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The Uncertain Response of Atmospheric Temperatures to Increasing Carbon Dioxide Levels and Implications for Climate Litigation and Compensation Claims

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ABSTRACT

Climate change has increasingly become an issue where parties are being held accountable because of assumed causation by human greenhouse gas emissions. At the international level, the United Nations COP21 led to the Paris agreement in 2015, a legally binding international treaty on climate change, adopted by 196 parties. Subsequently in 2021 at COP26 in Glasgow, loss and damage was a key issue. Attempts to seek financial compensation or enforce restrictions on activities relating to fossil fuels have occurred at various levels in many different countries. In 2022, the U.N. Human Rights Committee found that Australia had failed to adequately protect indigenous Torres Islanders against adverse impacts of climate change. Other cases relate to Project Approval and Corporate Accountability, but there is generally an absence of questioning the IPCC position that climate change during the industrial era has been predominantly caused by human emissions of greenhouse gases. However, an examination of the scientific literature reveals that the assumption "the science is settled" needs to be carefully reconsidered. Using techniques such as AI provides evidence that the sensitivity of climate change to anthropogenic emissions may be significantly lower than currently endorsed by the IPCC, and the contributions of natural factors is under-estimated, thereby reducing climate sensitivity from a mean of 3.7°C to 0.7°C. Trillions of dollars are being claimed worldwide for loss and damage allegedly caused by anthropogenic climate change. These claims could be greatly affected if the dominant cause of climate change is natural.

Keywords: climate change, sensitivity, greenhouse gas, natural, anthropogenic.

INTRODUCTION

The 29th Conference of the Parties to the UN Framework Convention on Climate Change (COP29) was held in Baku, Azerbaijan during November 2024 [1]. This was envisaged as being a pivotal opportunity to accelerate action to tackle the climate crisis. With global temperatures hitting record highs, and extreme weather events affecting people around the globe, COP29 sought to bring together leaders from governments, business and civil society to advance concrete solutions to the defining issue of our time. A key focus of COP26 held in Glasgow in 2021 was finance, as trillions of dollars are required for countries to drastically reduce greenhouse gas emissions and protect lives and livelihoods from the worsening impacts of climate change.

A recent article was published in The Australian newspaper [2] with the headline: Is there really a 97% scientific consensus on global warming? It claimed that a survey of over 12,000 peer-reviewed climate science papers by the citizen science team at Skeptical Science found a 97% consensus in the peer-reviewed scientific literature that humans are causing global warming [3]. Virtually all the papers that specifically examined the human and natural causes of global warming, concluded that humans are the dominant cause over the past 50 to 100 years.

However, the way in which these results were presented are potentially misleading, as it does not convey the true present state of uncertainties relating to emissions and climate change. The earth has a highly complex climatic system and the idea that "the science is settled" is not unequivocally supported by reviewing the scientific literature. A major uncertainty is accurately quantifying the temperature response to increasing the atmospheric concentration of greenhouse gases, particularly carbon dioxide. This is important when differentiating between natural and anthropogenic contributions to climate change.

The Intergovernmental Panel on Climate Change (IPCC) Synthesis Report on Climate Change for 2023 [4] states that the likely range of total human-caused global surface temperature increase from 1850–1900 to 2010–2019 is 0.8°C–1.3°C, with a best estimate of 1.07°C. Over this period, it is likely that well-mixed greenhouse gases (GHGs) contributed a warming of 1.0°C–2.0°C. Natural (solar and volcanic) drivers changed global surface temperature by only –0.1°C to +0.1°C. According to the IPCC, natural influences have been very small compared to anthropogenic contributions to climate change since the beginning of the industrial era.

However, a very different perspective has been presented by others, including geologist Professor Ian Plimer [5] in his book Green Murder. Chapter 2, entitled Look Backwards to see Forwards, reviews past climate changes over varying time scales, from millions of years, to centuries and decades. Plimer maintains that the current climate is not unprecedented, and is driven by the same cyclical processes that have operated for billions of years with long-term, medium-term and short-term climate cycles, and also sporadic events that can suddenly change climate, and that dominant human-induced global warming is not supported by the geological evidence. There are numerous examples showing that past global warming events were not driven by carbon dioxide and the planet has been far colder and warmer in the past, and the rates of temperature change have been faster than currently observed. Furthermore, Plimer suggests that the amounts of submarine volcanic heat and carbon dioxide added to the oceans is very large and this contribution is ignored by the IPCC, so that the human contribution to emissions is very exaggerated.

