

1.115 A world avoided: Impacts of changes in anthropogenic emissions on the burden and impacts of air pollutants .

Presenting Author:

Alexander Archibald, Cambridge University & NCAS, ata27@cam.ac.uk

Co-Authors:

Duncan Scott, Cambridge University

David Wade, Cambridge University

Gerd Folberth, Met Office

Abstract:

Emissions from anthropogenic activities are known to have deleterious impacts on human and ecosystem health and as such a significant amount of time, effort and money has been spent developing legislation to minimise their effects. But to what end have these efforts been a success?

Here we use a state of the art coupled chemistry-climate model HadGEM2-ES, with extended tropospheric chemistry, to assess the impacts that changes in emissions from anthropogenic activity have had on the burden and impacts of air pollutants over the last three decades. We use HadGEM2-ES to assess an alternative trajectory in air pollutant emissions to that which we have seen. This alternative trajectory can be considered to reflect a world avoided. In this world avoided, the significant levels of air pollution legislation imposed over the last three decades are simulated to not have come into effect in the contiguous United States and Western Europe. By combining the results of simulations of the world avoided with a base case present day atmosphere our model runs demonstrate that as a result of air pollution legislation, over 500,000 lives a year have been saved owing to reduction in sulfate aerosol and up to 10,000 as a result of improvements in ozone and NO₂ pollution. These results highlight the important role of legislation in reducing air pollution related mortality in these areas of the globe and highlight a compelling case for developing regions to follow.