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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Development and uncertainty analysis of a high-resolution NH_3 emissions inventory and its implications with precipitation over the Pearl River Delta region, China" *by* J. Y. Zheng et al.

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Dear Authors

Thanks you very much for this nice paper about a very important topic: Ammonia. Ammonia is the main alkaline component in the atmosphere and it is also very important for atmospheric chemistry such as particle formation. Some processes related to ammonia are fast while other are more slow, so accurate emissions are important for understanding and for model development of atmospheric transport models. It is great

to see, that the authors had put efforts into describing the temporal variation in the emissions. We greatly appreciate this. However, the temporal variation seems to be based on fixed monthly values.

Studies from Europe have shown, that a more process based (but simple) description of ammonia emissions is actually possible (e.g. Skjøth et al, 2004). This methodology is under implementation in several atmospheric chemistry models and is further explored in the large scale EU project ECLAIRE. Preliminary studies with four CTM models DEHM, OML-DEP, EMEP and EMEP4UK (e.g Skjøth et al, 2011, Geels et al, 2012, Reis et al, 2012) show that a process driven description of the hourly variation of emissions does affect the overall description of the atmospheric chemistry. Some of these variations are due to management (e.g. Gyldenkærne et al, 2005), while other are entirely due to physics such as volatilization of ammonia as a function of climatic variables (e.g. temperature). Studies from USA use a similar methodology and they were presented at the Nitrogen conference in Edinburg April 2011 by representatives from US-EPA.

We believe that a more process based description of ammonia emissions would be of value to knowledge concerning atmospheric chemistry, especially if it could be applied globally over all major ammonia emission sources including China (e.g. Sutton et al, 2011). Could you please elaborate on this and discuss if such a methodology would make sense or would be possible in the Chinese region?

Highly regards Carsten Ambelas Skjøth (cas@dmu.dk) and Camilla Geels

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