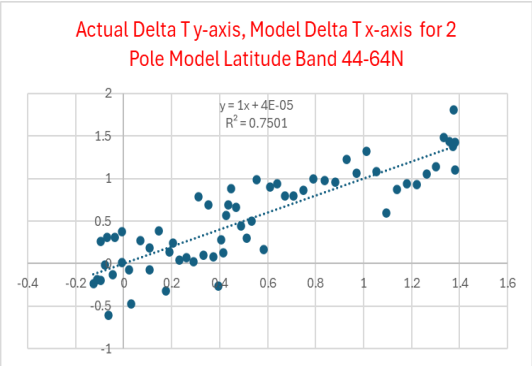

Figure 6: Output of 2 Pole model versus actual Delta T Gistemp 4 44-64N.

It can be clearly seen that the 2 Pole model elegantly accounts for the vast bulk of temperature change in the chosen latitude band.

5.5 CO2

The procedure described at 5.4 by subtracting actual temperatures produced by the model at Figure 6 from those of the Gistemp dataset as above was applied to CO2 concentration in the 44-64N latitude band, see Figure 7.

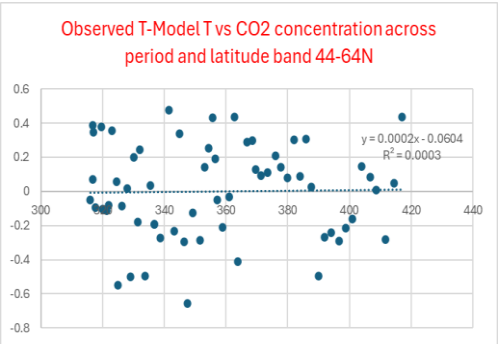

Figure7: 2 Pole model difference at 44-64 degrees North versus CO2 concentration

There is a virtually null correlation, equivalent of a tiny circa 2mK decade in terms of warming although not statistically significant.

The procedure was repeated for Southern Polar regions (64-90S) for the experimental period; result is shown in Figure 8.

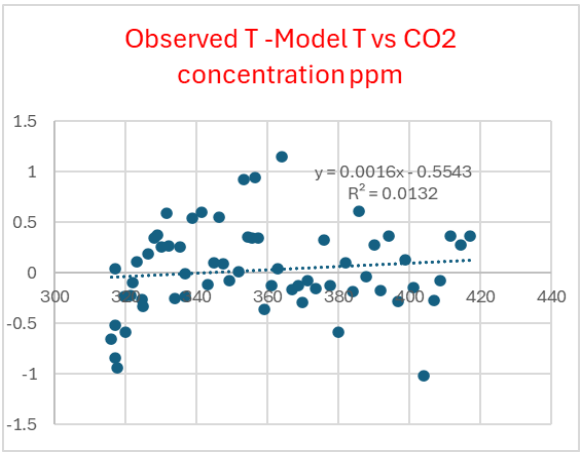

Figure 8: 2 Pole model difference at 64-90 degrees South versus CO2 concentration.

Again, a weak and statistically irrelevant correlation is seen but with a significantly larger slope of 32mK per decade. It would seem from above that that the Albedo effect is presently overwhelming any CO2 effects. Either the CO2 effect is much weaker than that proposed by the IPCC or it is saturating or perhaps has already saturated? Several authors have discussed CO2 absorption saturation but only one is peer reviewed and somewhat dated that is the work of Schack, A., "The Influence of the Carbon Dioxide Content of the Atmosphere on the Climate" (1972) [46]. Note for convenience of the reader, the original title has been translated from German as it appears above. Schildknecht (2020) [47] has revisited the theory of Schack and calculates that a doubling of present CO2 levels would only result in .5 Celsius of warming. This figure remains of course as do those of the present findings significantly lower than IPCC estimates.

