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GLOBAL WARMING - TRUE STORY OR URBAN LEGEND?

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Abstract

Global warming has been a controversial factor with polarizing supporters for many years. Initially, claims were made that global warming was a myth, given the relative short span of observed climate, but nowadays more and more scientists believe that global warming is a fact and this paper aims to prove that. From shrinking ice in Antarctica, acidification of oceans or CO_2 emissions effects to temperature graphs, there is ample evidence that there are snowballing effects that will impact Earth mid to long term. More than 97% of climate experts agree that anthropogenic actions are determining a steady increase in global temperatures, with compounding effects on the environment.

Key words: *global warming, climate, greenhouse gases, anthropogenic activity.*

INTRODUCTION

For many years, global warming has been a controversial subject in popular media, with even some political leaders coming out and stating that there is no evidence that global warming is caused by mankind (Trump, 2017). However, the majority of the scientific community agrees with the global warming theory. This article is going to present the major facts pertaining to global warming as being of anthropogenic cause. It will also address some common popular beliefs and provide counter arguments in this sense.

Regarding the temperature and ice melting

MATERIALS AND METHODS

Various scientific articles were used to present the main points of the global warming theory in order to counter some of the most popular misbeliefs (Anderson et al, 2016; Kusahara, 2015; Morice, 2012).

One of the popular beliefs about global warming is there is no global warming. "January 2008 capped a 12 month period of global temperature drops on all of the major well respected indicators. HadCRUT, RSS, UAH, and GISS global temperature sets all show sharp drops in the last year" (Watts, 2008).

A different author, Lindzen, states that climate has changed before and that this is no reason for concern. "Climate is always changing. We have had ice ages and warmer periods when alligators were found in Spitzbergen. Ice ages have occurred in a hundred thousand year cycle for the last 700 thousand years, and there have been previous periods that appear to have been warmer than the present despite CO_2 levels being lower than they are now. More recently, we have had the medieval warm period and the little ice age" (Lindzen, 2009).

Anderson mentions the work of Callendar on the topic of temperature increase that compared monthly average temperature records from the World Weather Records from 147 stations and calculated a global increase in land temperature of approximately 0.3oC between 1880 and 1935. He also approximated a 6% increase of atmospheric CO2 during the same period of time (Anderson, 2016).

These early calculations were the basis of future data analysis that concluded that the global temperature has increased during the period time when temperature was observed.

In an article published in Journal Of Geophysical Research, Morice et al. showed that state that “the trends in the northern and southern hemisphere for HadCRUT4 were 0.077/0.071°C per decade between 1979 and 2010” (Morice, 2012).

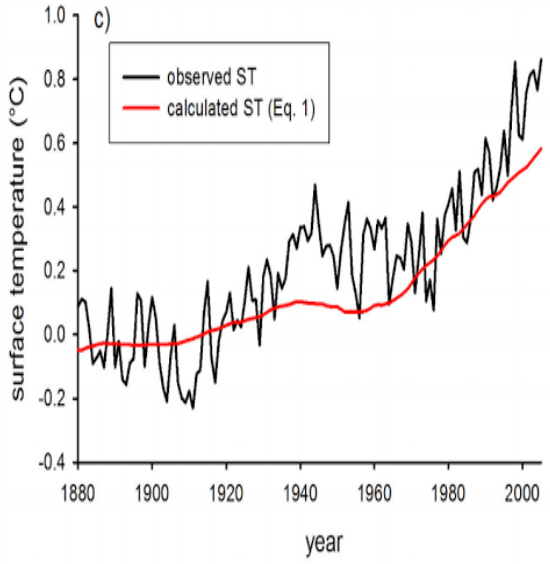

Figure 1. Temperature increase 1880-2000 (Anderson, 2016).

The amount of ice in Antarctica and thus the level of ice melting cause by increased average temperatures is another topic addressed in mainstream media: "ICE is expanding in much of Antarctica, contrary to the widespread public belief that global warming is melting the continental ice cap" (Roberts, 2009).
However Vaughan clearly shows a graphic image (Figure 2) of the evolution of Antarctic ice over a long period of time, thus proving that the levels of ice are actually shrinking. At the same time, Kusahara argues that the warming of the Southern Ocean compounded by an increase in greenhouse gas concentrations augment the basal melt of Antarctic ice shelves, resulting in the retreat of the grounding lines. If the entire ice on the planet, including Antarctic ice which holds a large portion of global water in solid form, were to melt, ocean levels would rise by more than 60 meters (Kusahara, 2015).

