

Regional aerosol modeling over Europe using HadGEM3-R

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Present day and 2030 aerosol quantities over Europe are simulated using a regional configuration of HadGEM3 at a horizontal resolution of 50 km. The regional model is driven by boundary conditions generated by an equivalent run from the global model. This has an advantage as both nested and host models use the same dynamical core and model physics.

This study focuses on secondary inorganic aerosols and the impact of changes in SO₂, NO_x and NH₃ emissions. In particular, secondary aerosol reductions resulting from SO₂ reductions are offset in part by an associated increase in nitrate. Primary aerosols (black and organic carbon from fossil fuels) are also considered. An additional run with 2030s climate and 2000s emissions separates the effect of climate change from emission changes on the aerosol quantities.

The study has a geographic focus on the UK assessing the effect of the national emissions compared to those from the rest of the European domain. For the UK, in addition to emission changes, the meteorology plays an important role and warrants further analysis.