

Interactive comment on “Response of secondary inorganic aerosol concentrations and deposition fluxes of S and N across Germany to emission changes during high PM₁₀ episodes in spring 2009” by S. Banzhaf et al.

Anonymous Referee #1

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This manuscript explores the response of SIA concentrations to changes in precursor emissions during high PM₁₀ episodes in central Europe. This work is significant in that it considers these responses during spring time episode conditions rather than over long timescales previously reported by others.

The scientific quality and presentation of the manuscript is very good.

There are only a few minor points to raise. 1. it would be beneficial to understand how the model treats the daily and seasonal profile of the ammonia emissions presented

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as an annual average in Fig1 c).

2. It is assumed that the reduction scenarios and analysis in section 4.3.2 refer to the combination of the two episodes described in sections 4.2.1 and 4.2.2? It would be helpful to clarify this and indicate the modelled period the Figure captions and text.

3. Given the non-linear nature of the model responses, some discussion of whether the authors feel that a similar result would be obtained by studying a period without an episode would be interesting, as would more discussion regarding comparison with the findings of annual average studies of this type referred to in the introduction. If the authors felt they had sufficient data the modelling period could be split into 'non-episode days', 'episode1' and 'episode2' and figure 9 could be calculated for the 3 cases. This would allow the effect of the emission scenarios on the different cases to be evaluated and possibly some conclusion to be drawn on the effectiveness of different reduction scenarios on different types of episode. Alternatively this could be considered as an extension in future modeling where a number of suitable episodes could be selected for modelling.

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