Climate Change Response

To effectively address the claim that climate change is not real, one needs to rely on facts and scientific evidence. This response paper highlights how scientists study past climates, the greenhouse effect, the role of greenhouse gases in global warming, evidence of climate change from NASA, and the likely effects of climate change in local areas.

How Scientists Learn About Past Global Temperatures and Climates

It is important to understand past climates to help identify the drivers and patterns of change. Scientists study the history of Earth through proxies that naturally record environmental conditions. For instance, ice cores from polar regions work by preserving layers of trapped air bubbles thereby revealing historical temperature and atmospheric composition. These cores can even be traced for thousands of years (Tierney et al., 2020).

In addition, there are proxies like tree rings, whose size depends on precipitation and temperature, and sediment layers from oceans and lakes, which contain chemical isotopes, and microorganisms that record shifts in climate. These tools when used together enable researchers to determine a comprehensive history of Earth's climate, identifying periods of cooling and warming.

The Greenhouse Effect

Essentially, the greenhouse effect is a natural process that makes Earth habitable. The radiation from the sun heats the surface of the planet, and then some of the heat is radiated back into space. Greenhouse gases like methane, carbon dioxide, and water vapor trap some of the heat, keeping the planet warm enough to sustain life. However, NASA (2023) notes that increased human activities have caused an increase in the concentration of greenhouse

gases in the atmosphere, escalating this effect leading to a rise in global temperatures, causing many environmental changes, and disrupting natural systems.

Greenhouse gases like methane, carbon dioxide, and nitrous oxide have been shown to mainly influence human-driven climatic change. Carbon dioxide is emitted through the burning of fossil fuels for energy. Methane comes from agricultural practices such as fossil fuel extraction, livestock farming, and landfills. Nitrous oxide is majorly released from the use of synthetic fertilizers and industrial processes. These gases trap heat in the atmosphere, causing a warming effect that, melts ice caps, disrupts weather patterns, and raises sea levels thereby destabilizing Earth's climatic systems (Mikhaylov et al., 2020).

Evidence of Global Climate Change

The consistent rise in the average surface temperatures of the Earth is a clear indicator of global climate change. Data by NASA shows that since the 19th century, Earth's temperature has risen by about 1.2°C (2.2°F), fostered by human activities such as deforestation and burning fossil fuels. For example, the Global Temperature Anomaly graph found on NASA's climate website demonstrates this trend. The graph shows that the last decade has recorded the warmest temperatures, with 2016 and 2020 tying as the hottest years. In addition, retreating glaciers, shrinking Arctic sea ice, increased frequency of extreme weather events, and rising sea levels all offer clear evidence that climate change is real (NASA, 2023).

Expected Impacts of Climate Change in My Area

In my area, major concerns with climatic changes include changing precipitation patterns, rising temperatures, and heightened frequency of extreme weather events. Information by the Environmental Protection Agency (EPA) shows that higher temperatures

can strain infrastructure and increase the incidences of heat-related illnesses, especially in urban areas. Growing seasons can also be lengthened by warmer conditions, in addition to causing more intense flooding and droughts, affecting water supplies and agriculture (Hornsey & Lewandowsky, 2022).

References

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