Climate change and the '97%'

# Introduction

So, what is climate change, and what is it doing to planet earth? Climate change has been recently referred to as large-scale, long-term shifts in global climate patterns [1], impacting average conditions over time [2]. We delve into this topic further by reviewing recent claims on the long-term effects on this planet we call home. This article also aims to review multiple sources on who or what are the leading causes for climate change, as well as evaluating the claim that *"97% of the world's climate experts agree that climate change has been caused by humans".*

# The effects of climate change

Before examining the causes of climate change, we shall explore what claims have been made on how climate change has impacted the planet. So far, we have seen many factors that are a proposed effect from melting ice and rising sea levels [3] to predicted human displacement across the globe by 2050 [4]. However, for this article, we shall focus our discussion on one of the main effects we have seen thus far that underpins the other effects, rising global temperatures.

One source of information discovered from the National Aeronautics and Space Administration (NASA) predicts climate change will affect rises in global temperature [5]. NASA's point of view attempts to inform the public straightforwardly about what climate change is doing. However, whilst NASA can be regarded as a credible institution, how do we know – empirically – that claim is legitimate, without further information? After the investigation of the web article, empirical studies have been obtained by The Intergovernmental Panel on Climate Change (IPCC), including the United States Global Change Research Program (USGCRP). With IPCC providing evidence, from a study published in 2007 stating that rising temperatures are impacting various biological systems and human environments across the planet, based on a collection of datasets ranging from 1970 [6], as visualised in Figure 2.1 below.

Map

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Figure . Changes in physical and biological systems and surface temperature 1970-2004 [6].

Alongside the IPCC, the USGRP has also echoed similar evidence to support this claim within their study published in 2017, stating they have found an average rise of 1.8 degrees Fahrenheit (1.0 degrees Celsius) between 1895 and 2016 [7]. Based on the findings we have uncovered so far on this topic, we find the evidence provided to be trustworthy, from relatively non-biased government bodies, multiple contributors involved, and peer-reviewed to ensure the information published is viable. However, where the IPCC information provides data from a global perspective to support NASA's claim, the USGRP's only focus for the United States; so, there is no data to compare between the global temperatures presented in both papers other than the United States alone.

# The causes of climate change

As with the effects of climate change, multiple causes are noted throughout the internet and literature that are suggested to impact directly.

One article from the European Commission details the causes believed are adding a negative impact on the subject, mainly a direct effect of human activity. One cause includes the increase of greenhouse gases – gases in the Earth's atmosphere are entrapping in the sun's heat, not allowing to escape - as well as deforestation - which reduces the planets' ability to absorb the CO2 (Carbon dioxide) produced [8]. However, whilst the European Commission can be thought of as a formal authority, they do not provide data or evidence to confirm these claims.

In contrast, another source of information we found comes from the book "Advancing the Science of climate change", produced by the National Research Council (NRC) in 2010. The NRC has gone into extensive detail about how climate change has influenced our planet and its factors. This book details potential causes of climate change, such as increasing CO2 emissions due to fossil burning and other human activities [9, p. 185], with a visualisation of estimated global CO2 emission over time, as shown in Figure 2.

Chart

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Figure Estimated global CO2 emissions from fossil fuel sources (or billion metric tons) in gigatons. [10, p. 186]

The NRC also mentioned within their book the use of aerosols having an impact also small liquid particles within the atmosphere, both human and naturally created, having a wide range of effects [11, p. 196].

Based on this publication, extensive information has been provided, and multiple contributors have references from previous research conducted in this area.

# So, where does the '97%' come in?

A theme is seen throughout our investigation that we as humans could be contributing to the impact of climate change. Whilst evidence is available to support this view, we explore this concept further; how much of climate change is due to anthropogenic activities? With that in mind, we arrived at this proposed statistic: "*97% of the world's climate experts agree that climate change has been caused by humans".* However*, w*here does this statistic originate? How credible is said claim? We did some investigating, and some resources emerged quoting, or at least paraphrasing this statistic.

A range of journal articles from IOPscience.org delves into this topic, one from Cook et al., stating 90-100% of climate scientists agree that anthropogenic global warming (AGW) is impacting climate change [12], which is based on a further study from Cook et al., of 11,944 climate paper abstracts between 1991-2011 [13]. However, upon further inspection, those results do not explicitly confirm the quoted statistic, where it states 32.6% of paper abstracts endorsed AGW, with 97.1% of them examined to have an AGW position [13]. This information could be construed as misleading and introducing selection bias compared with the quoted statistic mentioned above. This information presented is confirmed via a visualisation Cook et al. published within the said article, in Figure 3.

Chart, scatter chart

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Figure (a) Total number of abstracts categorised into endorsement, rejection, and no position. (b) Percentage of endorsement, rejection, and no position/undecided abstracts. [13].

# So, what is our conclusion?

This article aims to learn about climate change, its effects and impacts on Earth, and whether humans cause 97% of climate change. Factors such as increased greenhouse gases, deforestation and other anthropogenic activities are appearing to affect climate change in terms of rising temperatures on the planet. Our investigation uncovered that the evidence for climate change is vast, containing varying levels of research and evidence - particularly from the formal authorities we explored from NASA and the European Commission. While it could be said that many agree with anthropogenic activity having an impact on climate change and global warming, there is potential misinformation in terms of how many within the academic field are in support of this claim.

# References

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