Climate change: An atmospheric perspective

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Climate change is currently dominated by anthropogenic global warming induced by the burning of fossil fuels. Natural causes of climate change will likely be only a minor contributor in the 21st century. The anthropogenic increase of atmospheric greenhouse gases such as carbon dioxide, methane and nitrous oxide is enhancing the downward long wave infrared radiation at the Earth's surface resulting in higher temperatures. Much of the total warming is a result of the positive feedback associated with increasing atmospheric water vapour, itself a very strong greenhouse gas, which accompanies the higher temperatures. Large uncertainties still exist in quantifying a number of other feedbacks such as clouds, ocean circulation, surface albedo and vegetation. As a result climate models used in the latest IPCC Fourth Assessment predict that a doubling of carbon dioxide equivalent will increase the equilibrium global averaged surface temperature in the range from 2.0 to 4.5 C with 3.0 C being most likely. Very significant regional climate change, including more frequent floods, droughts and heat waves, are predicted if atmospheric carbon dioxide continues to increase without strong mitigation efforts.

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