A common approach to attribution of climate change during the post-industrial era depends on development of mathematical models for temperature variation. These models often include adjustable factors that enable better correspondence between the actual temperatures and increasing levels of greenhouse gases in the atmosphere. A measure of the relationship between temperature and carbon dioxide concentration can be expressed by the climate sensitivity [6, 7, 8]. A commonly used factor is called the Equilibrium Climate Sensitivity (ECS), defined as the increase temperature corresponding to a doubling of atmospheric carbon dioxide concentration. Higher calculated values of ECS are often associated with greater relative contribution to warming from anthropogenic factors.

The IPCC is very reliant on Global Climate Models (GCMs) in assessments of climate change. These are highly complex mathematical models that attempt to simulate the earth's climate based on an assumed knowledge of the underlying very complex physical phenomena that affect climate.

An alternative modelling approach, not widely used by the IPCC, examines historical temperature data attempting to find persistent patterns, usually identified as oscillations [9]. If these oscillations exist and sufficient data prior to the industrial era is available, this information can be used to project temperature profiles forward into the industrial era, enabling comparison between natural and actual temperature change during the industrial era. A variant on this approach develops models that incorporate previously identified oscillations in climatic processes, for example oscillations associated with solar activity Another approach to evaluating ECS relies on experimental results based on experimental spectroscopy.

The following discussion gives some background describing how these different approaches can lead to quite different values of the climate sensitivity and the relative contributions of natural and anthropogenic temperature change, and potentially this can have significant impacts on economic and policy considerations. Results are presented from our recent investigations for the northern and southern hemisphere using published historical proxy temperature data to calculate value for ECS using component oscillatory processes and Artificial Intelligence [9, 10], in particular neural networks. A recent report [11] using historical temperature data for central England over the past 4 centuries to calculate ECS is also considered.

CLIMATE SENSITIVITY FROM GLOBAL CLIMATE MODELS

Global Climate Models (GCMs) are a key component in how the IPCC attempts to simulate climate change. GCMs comprise an Atmospheric General Circulation Model (AGCM) that dynamically attempts to simulate the circulation of the atmosphere, and an Ocean General Circulation Model (OGCM) that simulates the circulation of the oceans. The IPCC is very reliant on the capacity of GCMs to simulate future climate and these models are central to the position taken where dominant attribution of observed climate change is to anthropogenic emissions of greenhouse gases. The IPCC claims the "development of climate models has resulted in more realism in the representation of many quantities and aspects of the climate system," and, "it is extremely likely that human activities have caused more than half of the observed increase in global average surface temperature since the 1950s" [12]. Atmosphere-Ocean General Circulation Models (AOGCMs) are composed of a set of basic mathematical equations with variables that describe the instantaneous state of the atmosphere. This represents a set of equations that can describe atmospheric motions and processes representing four basic physical principles: (1) conservation of mass, (2) conservation of energy, (3) conservation of momentum, and (4) elemental kinetic theory of gases.

A number of limitations of GCMs have been discussed in the literature. GCMs can fail to account adequately for certain "multiplier effects" that may significantly amplify the initial impacts of various biospheric processes. For example, although the absolute variations associated with some solar-related phenomena are rather small. Several multiplier effects may significantly amplify the initial perturbation. This could contribute to an enhanced contribution from natural phenomena [13].

