



Global Warming without Global Mean Precipitation Increase?

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Global climate models simulate a robust increase of global mean precipitation of about 1.5 to 2% per kelvin surface warming in response to greenhouse gas (GHG) forcing. Here, it is shown the sensitivity to aerosol cooling is robust as well, albeit roughly twice as large (3-4% per kelvin). This larger sensitivity is consistent with energy budget arguments. At the same time, it is still considerably lower than the 6.5 to 7%K⁻¹ decrease of the water vapor concentration with cooling from anthropogenic aerosol since the water vapor radiative feedback lowers the hydrological sensitivity to anthropogenic forcings. When GHG and aerosol forcings are combined, the climate models with a realistic 20th century warming indicate that the global mean hydrological response to GHG warming has until recently been completely masked by aerosol drying. This explains the apparent lack of sensitivity of the global mean precipitation to the net global warming recently found in observations. As the importance of GHGs increases in the future, a clear signal will emerge.