If on the other hand, the CO2 greenhouse effect is not saturated but simply weaker than expected then quantum mechanics may hold the answer, see Macdonald, Blair D. "Quantum Mechanics and Raman Spectroscopy Refute Greenhouse Theory." (2019) [48]. This and similar papers argue that the greenhouse effect, as traditionally described, is misconceived. It uses quantum mechanics to assert that atmospheric gases like nitrogen (N2) and oxygen (O2), which constitute ~99% of the atmosphere, emit and absorb infrared (IR) radiation at their quantum-predicted spectra (2338 cm^{-1} for N2 and 1556 cm^{-1} for O2), as observed by Raman spectroscopy. The authors claim that CO2's role in the greenhouse effect is overstated because all atmospheric gases absorb and emit IR radiation, challenging the idea that CO2 is uniquely responsible for heat trapping. They suggest that the greenhouse effect theory, which assumes N2 and O2 are radiatively inert, contradicts quantum mechanics and thermodynamics principles like equipartition.

Nevertheless, consensus to date has until now held that the primary driver of modern warming was anthropogenic greenhouse gases (GHG), especially CO2. Indeed, the 15-micron absorption top of atmosphere absorption peak can be seen by satellites. However no single experiment has directly proved the existence or magnitude of the Greenhouse effect for the entire atmosphere they all can at best test layers or small locations and need to be linked through models. Real experiments have been lab based, for example 'A simple experiment on global warming', Levendis & Yiannis[49] Using pure CO2 Fraser shows slowing of heat loss in a ballon but also shows that convective heat transfer can account for 89% of change. The experiment can be further criticised for employing pure CO2. Even Tyndall's original experiment only qualifies a greenhouse effect, it does not quantify. Seim, H. & Olsen, B., "Laboratory validation of CO_2 greenhouse effect: A critical review," Energy & Environment, Vol.31, Issue.1, pp.123-135, 2020 [50] show that CO2 is an absorber in its main bands of 4.3 micron and 15 micron but that at 400 ppm effects are almost saturated. According to the calculations made by this present author Seim achieves about 35% of the change modern consensus warming theory would predict. Almost pre-empting the findings of this present work, the present author's previous paper considered the possibly that maybe something is wrong the notion of CO_2 as dominant driver, what if for instance if more dominant drivers have possibly been

overlooked? For example, it was recently it was discussed how earthquake induced obliquity could alter climate [51], and Lu, Q.-B. [52] had noted 'No significant trends in total greenhouse gas effect in : A study of polar and non-polar regions. What if a hitherto undiscovered factor was to be driving climate? What if, especially, that factor was driving climate at a temporal rate very similar to the evolution of CO2? The consequences would be that all climate models would be incorrect and moreover and importantly all would be vastly overestimating the climate sensitivity to CO2.

In paleoclimate studies it has been noticed that sometimes CO2 lags temperature increases and sometimes it leads. Very recently indeed, it has been reported in a cross-correlation study by Nishioka (2024) [53] that increases in global CO2 emissions and a subsequent rise in global temperature proposed by IPCC are not being observed. What is being observed is an increase in global temperature, an increase in soil respiration, and a subsequent increase in global CO2 emissions. The authors propose this to be a natural process detected during periods of increasing temperature specifically during El Niño events. They conclude thus there may be strong doubts that anthropogenic CO2 is the cause of global warming. It is therefore instructive, despite the previous large consensus to the contrary, to continue in the above regard and further search the literature for any other kinds of supportive studies which show zero or reduced relevance of CO2. These include Paleoclimate studies, Experimental/Observational Studies, Satellite studies and Alternative AGW warming hypotheses. It is also instructive to understand that consensus can, in some circumstances, be wrong, see Briant (2005)[54] or even impede progress, see Düzgüneş (2024)[55] which although written in relation to biomedical research has a Title which elegantly as relevant with the present situation in climate science, extract of that said title follows: ''Science by consensus' impedes scientific creativity and progress:'

A Paleoclimate study was made by Soon, W., & Baliunas, S. (2003) [56] . "Proxy climatic and environmental changes of the past 1000 years." Climate Research, 23, 89–110. also argue the diminished relevance of CO2 on the basis that that solar variability and cosmic ray-induced cloud cover changes are significant climate drivers, with CO_2's role overstated. Their methodology was to reviews proxy data (tree rings, ice cores) to reconstruct past climate and correlate it with solar activity. Their findings were that Medieval Warm Period and Little Ice Age aligned with solar cycles, suggesting natural variability overshadows CO_2. That study of course lines up rather well with the present author's work now and before. Fortunately, there are now publishing platforms who are most sincerely interested in advancing science, those with Editorial and Peer Review roles which seek to develop rather than frustrate knowledge for the sake of consensus, as elegantly put by Hollenbeck (2008) [57].

