



## **Scale interactions in ozone formation studied with WRF-Chem**

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Distributions and changes in tropospheric ozone on a global scale are normally calculated with rather coarse resolution Chemistry-Transport Models (CTM). E.g. the T42 resolution (2.8 deg x 2.8 deg) is now frequently used for this purpose. However, a substantial part of the chemistry affecting production of ozone takes place in polluted regions on scales well below the resolution of global CTMs. This introduces errors as the formation of ozone from ozone precursors is non-linear. In order to quantify such inaccuracies we have used the WRF (Weather Research and Forecasting) model. The version we use is the WRF-Chem with the RADM2 chemistry scheme. The model is run for two 3 day periods in the summer 2003 in Europe. We have used various resolutions in emission fields, namely 81km x 81km, 27km x 27km, and 9km x 9km, for ozone precursors over the city of London and over the Ruhr area. The model resolution, 9km x 9km, has been kept unchanged. Assimilated meteorology from the ECMWF is used as initial and boundary conditions. Emissions of ozone precursors (VOC, NO<sub>x</sub> and CO) are from the UK National Emissions inventory over London, from LANUV over Ruhr, and from EMEP/INERIS/CityZen for the rest of Europe. Deviation in ozone between the two coarsest emissions grids and the finest grid have been quantified. We have diagnosed changes in Europe as a total, taking into account any changes in transport of ozone out of the European grid. In order to study the impact of various meteorological conditions and background chemistry we have performed a set of model experiments where the London emissions have been assumed over the location of Cairo.