Many of the estimates of anthropogenic contribution to global warming depend on the results generated by GCMs [14]. The current generation of earth system models participating in the Coupled Model Intercomparison Project Phase 6 (CMIP6), the range of equilibrium climate sensitivity is 1.8°C to 5.6°C, with a mean of 3.7°C, the largest of any generation of models dating back to the 1990s [15]. Because the higher ECS values in some models are related to cloud feedbacks and cloud-aerosol interactions, a major research question that needs to be pursued is what is the actual nature and magnitude of cloud feedbacks in general and cloud-aerosol interactions in particular. Recent reports of ECS derived using GCMs extend to even higher values than quoted by CMIP6. One study [16] reported ECS values between 2.57°C and 8.55°C, and another [17] reported ECS values above 8.0°C. Various explanations have been presented to explain these very high values of climate sensitivity in terms of the models used [18,19]. The magnitude of the range of projected responses to a doubling of atmospheric CO_2 by itself establishes that large errors and limitations in the models remain to be corrected [21].

A number of review articles published recently focus on climate sensitivity determinations linked to unavoidable value judgements in constructing models [21]. A recent assessment of ECS evaluations, [22] referred to methodological choices involved as “unavoidably subjective”. A major limitation of GCMs [23] is that they do not adequately generate the necessary amplitude of temperature oscillations apparent in proxy records extending back over several millennia. It is well established that there are natural cycles in earth’s climate, including millennial, centennial and decadal time scales [24]. The following section illustrates the presence of oscillations and how these can be used to estimate the contribution to anthropogenic and estimation of ECS.

OSCILLATIONS IN TEMPERATURE RECORDS AND THEIR APPLICATION TO DERIVE CLIMATE SENSITIVITY

There are many published studies that have shown the presence of oscillatory cycles in temperature profiles for many regions of the world, extending back hundreds or thousands of years. The oscillations occur on a wide range of time scales, including millennial, centennial and decadal. For example, one study [25] examined six long European instrumental temperature records of monthly averages reaching back as far as 1757AD. Reliable monthly temperature records exist for six locations in the Czech Republic, Germany, Austria, and France. All six temperature profiles exhibit a V-shape, with temperatures decreasing during the 19th and rising in the 20th century. The temperature records from the six Central European stations show remarkable agreement, justifying their averaging to produce a Central European temperature record (M6). Spectral analysis of M6 generated six strong periodic components at 254, 85, 64, 51, 42 and 36 years. Very good agreement of temperature reconstruction and the original profile was found using these six components, showing that the present climate dynamics are dominated by periodic processes. Another study [26] investigated dominant cycles in worldwide temperature proxy data of the last 2000 years complemented by instrumental temperature measurements of global temperatures, with the strongest components at ∼1000-, ∼460-, and ∼190-year periods, most likely having a solar origin.

An investigation [27] analysed two series of surface air temperatures for northern hemisphere high latitudes. The first was for the period 1912–2010 from Svalbard, located between the northern coast of Norway and the North Pole. The second comprised reconstructed surface temperature series the last 4000 years from central Greenland. The dominant periodic variations of 1130, 790–770, 560 and 390–360 years were identified by the wavelet analysis. The present warm period following the Little Ice Age since about 1800 AD can be reproduced by a simple three input period approach, based on the Greenland GISP2 temperature record. Apparently, the present period of warming since the LIA to a high degree may be the result of natural climatic variations, known to characterize at least the previous 4000 years.

The study by Abbot (2021) [9] examined oscillations from spectral analysis applied to eight published multi-proxy temperature northern hemisphere records, extending back up to 2000 years. Analysis of each temperature record showed oscillations at millennial, centennial and decadal time-scales. For example, the temperature record from Moberg (2005) [28] was derived from tree rings, lake and ocean sediments between 1 and 1979 AD exhibited millennial (1223 years), centennial (380, 183, 126 and 106 years) and decadal (82, 75. 63, 55 and 49 years) oscillations.

An alternative to modelling with GCMs examines historical temperature data by attempting to find persistent patterns within the temperature profiles. If these patterns exist in sufficient data prior to the industrial era, this information can be used to project temperature profiles forward into the industrial era. The forward projections of oscillations established during the pre-industrial era can be taken to represent natural processes and show the expected temperature profile without contribution from anthropogenic emissions in the industrial era. If the actual temperatures measured during the industrial era exceed the modelled natural temperature profile, the difference can be attributed to anthropogenic emissions and a corresponding value of the ECS calculated. This approach has been implemented for different regions of the world and the models generated are usually based on patterns comprising natural cyclic phenomena or oscillations found within the historical temperature profiles. Recombining the set of oscillations either directly or as input to an AI program such as a neural network can generate a close representation of the original temperature profile and then enable a forecast based on extension of the natural cycles.

