BIOL 1301-01 Introduction to Biology

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**Comparison of Natural and Human-Induced Processes**

Global climate change is influenced by both natural and human-induced processes. Natural processes include volcanic eruptions, solar radiation variations, and natural greenhouse gas emissions. For example, volcanic eruptions can release large amounts of sulfur dioxide into the atmosphere, which can temporarily cool the Earth by reflecting solar radiation back into space. Solar radiation variations, such as changes in the sun’s intensity, also affect the Earth’s climate over long periods (IPCC, 2013).

In contrast, human-induced processes primarily involve the burning of fossil fuels, deforestation, and industrial activities that release large quantities of greenhouse gasses, such as carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O), into the atmosphere. Since the Industrial Revolution, human activities have significantly increased the concentration of these greenhouse gasses, leading to an enhanced greenhouse effect and global warming (IPCC, 2013).

**Changes in the Past and Present**

Historically, natural factors have caused significant climate changes. For example, during the last Ice Age, the Earth experienced periods of glaciation and warming due to natural fluctuations in the planet’s orbit and tilt, known as Milankovitch cycles (Ruddiman, 2001). These cycles influenced the amount of solar energy the Earth received, driving long-term climate patterns.

In the present day, however, the rate and magnitude of climate change are unprecedented and are largely driven by human activities. The increase in global temperatures, melting polar ice caps, rising sea levels, and more frequent extreme weather events are clear indicators of anthropogenic climate change. According to the Intergovernmental Panel on Climate Change (IPCC), human activities are the dominant cause of the observed warming since the mid-20th century (IPCC, 2013).

**The Greatest Factor Influencing Global Climate Change**

In my opinion, the greatest factor influencing global climate change is the burning of fossil fuels. This activity releases vast amounts of CO2, the most significant greenhouse gas, into the atmosphere. The persistent and cumulative effect of CO2 emissions has led to a substantial increase in global temperatures, contributing to various climatic disruptions (IPCC, 2013).

Fossil fuel combustion for energy production, transportation, and industrial activities remains the largest source of CO2 emissions. Mitigating climate change, therefore, requires a significant reduction in fossil fuel use and a transition to renewable energy sources. The impact of fossil fuel burning on the climate is well-documented and presents the most pressing challenge in addressing global climate change (Mann, 2012).

**Conclusion**

Both natural and human-induced processes have influenced global climate change, with natural factors driving long-term climatic shifts and human activities causing rapid and severe changes in recent history. Among these, the burning of fossil fuels stands out as the most significant factor, necessitating urgent action to mitigate its impact. Transitioning to sustainable energy sources and reducing greenhouse gas emissions are crucial steps in combating climate change and ensuring a stable climate for future generations.

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