

## **NON-LINEARITIES IN THE RESPONSE OF THE ATMOSPHERE TO REDUCTIONS IN SULPHUR EMISSIONS**

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Acid deposition, the effect of aerosol on climate and rural air quality are areas of concern for sulphur emission control strategists. Downing *et al.* (1995) reported a reduction in the rate of sulphur dry deposition at Eskdalemuir, Scotland, of twice that expected from reductions in UK sulphur emissions during the period 1978-1993. This has been quoted as evidence for a non-linearity in the atmosphere's response to sulphur emission reductions but without a robust explanation. We present a re-analysis in sulphur dioxide versus emission space to better describe the data. A model has been developed from four basic assumptions and provides a plausible physical/ chemical mechanism for a non-linearity. The model results imply the extent of the non-linearity is distance from source dependent. To confirm this prediction analysis has been conducted at two sites closer to the major UK emission sources. Finally, various factors such as seasonality and synoptic weather conditions were isolated in order to clarify observations of the non-linearity.