The following experimental and observational studies have also been made. Harde (2017)[58] concluded by means of radiation transfer calculations that CO2 accounts for at most 40% or warming over the last Century and that Cloud cover was far more relevant to climate than the IPCC acknowledge. Ollila (2014)[59] in summary argues again by analysing radiative forcing equations and comparing CO_2 and water vapor contributions that CO_2's warming effect is logarithmic and diminishes at higher concentrations, with water vapor dominating and CO2 at most contributing 10% to warming. The paper is elegant in that it explains why back radiation defies laws of thermodynamics and explains GHG in terms of SW trapping and not LW trapping.

Three relevant satellite studies have been identified. Firstly, that of Spencer et al (2011) [60] where the paper by analysing CERES satellite data to assess cloud cover and radiative balance, suggests that climate models overestimate CO_2-driven warming by misinterpreting cloud feedback effects. Secondly. Lindzen et al (2011)[61] which uses ERBE satellite data to estimate radiative feedback and sensitivity. It argues that due to additional negative feedback, climate sensitivity to CO_2 is low (0.5–1.3°C per doubling), based on this satellite data.

Next, dealing with Nikolov and Zeller (2024) [2] "Roles of Earth's Albedo Variations and Top-of-the-Atmosphere Energy Imbalance in Recent Warming: New Insights from Satellite and Surface Observations," published in Geomatics 2024, in more detail. These authors analyse NASA's Clouds and the Earth's Radiant Energy System (CERES) satellite data from 2000 to 2023 and employ a new and novel climate-sensitivity model derived from NASA planetary data, using Dimensional Analysis to quantify the impact of Earth's decreasing albedo and increasing solar radiation absorption on Global Surface Air Temperature (GSAT). The study examines radiative flux anomalies, focusing on large increases in solar energy absorption due to reduced low-level cloud cover, and compares these to temperature trends. Monthly anomalies were smoothed using 13-month running means to assess long-term trends. The authors conclude that this observed albedo decrease, accounts for 100% of the global warming trend and 83% of interannual GSAT variability over the past 24 years, including the 2023 heat anomaly. They argue that solar forcing, not greenhouse gas (GHG) concentrations, is the primary driver of recent warming, as their analysis leaves no room for GHG-induced radiative forcing or positive feedback. Their study challenges the IPCC's narrative, suggesting that atmospheric pressure, not CO2, significantly influences surface temperatures via adiabatic heating, consistent with their earlier work [62]. They also appeal for reconsideration of the anthropogenic climate change paradigm. Their work on low level clouds is particularly poignant and relevant to the present author's previous work [4] and this present work.

Sorokhtin et al. (2011) [63] and earlier works argue that the greenhouse effect is mischaracterized. They propose an adiabatic model where atmospheric temperature is set by pressure, gravity, and the specific heat capacities of gases, not radiative trapping. Certainly, this could possibly account for the small values observed in this present study.

An initial surprise for the present author particularly in his previous work was noting how hugely intercorrelated Pole Shift and CO2 appeared to be. It was pointed out that CO2 or small changes in earth temperature could not possibly be driving processes in Earth's mantle . We must look at processes the other way around to make sense of the conundrum. In the latter respect Vares et al [27] have discussed how magnetic energy release into the oceans during field diminishment can release CO2 which lags said magnetic change and which explains the high multicollinearity observed. Pole shift must drive CO2 because it drives clouds (or presently their disappearance) amplifies solar input and hence earth temperature, in turn driving ENSO/QBO etc and releasing CO2 from the oceans. Several authors have commented on the strong relationship between ENSO and CO2. For example, McMillan & Wohar (2012) [64] discussed the relationship between temperature and CO2 emissions by examining evidence from a short and a very long dataset. The key result from their analysis was that at best CO2 has a weak relationship with temperature and there is no evidence of trending using a sufficiently long dataset. Moreover, as a secondary result they highlighted the danger of using very small samples in such a context.