Figures 1, 2, and 3 illustrate reconstructed temperature profiles following decomposition into a set of sine wave oscillations, using published proxy temperature data, followed by recombination using AI. This has been applied to data prior to 1880AD for training neural networks, enabling temperature projections to be made during the industrial era for the defined geographical area.

One study [9] examined 6 different geographical regions including South America, Canadian Rockies, Swiss Alps, the South Island, New Zealand and Tasmania. Results are illustrated in Figure 1 for South America using temperature data from ice cores, tree rings, coral lake and marine sediment and instrumental data [29]. Sine wave oscillations were generated at: 745, 383, 245, 217, 141, 129, 89, and 52 years. Figure 2 illustrates results using temperature data for the Canadian Rockies from tree rings [30], generating oscillations at: 442, 271, 190, 119, 69, 47 and 42 years. Reconstructions using the identified sets of oscillations produce a good representation of the original profiles and there are increasing forecast temperatures since 1880AD, in agreement with observation [8]. For the six geographically distinct regions considered, an average Equilibrium Climate Sensitivity (ECS) of approximately 0.6°C was estimated.

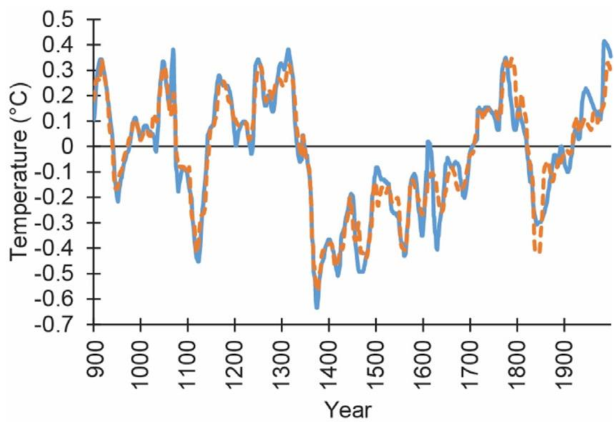

Figure 1: Proxy temperature record (blue) and neural network output (orange) based on input from spectral analysis for regional southern South America multi-proxy temperatures [29] Training period 900–1830; test period 1830–1995.

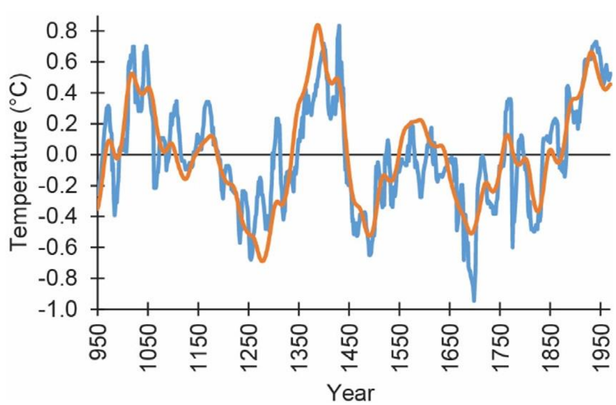

Figure 2: Proxy temperature record (blue) and neural network projection (orange) based on input from spectral analysis for Canadian Rockies tree-ring proxy temperatures [30] Training period 950–1830; test period 1830–1975.

The literature has many studies for the northern hemisphere proxy temperatures over the past 1000 years {31, 32]. Figure 3 illustrates the profile generated by Esper et al., and the reconstruction obtained by spectral analysis to generate a set of oscillations. Oscillations at: 1173, 460,192, 113, 69 and 49 years. These were then used as input to a neural network to generate the projected profile after 1880. The increase in temperature after 1880 predicted by the extension of the oscillatory processes in the preceding period and is likely to be mainly attributable to natural climatic processes.

