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## Global Climate Change Depends on More than Combustion of Fossil Fuels

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### ABSTRACT

Recent discussion within the news appears to present the idea that climate change is a result of fossil fuel combustion and associated increase of carbon dioxide (CO<sub>2</sub>). It is really far more complex. As with many natural systems climate change is dependent on many factors among these are: aerosols, Milankovitch cycles, other greenhouse gases, ozone, solar irradiance cycles of various lengths, and surface albedo. Aerosol particles have both natural and anthropogenic sources. Milankovitch cycles include cycle of axial tilt, eccentricity, and precession. Other greenhouse gases include: methane, nitrous oxide, and other halocarbons. The most familiar cycle of solar irradiance is the approximately 20-year sunspot cycle often correlated with droughts throughout the Midwest and Great Plains of the United States. However, there many others that are decades to centuries long.

There is a large amount of evidence that indicates that climate change is dependent on other factors than fossil fuel combustion and CO<sub>2</sub>: (1) climate change elsewhere in the solar system, (2) climate change throughout recorded history prior to the industrial revolution, (3) climate change throughout geologic time, and (4) correlation between CO<sub>2</sub> concentration and past temperature that is not strong. A variety of atmospheric parameters will be considered by correlation of global temperature with concentration of aerosols, CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and other parameters. Two indicators of solar activity were also considered for correlations with: global temperature: production rates of radioactive beryllium 10, and sunspot activity.

As a result of this examination there is clear evidence that there are other drivers influencing global climate than just CO<sub>2</sub> concentration. These influencing factors can be classified into three categories: (1) solar variability, (2) variations in Earth's rotation and revolution about the sun, and (3) variability of aerosols, other atmospheric gas concentrations and albedo. The first two of these categories are only a function of natural variations while the third has been influenced by both natural and anthropogenic processes.