Humlum et al (2013)[65] between atmospheric carbon dioxide and global temperature. They showed that changes in global atmospheric CO2 lag 11–12 months behind changes in global sea surface temperature. It is assumed in this present work and the author's previous work [6] that polar EEP/cloud changes mainly drive this by solar amplification hence changing SSTS. They also found changes in global atmospheric CO2 to be lagging 9.5–10 months behind changes in global air surface temperature. They also found changes in global atmospheric CO2 to be lagging about 9 months behind changes in global lower troposphere temperature. They concluded that changes in ocean temperatures explain a substantial part of the observed changes in atmospheric CO2 since January 1980, in other words changes in atmospheric CO2 are not tracking changes in human emissions. The overall conclusion was that there exists a clear phase relationship between changes of atmospheric CO2 and the different global temperature records, with the sequence of events being moving heat from 1) the ocean surface to 2) the land surface to 3) the lower troposphere. In other words, CO2 cannot heat the ocean surface, but solar radiation can.

Nishioka (2024) [53] found global CO2 emissions did not precede subsequent increases in global temperature proposed by IPCC. A reverse situation where an increase in global temperature caused an increase in soil respiration, and a subsequent increase in global CO2 emissions was found. Moreover, this natural process was clearly attributed to increasing temperature specifically during El Niño events. Thus, their results cast strong doubts that anthropogenic CO2 is the cause of global warming. To fully understand the effect of C02, in the present author's opinion requires no more than to be able to read and comprehend the work of Smirnov (2018)[66] who discuss collision and radiative processes in emission of atmospheric carbon dioxide and conclude that an absorption band model as used by IPCC and many authors etc. is not the correct way to calculate the radiative flux change at doubling of carbon dioxide concentration because averaging over oscillations decreases the range where the atmospheric optical thickness is of the order of one, and only this latter range determines any change. They employ a line-by-line method which gives a very much lower change in temperature of some +.4K because of doubling the carbon dioxide concentration. Moreover, they state the change due to anthropogenic injection of carbon dioxide in the atmosphere since pre-industrial to be approximately 0.02 K now. This is very much of the same order of magnitude as has been derived in this present work which by extrapolation to 1850 would be some 0.034K.

5.6 S02

The procedure described at 5.4 above was applied to world S02 concentration across the Northern Latitude Band (64-90N) for the experimental period. The result is shown in Figure 9.

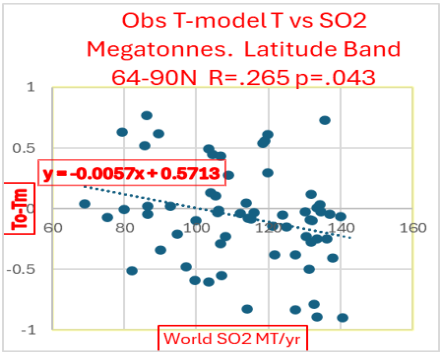

Figure 9: 2 Pole model difference at 24-90 degrees North versus world SO2 concentration.

The result is statistically significant and shows that S02 presumably by its ability to form cooling atmospheric aerosol has a cooling effect of some 100mK per decade. In that respect Lelieveld and Heintzenberg (1992)[67] discuss 'Sulfate Cooling Effect on Climate Through In-Cloud Oxidation of Anthropogenic SO2'. In the latitude band 44-64N the effect of SO2 (plot not shown) was approximately half of that in the Northern Polar region and not quite statistically significant.

5.7 Electrical Power

The procedure described at 5.4 above was applied to the growth in world electrical power regressed first across the Northern Latitude Band (64-90N) for the experimental period. The result is shown in Figure 10.