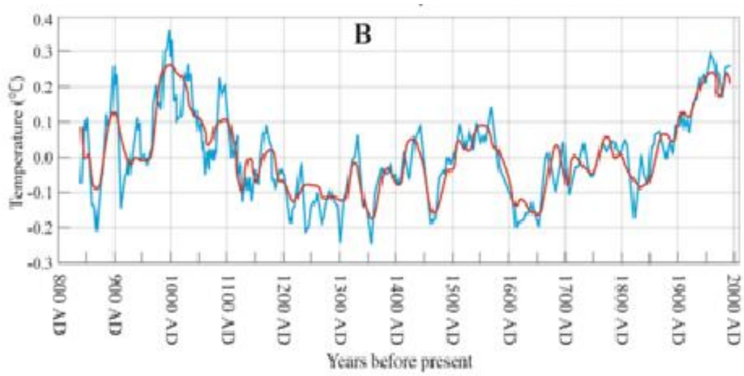

Figure 3: Proxy temperature profile for the northern hemisphere [31] (blue line). ANN output using sine wave set from spectral analysis as input to ANN, with data prior to 1880 AD used for training and validation, and after 1880 AD for forecasting (red line).

Another recent study [33] examined the 362-year Central England temperature (CET) record. This was divided into a 262 year-long early part when only natural temperature variation was significant, and a 100 year-long later part. The early part was decomposed into eight components in the spectral range 15 to 257 years and the components were forward projected to the next 100 years. Based on the small difference between the projected temperatures and the actual CET, a minor role was attributed to anthropogenic warming and a climate sensitivity to CO_2 doubling estimated with a median value of 0.7°C, falling within the range 0.5 to 0.9°C.

A variant on this modelling approach is to construct a model incorporating previously established oscillations in climate, often using those linked to solar activity. For example one investigation [23] applied a model based on astronomical cycles that showed about 50% of the ~0.5°C global surface warming observed from 1970 to 2000 was due to natural oscillations of the climate system, rather than anthropogenic forcing. It was concluded that the climate sensitivity should be reduced by half, for example from the 2.0-4.5°C range (as claimed by the IPCC, 2007) to 1.0-2.3°C with a likely median of 1.5°C instead of 3.0°C. Another study [34] developed a model using periodic temperature oscillations associated with the Pacific Decadal Oscillation and Atlantic Multi-decadal Oscillation, resulting in a median value of 1.99°C for ECS with a range of 1.75-2.23°C.

Significant differences have been reported [35] among 38 CMIP6 GCMs analysed with the models presenting some serious problems in modelling the atmospheric and oceanic circulations. The result suggests that climate change and its natural variability remain poorly modelled by the CMIP6 GCMs. Using semi-empirical climate models that include natural oscillations not predicted by the GCMs that the ECS could be between 1 and 2°C, which implies moderate warming for the next decades.

SPECTROSCOPIC AND EXPERIMENTAL STUDIES ON CARBON DIOXIDE

A number of experimental studies have concluded that the contribution to global warming from carbon dioxide is much smaller than accepted by the IPCC from modelling, based on physical properties of carbon dioxide [36]. A detailed study [37] of the infrared properties of carbon dioxide to estimate its contribution to the global warming during the period 1880-

2010. The results suggest that atmospheric carbon dioxide is not the dominant factor accounting for terrestrial temperature increase, with only a moderate contributing effect of less than 33% found. Another investigation [38] considered models based on spectroscopic properties of carbon dioxide and calculated a value of 0.9°C for climate sensitivity.

IMPACT OF CLIMATE SENSITIVITY MAGNITUDE ON ECONOMICS AND POLICY

An economic analysis [39] of the effect of climate sensitivity and concluded that the largest policy error arises when the climate policy is overly passive. In contrast, an overly zealous climate policy where a high carbon tax is applied when climate change and its negative impacts on the economy are very limited does not damage the economy much as there is considerable substitutability between fossil and non-fossil energy sources.

