

Congress of the United States

Washington, DC 20515

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Is Human Activity Contributing to Global Warming Trend?

Dear Colleague:

As the Senate Commerce, Science and Transportation Committee hears testimony today on impacts of global climate change and human contribution to this phenomenon, our concern about the growing signs of global climate change increases. Sea levels are rising and permafrost in the northern hemisphere—the permanently frozen soils of the tundra—is melting at a historically unprecedented rate. The ocean is evaporating more quickly in warmer waters, increasing salinity at the equator and decreasing it toward the poles, and the Atlantic Ocean Gulf Stream is slowing down. We have seen a widespread and, in some regions, a dramatic, retreat of polar ice and glaciers. From a policy perspective, the issue now centers on the extent to which humans are contributing to this warming trend, and scientists across the globe are closely examining this question:

Have humans contributed to global warming trends?

The charts below represent a relatively simple method for attributing 20th century climate change to human activities, such as the burning of fossil fuels. Climate variability occurs in response to two difference sources: natural factors (or forcings) such as solar variability, volcanic activity, ocean circulation, etc. and anthropogenic (human) forcings such as greenhouse gases and land-use changes. In this analysis, a series of modeling experiments were conducted to test whether the observed changes in 20th century temperatures could be accounted for solely by natural forcings. In Chart (a), the light gray line shows temperatures from a climate model incorporating only natural forcings over the 20th century. These were compared with the observed temperature record (dark line). The two curves have some similarities, but generally are a poor match, particularly over the past 30-50 years.