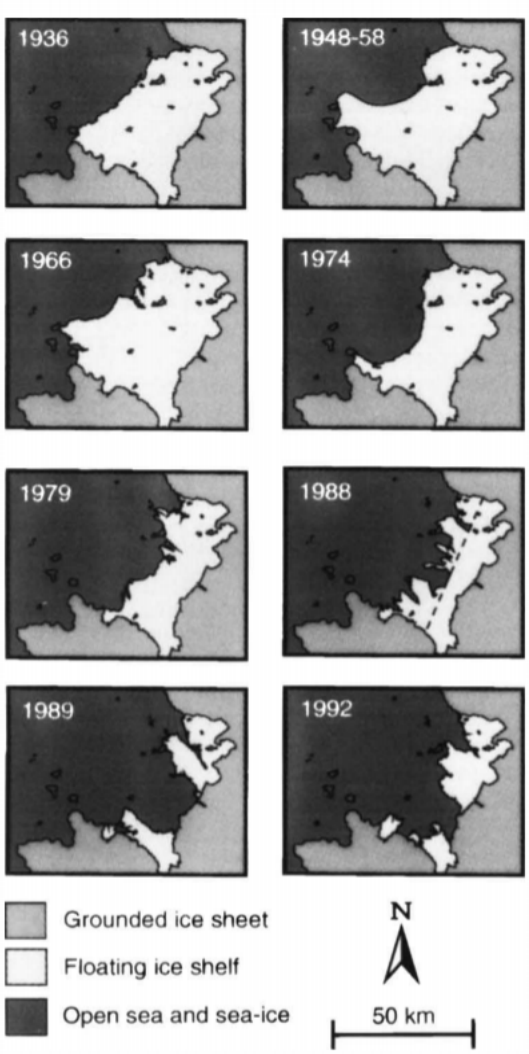

Figure 2. Cartoon of 50 years of retreat of Wordie Ice Shelf from 1936 to 1992 (Vaughan, 2009).

In terms of ocean acidification, the common belief is that the level of CO_2 emissions is insufficient to cause any harm. Christopher Monckton stated that: “Our harmless emissions of trifling quantities of carbon dioxide cannot possibly acidify the oceans. Paper after paper after learned paper in the peer-reviewed literature makes that quite plain. Idso cites some 150 scientific sources, nearly all of them providing hard evidence, by measurement and experiment, that there is no basis for imagining that we can acidify the oceans to any extent large enough to be measured even by the most sensitive instruments” (Monckton, 2009).
On a global level coral reefs are threatened by ocean acidification as a result of climate change and some of their effects include coral bleaching, increased marginal carbonate saturation and increases in coral diseases caused by temperature increase (Fiedler, 2014).

Around half of the amount of CO2 introduced into the atmosphere by human activities over the past two hundred years has been dissolved in oceans (Raven et al., 2005; LeQuéré et al., 2009). A large quantity of CO2 is present in surface waters, generating an overall decline in pH of *0.1 (Raven et al., 2005).
The steady increase in ocean water pH can be seen in Figure 3 (Feely, 2011).

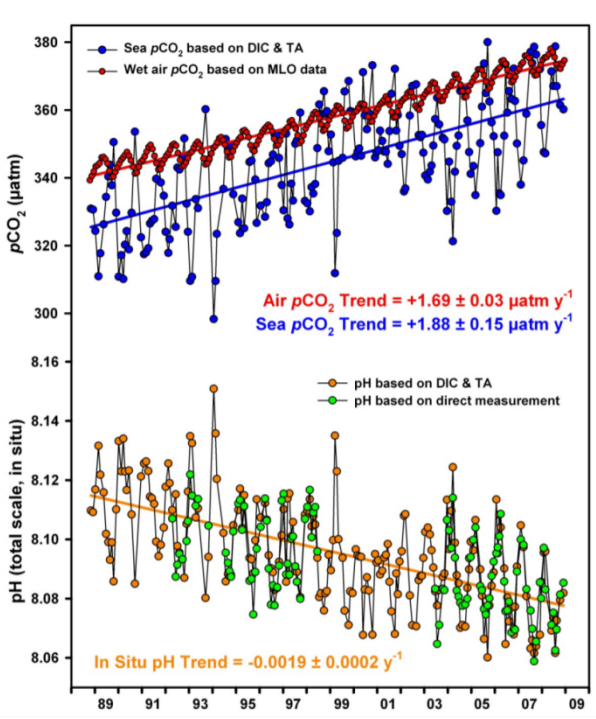

Figure 3. pH levels in Hawaii 1989-2009 (Feely, 2011).

The Petition Project states that over 31,000 scientists agree with the idea that "There is no convincing scientific evidence that human release of carbon dioxide will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere" (Petition Project, 2007).
On the other hand, Cook et al argue that the consensus that humans are causing recent global warming is shared by 90%–100% of publishing climate scientists according to six independent studies. An analysis of 11944 abstracts of research papers shows that 4014 took a position regarding the cause of recent global warming. A survey of the authors of some of the papers (2412) shows a 97% consensus (Cook et al, 2013).

CONCLUSIONS

Despite common belief, global warming is a reality and there is ample evidence supporting the effects of CO2 emissions on the environment. Its effects on marine and terrestrial wildlife have been documented and proven as being the result of anthropogenic activity by 97% of the scientific community.

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