

## ***Interactive comment on “Spatial, temporal and vertical distribution of ammonia concentrations over Europe – comparing a static and dynamic approach with WRF-Chem” by M. Werner et al.***

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Dear Dr. Tony Dore

Thank you very much for the response on this manuscript. Dr. Werner is currently travelling so I therefore write our response on her behalf.

We sincerely hope that your response will be similar in the rest of the scientific community, in particular the ECLAIRE group. We did in fact get a surprise when we evaluated the hourly response in the model against observations from Harwell (e.g. Fig 1). We have previously explored hourly ammonia concentrations in relation to short term cam-

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paigns and therefore expected some disagreements. But this clear anti-correlation between model and observations in the hourly signal was unexpected. In our opinion this shows that the governing processes for ammonia emission needs improvements in regional scale models. It also shows how important it is that these improvements are related to hourly observations of ammonia. This version of the dynamical emission is in fact based on old experiments and has several times been evaluated – but always against daily mean concentrations or monthly mean values. The step towards hourly concentrations clearly exposed a knowledge gap. Also, the results could indicate, as you clearly write, that current understanding on how climate and climate change affects the nitrogen cycle - through ammonia emissions – needs improvements.

On behalf of all co-authors Carsten Ambelas Skjøth

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