



Understanding the large-scale atmospheric dynamical response to changes in anthropogenic aerosols

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By inducing anomalous heating gradients in the atmosphere and at the surface via radiation changes and diabatic heating anomalies, especially in the tropics, aerosols can affect the large-scale atmospheric circulation and, as a result, induce teleconnections which extend the climate impact of aerosols far from their source regions to produce anomalies at hemispheric, if not near-global, scales.

One of the key uncertainties hindering our ability to more robustly project future climate change, especially at regional scale, is our limited confidence in understanding and quantifying the atmospheric dynamical response to climate forcing. The latter, in the case of aerosols, is also poorly characterised due to compounding uncertainties in the aerosol processes themselves.

This talk will discuss various aspects of the atmospheric circulation response to regional and global aerosol forcing and associated climate impact by using multiple sets of experiments with state-of-the-art climate models with perturbed aerosol emissions. Particular focus is given to tropical-extratropical interactions and the monsoon system, and the underlying physical pathways generating regional and remote climate anomalies are discussed.