Another study [40] considered the significance of uncertainties in climate sensitivity in formulating climate policy and how do diverging estimates influence the emission reduction requirements to limit warming to below particular temperature thresholds such as 1.5°C It was concluded that, in light of the large uncertainties that still exist, the lack of consensus across different studies and lines of evidence the possibility of lower values for climate sensitivity does not reduce the urgency for climate mitigation. On the contrary, a risk averse strategy points to more ambitious reductions compared to what countries have done so far.

A study [41] concluded that improved knowledge of Earth's climate sensitivity is essential to development of optimal energy strategies. However, even for climate sensitivity at the low end of the range of present estimates, substantial reductions in CO_2 emissions from their present values would be required to avert dangerous anthropogenic interference with the climate system that would otherwise occur.

A recent article in the Spectator [42] suggests that climate policy in Australia is oriented in the wrong direction and cites a number of sources that provide grounds to question the idea that the science is settled, and the high values of climate sensitivity derived from the IPCC-endorsed GCM approach. The Spectator article quotes Professor Asten saying that, 'Until mainstream climate science opinion can be reconciled with observations of natural variability, climate science can be considered a work-in-progress [43]. It also quotes Professor Judith Curry (2021) [44], a prominent US climate scientist, 'The climate system is way more complex than just something that you can tune with a carbon-dioxide control knob.'

An alternate perspective is provided by Climate Intelligence (CLINTEL), [45] an independent foundation with a focus on climate change and climate policy. CLINTEL was founded in 2019 by emeritus professor of geophysics Guus Berkhout and science journalist Marcel Crock, and now comprises a global network of over 1500 scientists and professionals. It suggests that climate science should be less political, while climate policies should be more scientific. Also, scientists should openly address uncertainties and exaggerations in their predictions of global warming, while politicians should dispassionately count the real costs as well as the imagined benefits of their policy measures. Furthermore, scientists should emphasize that their modelling output is fully dependent on what theoreticians and programmers have chosen to include - the hypotheses, assumptions and relationships, as well as what has been excluded. Unfortunately, in mainstream climate science most of this is generally undeclared.

The outputs of climate models depend on what the model makers have included and what has been excluded. This is precisely the problem of today's climate discussion where climate models are of central importance. Climate science has degenerated into a discussion based on beliefs, not on sound self-critical science.

CLINTEL takes the position that Earth's climate has varied as long as the planet has existed, with natural cold and warm phases. The Little Ice Age ended as recently as 1850 AD. Therefore, it is no surprise that we now are experiencing a period of warming. Climate models have many shortcomings and are not reliable as the basis for formulating global policy, as they exaggerate the effect of greenhouse gases such as CO_2. In addition, they ignore the fact that enriching the atmosphere with CO_2 is beneficial. More CO_2 in the atmosphere promotes growth in global plant biomass. It is also good for agriculture, increasing the yields of crops worldwide. CLINTEL suggests that carbon dioxide should not be regarded as a pollutant and it is essential to all life on Earth.

IMPLICATIONS FOR CLIMATE LITIGATION

The United Nations Global Climate Litigation Report: 2023 Status Review [46] shows that people around the world are increasingly using the courts to combat the perceived climate crisis. In 2022, 2,180 climate-related cases were filed in 65 jurisdictions, including international and regional courts, tribunals, other judicial bodies including within the United Nations, representing increases from 884 cases in 2017 and 1,550 cases in 2020.

A recent prominent climate litigation case [47] from 2019 involved the company Shell Oil and the climate activist group Friends of the Earth Netherlands. In November 2024 a Dutch court in The Hague accepted Shell's appeal against the original landmark climate ruling, dismissing the order for the oil and gas company to sharply reduce emissions. The court accepted Shell's appeal against a landmark climate ruling, dismissing the emission reduction order for the oil and gas company. The presiding judge Carla Joustra stated "Even though Shell bears a special responsibility as a large oil and gas company, that does not mean we can apply a general reduction goal of 45 per cent". The court said: "There is currently insufficient consensus in climate science on a specific reduction percentage to which an individual company like Shell should adhere."

