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Environmental Essay

Whether or not anthropogenic (human caused) carbon dioxide is a major contributor to the total amount of CO₂ in the atmosphere has become a major topic of debate over the last few years. There is evidence that supports both sides, making it hard to decide. Are humans ruining the planet, or is the planet merely going through another natural warming period?

The first argument is that anthropogenic CO₂, is a major contributor to the total amount of CO₂ in the atmosphere. According to the Atmosphere, Climate and Environment Information Programme, CO₂ is released by burning fossil fuels such as coal, oil and gas for power and electricity, and the production of cement. Another source of increased CO₂ is deforestation. Trees and plants take in CO₂ through the process of photosynthesis and store it in their tissues and wood fiber. When the plants and trees are cut down, it releases a large amount of carbon from the plant into the atmosphere as CO₂. Before the industrial revolution, the amount of CO₂ in the atmosphere changed little over hundreds of years. This was because the amount of CO₂ removed from the atmosphere by the CO₂ sinks equaled the amount released to the atmosphere from the CO₂ sources. Sinks are a method by which a gas can be removed from the atmosphere. Examples of sinks include trees, plants, and the oceans. The anthropogenic CO₂ in the atmosphere is being released from sources faster than it can be absorbed by the sinks, so the concentration of CO₂ in the atmosphere has increased by as much as 30 percent. Another important factor is that the CO₂ released into the atmosphere has an atmospheric lifetime

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of between 50-200 years. Because CO₂ has such a long lifetime, there is a possibility that the CO₂ will be present in the atmosphere for at least 50 years before it is absorbed by a sink or becomes part of another chemical reaction. (Atmosphere, Climate and Environment Information Programme(1))

The second argument is that anthropogenic produced CO₂ is not a major contributor to the total amount of CO₂ in the atmosphere. CO₂ is created naturally by animals breathing and by the decay of plant and animal matter. It is also created by volcanoes and forest fires that occur naturally in nature. These processes are natural sources of carbon dioxide that account for 38 percent of all CO₂ emissions. This is much larger than the emissions that are man-made. (1)

According to Water: Science and Issues, the oceans are another large natural source of CO₂ in the atmosphere. In the oceans alone, there is approximately 50 times more CO₂ than in the atmosphere, and 19 times more than the land biosphere. The reason that the oceans can hold more carbon than the atmosphere is that the CO₂ that diffuses into the oceans reacts with the water to form carbonic acid and its dissociation products, which are bicarbonate and carbonate ions. This conversion of CO₂ gas effectively reduces the CO₂ gas pressure in the water, thereby allowing more diffusion from the atmosphere. (Water Encyclopedia (2))

During the last 400,000 years the upper limit of atmospheric CO₂ was about 300 ppm (parts per million). CO₂ concentrations are about 370 ppm. Humans can take credit for some of the addition, but definitely not all of it. The natural sinks will respond to take up these additions, it just takes time. Compared to other geologic time periods, the CO₂ concentrations in our atmosphere are still very small and may not have a statistically

measurable effect on our global temperatures. For example, during the Ordovician Period, which was 460 million years ago, carbon dioxide concentrations were at 4,400 ppm while the temperatures were approximately the same as they are now. This shows that the earth's climate has been warming and cooling on its own for the last 400,000 years and will continue to do the same. (CO₂ vs temperature: Last 400,000 years)

Seeing all the evidence of both sides it is hard for me to choose a side to believe. I do believe that humans are contributing to the increased amount of CO₂ in the atmosphere, but I do not believe that it will ruin the planet. I believe that we are going through another warming period like the ones that have reoccurring throughout the last 400,000 years. The patterns of weather have always repeated throughout history and right now we are in the warming period before we go into the next ice age.

Works Cited

"Atmosphere, Climate & Environment Information Programme." *Atmosphere, Climate & Environment Information Programme*. N.p., n.d. Web. 14 Jan. 2010.

<http://www.ace.mmu.ac.uk/Resources/Teaching_Packs/Key_Stage_4/Climate_Change/02p.html>.

"CO2 vs Temperature: Last 400,000 years." *Plant Fossils of West Virginia*. N.p., n.d.

Web. 13 Jan. 2010. <http://www.geocraft.com/WVFossils/last_400k_yrs.html>.

CO2, my calculation the ocean is currently storing only a fraction of it's capacity of, anthropogenic CO2 can only accumulate in the atmosphere if there is no equilibrium between atmosphere, and ocean.. "Carbon Dioxide in the Ocean and Atmosphere - sea, depth, oceans, important, system, plants, marine, oxygen, human, Pacific." *Water: Science and Issues*. N.p., n.d. Web. 14 Jan. 2010.

<<http://www.waterencyclopedia.com/Bi-Ca/Carbon-Dioxide-in-the-Ocean-and-Atmosphere.html>>.