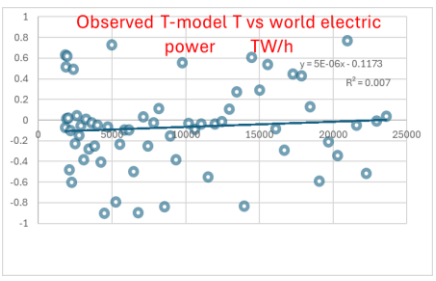

Figure 10: 2 Pole model difference at 24-90 degrees North versus world electrical power

An increase of approximately 28 mK per decade is observed but with R= .083 and p = .53 this is not statistically significant. For the equivalent latitude band in the Southern Hemisphere (not shown) the R value is even weaker, and the warming rate reduces to 16 mK per decade. The theory of how harmonic radiation from the world's power grid may disrupt EEP/Upper atmosphere chemistry and hence climate has been discussed at length, see 5.3 above. It should be noted that interconnected AC power grids with phase imbalance are likely to radiate most energy into earth's magnetosphere and as world electrical energy use increases the now minimal warming could increase. A solution would, of course, be to focus on either DC power transmission and/or local off -grid systems.

5.8 World Aviation

The procedure described at 5.4 above was applied to the growth in world aviation regressed first across the Northern Latitude Band (24-90N) for the experimental period. This latitude band was chosen because the bulk of air flights are in the Northern Hemisphere. The result is shown in Figure 11.

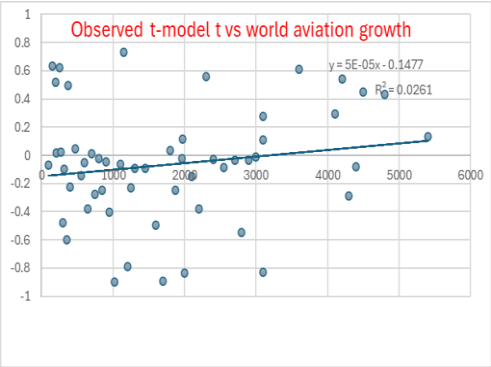

Figure 11: 2 Pole model difference at 24-90 degrees North versus world increase in aviation

The p value was .22 so barely statistically significance but certainly has more bearing than CO2 or Electrical Power. The equivalent warming is circa 45mK/decade. There are hundreds if not thousands of papers on the effects of aviation on climate from both emissions and contrails perspectives. None seem to be able to agree. In agreement with the present work, one publication predicts warming potential to be positive at all latitudes as is observed here and that is the work of Kohler et al (2013) [68]. .

5.9 Solar influence/ sunspot number

The procedure described at 5.4 above was applied to the smoothed annual sunspot number across the Northern Hemisphere, Latitude Band (0-90N) for the experimental period.

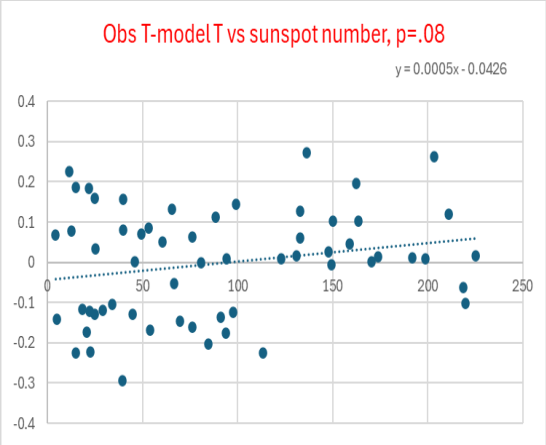

Figure 12: 2 Pole model temperature difference at 0-90 degrees North versus Sunspot number

