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# Aerosol and ozone radiative forcing 1990-2015

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The regional changes in economic growth and pollution regulations have caused large changes in the geographical distribution of emissions of precursors and components affecting the radiation balance. Here we use recently updated emission data over the 1990-2015 period in eight global aerosol models to simulate aerosol and ozone changes and their radiative forcing.

The models reproduce the general large-scale changes in aerosol and ozone changes over this period. The surface particle mass changes is simulated to 2-3 %/yr for the total fine particle concentration over main industrialized regions. Six models simulated changes in PM2.5 (particulate matter with aerodynamic diameters less 2.5 $\mu$m) over the 1990-2015 period. Observations of changes in PM2.5 are available for selected regions and time periods. The available PM2.5 trends from observations and model mean results are compared and for Europe the observed trend is 20% stronger than the model-mean over the 2000-2010 period. Over the 1990-2010 period the US observed changes are 13% lower than the simulated changes. Despite this relatively promising result, the agreement over US for the 2000-2010 period is poor. The reasons for this will be further explored. The forcing for ozone and aerosols increase over the 1990-2015 period and more positive relative to results in IPCC AR5. The main reason for a positive aerosol forcing over this period is explained by a substantial reduction of global mean $SO_2$ emissions, in parallel with increasing black carbon emissions.