

MODELLING OF AIR QUALITY AND ACID DEPOSITION IN THE UK AND EUROPE - DEMONSTRATING THE VALUE OF A 'ONE ATMOSPHERE' APPROACH

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The effects of pollutant emissions to the atmosphere must be assessed at a range of scales from local through to transboundary. This assessment is complex because multiple pollutants contribute to a given environmental effect, and a single pollutant may contribute to multiple environmental effects. The policy and investment decisions required to reduce environmental effects need a framework which can simulate this complexity, and allow cost effective solutions to be found. Models of long-range atmospheric transport play a key role in this process. A UK and European version of the USEPA Models-3/CMAQ system has been developed over the last few years by the UK electricity generators Joint Environmental Programme to meet the air quality and acid deposition modelling needs of the industry. The model offers four key advantages through its ability to:

- 1) Simulate and couple processes from local to transboundary scales
- 2) Simulate both short-term episodes and annual effects
- 3) Simulate all the key atmospheric processes of concern within a single modelling framework, including the coupling of acid deposition, particulates and ozone
- 4) Examine the sensitivity of model results to the underpinning science via a modular software design.

A description will be given of the application of Models-3 to long-range transport of pollutants over the U.K. and Europe over a range of spatial scales from local to transboundary, and timescales from episodic to annual. The benefits of coupling acid deposition, particulates and ozone into a single framework are exemplified and discussed.