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## Climate effects of changing aerosol emissions over the coming decades

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Emissions of anthropogenic aerosols strongly influence the climate, by modulating global and regional temperature, and by affecting precipitation, extremes, circulation patterns and other local-to-global scale features. This influence has been continually changing over previous decades, and will continue to change at least until 2050. It is also highly heterogeneous, in space and time. Hence, a deeper look at the potential role of anthropogenic aerosol emissions in shaping climate change over the coming decades is crucial for both adaptation and mitigation strategies.

Here, we discuss three techniques to bound the potential near-term role of aerosols: (i) The influence on local and global rates of warming, relative to natural variability, using simplified models in combination with Large Ensembles, (ii) an overall constraint on the precipitation influence of absorbing aerosols, combining recent emission projections with results from several multi-model intercomparison projects, and (iii) changes to regional distributions of daily temperature and precipitation as function of the level of aerosol emissions and global warming, leveraging the statistics available through Large Ensembles.

Overall, we find that while greenhouse gas emissions will continue to dominate the global mean climate evolution, by driving surface temperature change and its associated feedbacks, aerosol emissions may still hold a key - or even dominating - influence on changes to regional weather and climate.