Here the result borders on being statistically significant and carries more weight than any other potential warming factor considered beyond the 2-pole model other than the cooling effect of S02. It must be emphasised that this represents the equivalent solar warming across the entire period not accounted for by the Pole shift model i.e. the direct solar effect as opposed to the EEP amplified effect and amounts to some +.22C across the period or circa 18mK per decade. Various correlation lags were explored, and the best result is shown is shown in Figure 12 and is for a lag of 18 months. The lag suggests that clearly some solar effects in the mesosphere do not immediately change lower parts of the atmosphere. Possible explanations are as follows. Schieferdecker et al (2015)[69] discuss a solar signal in lower stratospheric water vapour which has up to a 25-month phase delay. Forster et al (2002) [70] discuss stratospheric water and show it can cause very significant warming. Indeed, they find a 40-year climate forcing equivalent of up to 75% the alleged 'consensus' CO2 forcing. Covariance between the polar stratosphere and the tropical troposphere is often found at periods shorter than five years, see Salby and Callaghan (2005)[71] who discuss interactions between the Brewer–Dobson Circulation and the Hadley Circulations, also included is biennial variability, which accompanies the QBO in the polar stratosphere. These stratospheric variations involve the same time scales as biennial variability in the tropical troposphere, which likewise influences convection. Planetary wave activity is also modulated by a quasi-2-year oscillation, the so called QBO, see Höppner and Bittner (2007) [72]. Wang et al (2019) [73] found that solar signals in the atmosphere and the ocean, especially in tropopause temperatures and lower stratospheric water vapour can cause a positive feedback effect resulting in peak of El Niño Modoki events about 2 years after the solar maximum. Figure 9a compares observed and modelled GSAT anomalies since March of 2000. The modelled time series of generated Nikolov and Zeller (2024) [2] see their equation (16) using CERES-reported TOA anomalies and of TSI and albedo as input (their Figures 1a and 2) also yield virtually identical El Niño-Southern Oscillation (ENSO) cycles, which suggests that ENSO events are externally driven by solar forcing as per this present study also via albedo variations rather than caused by internal being caused by factors such as the release of heat from the Equatorial Pacific Ocean as is currently believed.

Conclusions

6.1 Main cause of warming

As per the paper's title, it can be concluded that Modern Global Warming is predominantly geomagnetically driven, across all of earth's latitudinal bands, amounting to about 250 mK/decade since 1958 in mid latitudes and double this in the Northern Polar region. All single magnetic parameter model variants including models such as those including Northern Dip Pole latitude, Tilt and Field strength alone produces very respectable fits across the globe. This is because they are all inseparably intercorrelated. Because technically the earth's magnetic field is not a straightforward single symmetric dipole [see for example Allredge +Hurwitz 1964 [74], Wilson 1970,[75], Hulot +Le Mouel (1994) [76] and Tikhonov +Petrov (2002) [77] , then most likely because of this the best fit is produced by the 2 Pole model. Similar and intercorrelated fits are achieved using a combination of Tilt and Dipole Strength. From 34 degrees North to the South Pole the model accounts for between 80-100% of all warming in

the period. From 44 degrees North to the North Pole the model accounts for 87% of all warming. Unexplained warming deduced from figure 2 is thus in the region of 48mK/decade. From circa 40 degrees South to the South Pole, the two Pole model accounts for all warming. The models give alternative explanations for Polar Warming because of reduced cloud albedo without the need for complicated arctic amplification mechanisms. For example, the because of the Northern Dip Pole Latitude effect, warming would be expected to be greatest over Siberia in line as EEP heights increase in line with the observation of Srivastava et al (2025) [28] and hence low cooling cloud nucleation is reduced. Evidence of the same has been obtained independently here wherein the CERES Absorbed Solar Radiation Map shows a massive 7.5-10.5 W/m^2/decade trend, exactly of the order of magnitude predicted by the author's EEP hypothesis [6]. Another huge win for this work is that the models is that they have confirmed how decreasing Dipole Moment counters EEP effects in the SAA where the geomagnetic field is weakest. The results obtained here are in fully supported by the observations of Nikolov and Zeller [2] who state ' Changes in Earth's cloud albedo emerged as the dominant driver of GSAT, while TSI only played a marginal role.' In that respect TSI is also discussed below.

6.2 Additional causes of warming both anthropogenic and solar cycle (TSI).

A breakdown of this unexplained warming has been sought. Although mainly statistically of very weak relevance, the sources especially for Northern mid latitudes are in order of intensity; Aviation +45mK/decade (18%), Electrical Power +28mK/decade (8.9%), Solar cycle +18mK/decade (TSI) (7.2%) and CO2 2mK/decade (.8% rising to 7.8% in the Arctic). This totals 75mK/decade anthropogenic and 18mK/decade natural solar cycle. This is offset by SO2 which except in the polar regions has a cooling effect of approximately 50 mK/decade.

