

Abstract:

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**Title: Is it possible to reduce the uncertainty in aerosol radiative forcing?**

Aerosol radiative forcing has persisted through all IPCC reports as the largest source of uncertainty among all forcing components. I argue that progress has been slow partly because there are dozens of uncertain processes that affect the modelled forcing, but we rely on an extremely small set of climate model simulations to estimate it. There's no way these estimates will ever be statistically robust. In this presentation I will show what happens when you emulate to produce 1 million variants of a climate model that sample all the important causes of uncertainty and then try to constrain them using extensive observations. The results are encouraging in terms of uncertainty reduction, but the observationally constrained spread of estimates is larger than the multi-model spread, suggesting that the multi-model estimates are not independent.