Australia presently has the second largest number of climate cases globally. The Law School at the University of Melbourne has developed a litigation database [48] that includes settled cases and court orders on issues of climate change in Australia, New Zealand and the Pacific Islands. It encompasses cases across several different substantive categories including: Project Approval, Corporate Accountability, Constitutional and Human Rights and State Accountability.

Under the category of Constitutional and Human Rights, a complaint was made against Australia to the UN Human Rights Committee by Torres Strait Islanders [49]. This complaint was filed by eight Australian nationals and six of their children, all indigenous inhabitants of small, low-lying islands in Australia's Torres Strait region. The Islanders claimed their rights had been violated as Australia failed to adapt to climate change by upgrading seawalls on the islands and reducing greenhouse gas emissions. In a ground-breaking decision in 2022, the U.N. Human Rights Committee found that Australia's failure to adequately protect indigenous Torres Islanders against adverse impacts of climate change violated their rights to enjoy their culture and be free from arbitrary interferences with their private life, family and home. Possible issues of causation of climate change, other than greenhouse gas emissions, appear not to have been considered.

The database had 65 cases relating to climate change and coal, particularly project approval. For example, in 2022, the Queensland Land Court recommended that Waratah Coal's applications for a mining lease and environmental authority to mine thermal coal in the Galilee Basin be refused [50]. The science of climate change was not disputed in the hearing. The court ruled that the estimated 1.58 giga-tons of CO_2 emissions was a meaningful contribution to meet the long-term temperature goal of the Paris Agreement. Making the coal available for combustion could limit the options for achieving that goal. There were risks unacceptable climate change impacts to Queensland people and property, even taking into account the economic and social benefits of the project.

In both of the cases above it would appear very important to consider that relative contribution of natural and anthropogenic influences in causing climate change, particularly global warming. Reviewing the cases on the database reveals that this explicit differentiation is almost entirely absent from climate litigation. A 2015 Judicial Review by the Supreme Court of Western Australia [51] contained the statement: "The courts in this country are the last place in which there is any proper scope for scepticism, denialism or contrarianism in relation to evidence-based expert scientific consensus on scientific matters, whether the issue be the cause and probable effect of climate change or the safety and environmental risks associated with genetic engineering in agriculture.

CONCLUSION

One scenario, endorsed by the IPCC, suggests an equilibrium climate sensitivity in the range 1.8°C to 5.6°C with a mean of 3.7°C [15], although recent GCMs have generated ECS values above 8°C. An alternative perspective based on analysis of temperature oscillations produces ECS values of about 0.7°C. This can have important consequences for policy. If there is indeed a critical threshold of 1.5°C for global warming, and the climate sensitivity is at the upper range, then there is truly a climate emergency. On the other hand, if predictions based on climatic oscillations are valid, increasing temperatures over the past century are largely natural.

For example, recent studies [52] show the millennial oscillation was responsible for the cooling observed from the Medieval Warm Period (900–1400AD) to the Little Ice Age (1400–1800AD) and, could have caused about 50% of the warming observed since 1850AD, suggesting an equilibrium climate sensitivity of 1.0–2.3°C with a mean of 1.5°C. Other studies [53]) found that inclusion of an oscillation with a period of about 55 years in a climate model gave a value of the equilibrium climate sensitivity of 2.29°C. The studies by Abbot for regions and the northern hemisphere and by Edmonds for Central England also suggest significantly lower values for ECS than emerge from GCMs. It would appear that as more oscillations are included in a model, the lower the calculated value of ECS. At one extreme are GCMs that may have minimal representation of oscillations, and calculated ECS values can exceed 8°C. At the other extreme we have models taking into consideration multiple oscillations including millennial, centennial and decadal periods, leading to ECS of about 0.7°C, a factor of 10 lower.

It would appear important to put further resources into accurately evaluating the value of the climate sensitivity before committing vast amounts of money in support of policy decisions. If the low values of ECS are correct, then there needs to be an acceptance of the extent of natural contribution to global warming and policy decisions made accordingly. This does not mean that the transition from fossil fuels to renewable energy should not be encouraged, but more resources should be allocated to adaptation to natural climate change rather than imposed as compensation for loss and damage caused by anthropogenic emissions, primarily from developed countries.

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