Outside of the approximate 250 mK decade in Northern mid-latitudes because of Pole Shift induced albedo change, this leaves a total additional warming of 43mK/decade. This is remarkably close to the initial 48 mK estimate.

Most surprising of all was the very weak result for Carbon Dioxide. If statistically relevant which it was not this would represent 2mK/decade in Northern mid latitudes or about .8% of total warming. In Northern Polar regions this increases to 32mK/decade or about 16% of all warming. In any event these figures are orders of magnitude lower than those presented by the IPCC for its effects.

The entire result obtained here would appear to be very in line with the work of by Soon, W., & Baliunas, S. (2003) [56] . Fraser's work would suggest that CO2 actual heat trapping out to be about 11% of presently alleged values. The present author's previous work for warming in world was estimated 6% due to CO2 [6].

Climate research and whole earth models to date have not properly parametrized clouds which reduce CO2 forcing see Schmitt& Randall (1991) [78] or their true climate feedback nature, neither have they included nor had the benefit of the Pole Shift model [6] and this present work for an explanation of huge concurrent changes in albedo. This has resulted in a vast overestimation of the effect of CO2 no doubt stemming initially from the justifiable cause and effect proposition of Arrhenius (1896) culminating more recent politically driven and almost 'it all has to be due to CO2' sort of 'religious' fervour approach. Moreover, it has further resulted in a huge underestimation of the climate offset potential of sulphate aerosol when set against CO2. Typically, the IPCC indicate that the warming effect of CO2 always exceeds the cooling effect of SO2. Different references give different ratios of anything from about 1.5:1 to over 3:1. This present work has shown the reverse to be true. At the poles it is estimated that the warming to cooling ratio of the two gases is actually circa .3:1 and in mid northern latitudes circa .04:1.

6.3 Proposed further assessments and research into climate causation and CO2 and other mechanisms.

This finding of this present paper has added to the growing body of evidence that there is something desperately wrong with present climate models and with traditional CO2 heat trapping hypotheses.

It has been shown above that several studies exist, albeit some in lesser impact journals, which show the magnitude of effect of CO2 to be much more in line with that discovered here. It is proposed that as many experiments as possible be set up to test and or re-evaluate them with a view to clarification of CO2's precise action and it is also proposed that the same re-evaluation criteria should be applied to the various adiabatic/gravitation planetary atmosphere heat trapping theories such as but not limited to those of Nikolov and Zeller.

6.4 Dangers of Geo-engineering (SRM)

There are proposals to use Sulphate aerosol injection by aircraft or specialised aircraft to offset CO2 warming. Since this work, the author's previous work [6] and that of Nikolov and Zeller (2024) [2] has shown CO2 to be largely irrelevant, the present author views it as highly dangerous to attempt to offset what is largely natural warming by such an unnatural process. Robok (2009)[79] has commented on the dangers of such technology especially its ability to increase drought in Africa and Asia. Moreover, vegetation responses to SRM would be highly uncertain, see Glienke et al (2015) [80]. Finally, some types of SRM could cause potentially hazardous increases of ground level ozone not good for human health, see Xia et al (2017) [81].

6.5 Appeal for a paradigm shift.

There now needs to be an urgent paradigm shift in Climate Science. Future research directions need to be more in cloud physics, upper atmosphere chemistry, global electric circuit and cloud climatology as driven mainly by earth's geomagnetism and to a lesser extent by the sun and how to predict future changes. Anthropogenic drivers to remain somewhat cautious of are SO2, aviation and coupling of VLF transmitter emissions and grid connected A.C power systems into earth's magnetosphere. At least for the moment it would seem CO2 pales into insignificance.

Data Availability

For temperature, the NASA Goddard Institute for Space Studies (GISS) Surface Temperature Analysis (GISTEMP) dataset, v4 was employed. For the position of the magnetic North Dip Pole, data from NOAA[IGRF] was employed. For Paleomagnetic data, reference [23] was employed as per text hereinabove.

Conflict of Interests

None

Funding Source

None- private individual and independent researcher/scientist.

Author's contribution

The single present author was responsible for 100% of the ideas, research, theories and entire drafting of the paper.

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