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Global warming is real

In the past 1,300 years, the earth has not experienced such a warming trend as we are having now (NASA, 2016). In fact, the World Meteorological Organisation has stated that the global temperature is 1.2C above pre-industrial levels and for three years in a row, it has been the hottest year on record (Carrington, 2016). Though the scientific evidence seems overwhelming in favor of global warming, there are those, for various reasons, who believe that global warming is a hoax or not empirically verified.

This is disappointing, as the future of our planet is at stake, and the last thing we should do in this critical time is argue whether or not our world is being destroyed. In order to enlighten those who believe global warming is not currently happening, I will present evidence that will show that global warming is real due to sea levels rising, global temperatures rising, warming oceans, shrinking ice sheets, declining Arctic sea ice, glacial retreat, extreme temperature events, ocean acidification, and decreased snow cover. In turn, I will also discuss counterarguments and their refutations. The world over, sea levels are rising at an unprecedented rate.

Two reasons why sea levels are rising is because of the warming of sea water (water expands when it warms) and the melting of land-based ice, such as glaciers and ice sheets. According to scientists John Church and Neil White, the global sea level rose 17 centimeters (6.7 inches) in the last century. Furthermore, the rate in this last decade has been nearly double compared to the last century (Church & White, 2006). So, if we

compare the sea levels from this century to the last, it is obvious that sea levels are taking an unexpected turn—and the global rise in temperature has much to do with this.

A global rise in temperature has been obvious for some years now. T.C. Peterson et.al., in their analysis for the Special Supplement to the Bulletin of the American Meteorological Society, found most of the warming happened in the past 35 years, with 15 of the 16 warmest years on record occurring from 2001. In addition, 2015 was the first time the global average temperatures were 1 degree Celsius or more above the 1880-1899 average (T.C. Peterson et.al, 2016). This clearly demonstrates that global warming is a recent phenomenon, and should be considered especially dangerous if it continues at its current rate. Like sea levels rising from warming, the oceans are also shown to be warming.

According to geophysical research by Levitus, et. al., the oceans have absorbed the increasing global heat, with the topmost 700 meters (about 2,300 feet) of oceans demonstrating a warming of 0.302 degrees Fahrenheit since 1969 (Levitus, et. al., 2009). Even on the surface of oceans, something that is easy to record scientifically, global warming is more than noticeable. Another happening that is also easy to detect is the shrinking of ice sheets. Specifically, the Greenland and Antarctic ice sheets are decreasing in mass at an accelerated rate.

Information from NASA’s Gravity Recovery and Climate Experiment point to Greenland, which lost 150 to 250 cubic kilometers (36 to 60 cubic miles) of ice per year between 2002 and 2006, and to Antarctica, which lost about 152 cubic kilometers (36 cubic miles) of ice between 2002 and 2005 (NASA, 2016). This is not normal by any means, and shows there is an uncertain future for animals that inhabit those ice sheets and for us as a species, as higher ocean water levels means certain masses of land will be covered by water. Along with ice sheets, Arctic sea ice is declining rapidly. The National Ice & Snow Data Center show that the extent and thickness of Arctic sea ice has dissipated quickly over the past several decades (National Snow and Ice Data Center, 2016). This is a telltale sign that global warming is at work.

Glaciers are also being attacked by global warming, like other frozen bodies of water. The National Ice & Snow Data Center presents evidence that glaciers are retreating globally. This includes areas such as the Alps, the Himalayas, the Andes, the Rockies, Alaska, and Africa (National Snow and Ice Data Center, 2016). It is not a rarity or a strange, local phenomenon: it is a global catastrophe that needs to be addressed. Extreme events come hand in hand with catastrophes. According to the National Centers for Environmental Information, the amount of record-high temperature events in the United States has been increasing, while the amount of record-low temperature events has been decreasing, since 1950.

In addition, the U.S. has seen increasing amounts of intense rainfall events (Gleason, 2016). There is no doubt we still have cold winters, but the extreme high temperatures we continue to experience worldwide are becoming more and more harsh, which can kill more people and ravish crop lands. Another dangerous result of global warming that is present is ocean acidification. The PMEL Carbon Group states that since the start of the Industrial Revolution, the acidity of surface ocean waters has grown by approximately 30 percent (PMEL Carbon Group, 2016). To put this conundrum into greater perspective, C. L Sabine, in his article, "The Oceanic Sink for Anthropogenic CO2" noted that the amount of carbon dioxide absorbed by the upper layer of the oceans is growing by near to 2 billion tons per year (Sabine, 2004).

This leaves coral reefs and many other species living in the oceans vulnerable to adverse effects and points to our own demise as a species in the near future. Now let us rise to the mountains from the oceans. Spring snow, that beautiful sight we have while driving through the mountains is in danger. Gleaned from the research done by the National Snow and Ice Data Center, we get to know that satellite observations demonstrate that the amount of spring snow cover in the Northern Hemisphere has decreased over the past five decades. In addition, the snow is melting earlier than usual (National Snow and Ice Data Center, 2016). Not only does this mean less of a chance to do winter sports, but it also endangers the habitats that these mountains maintain.

Despite all these factors involved and the evidence shown from highly-credible sources (mostly governmental), there are critics of global warming as a scientific fact. One such criticism is that there is no real consensus that it is real, and that it is something up for discussion. However, the fact is that according to the authors of seven major climate consensus studies, about 97% of climate scientists believe in global warming (Skeptical Science, 2016). The critics who try to debase these results point to minor studies funded by far-right politicians and lobbyists. Another significant criticism of global warming as a true phenomenon is that what is happening now is a part of Earth's geophysical processes.

Every 1500 years, approximately, the heat distribution of Earth switches between hemispheres, though total heat globally remains the same. However, this is a much different happening than human-produced global warming, which has been created by emissions of CO2 in the atmosphere within the last 200 years. Unlike natural heat variations, the present temperature increase made by CO2 is being recorded globally—on the ground, in the air, and in the oceans (Skeptical Science, 2016). So, it is not a natural heat distribution issue that happens precisely at the same time (the 1500 year hemisphere seesaw), but rather an issue of global heat increase that has been happening since the Industrial Revolution.

Though this was only a glimpse at the mountains of evidence pointing to the fact of global warming, it is difficult to dismiss. From frozen bodies of water melting more rapidly, to water levels rising and having more acidity, to global temperatures rising to increasinglycommon events of extreme heat, global warming is showing its signs in a variety ways.

However, there are those that are against global warming as a fact, citing counter arguments, though most of them are illogical when faced with the growing mounds of empirical evidence that demonstrate global warming as a real phenomenon and the strong consensus in favor of it being a fact within the scientific community. And if you still do not believe in global warming after reading this essay and after seeing the data proving it, you have to admit that emitting CO2 in the atmosphere cannot be healthy for Earth in the

long run, and that we should do whatever we can to change the way we treat our planet and ultimately ourselves.

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