

# ***Interactive comment on “The role of long-range transport and domestic emissions in determining atmospheric secondary inorganic particle concentrations across the UK” by M. Vieno et al.***

## **Anonymous Referee #2**

Received and published: 16 February 2014

This paper uses a model to evaluate the contribution of continental Europe to secondary inorganic aerosols in the UK. Although national emissions have a dominant role in gas phase concentrations, it is found that long range transport has an important role for secondary species. The paper shows that there have been declines in pollution levels, but cautions that health limits may be exceeded due to long range transport. On a separate note, the results show that meteorological variability from year to year can lead to big changes in average pollutant levels on an annual timescale such that multi-year time periods should be considered for more robust evaluation. The paper is clearly written and the methodology is sound. Publication is recommended in ACP.

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Minor Comments: There is no consideration of intercontinental transport (ie. from North America) - could a brief description be added to the introduction about what is known about this and the magnitude of this compared with continental Europe?

Page 33439, Line 4-5: The 2006 peak at Strathvaich is curious. Is this just an anomaly, or could something be said about it from the meteorology at the time? A couple of lines in the discussion would be appreciated.

Page 33440, Line 20: Presumably a large factor in the greater contribution of non-UK emissions to UK secondary particles is the formation lifetime of the aerosols. Could this be added in the discussion?

Page 33443, line 23-26: The wording is confusing: SO<sub>4</sub> is less sensitive than NO<sub>3</sub> which is itself insensitive?

Page 33444, line 23-25: The discussion of spring 2003 is split up over several paragraphs in combination with other things. It could benefit from re-organization. Are there differences in emissions in the model for this episode? The model gets the peak correctly, is this just due to meteorology? Also, would it be worth saying something about the 2003 heat wave? I cannot tell from the figures if it associated with the high sulfate values.

PPM<sub>2.5</sub> seems like a clumsy acronym given the prevalence of parts per million - could something else be found?

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 33433, 2013.

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