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Atmospheric Chemistry and Physics Discussions

Interactive comment on "An extended Kalman-filter for regional scale inverse emission estimation" *by* D. Brunner et al.

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General Comments

I think that this is a very well-written paper. Enough details are provided so that the method could be reproduced, and I like the approach very much. The authors have been very thorough about testing the method too. My specific comments are mostly very minor and aimed at clarification. I congratulate the authors for their good work!

One suggestion I can make that may make the paper slightly more general, is that a short discussion be included on the applicability of the technique to gases that have natural or agricultural fluxes (e.g. CO2, CH4, N20).

Specific Comments

29196, L15-16 - Would the emissions be reported to the "Kyoto Protocol"? Or the UNFCC? Isn't the Protocol an agreement rather than an entity that one would report to?

29196, L25 - "integrate" or "represent" rather than "comprise".

29198, L26 - "provided by" rather than "lain down".

29199, L26 - The open parenthesis should be in front of "Keller" rather than in front of "2011".

29201, L5- The "already" should be omitted.

29201, L10 - The "exemplarily" should be omitted.

29205, L11-13 - It would be useful here to have a short discussion of why the ln(e) is used. This is because many readers might read this paper with the idea of estimating CO2 emissions.

29206, L13 - If D is the linear model, then why is it sparse? I don't understand this.

29207, L2 - "row i of Hk" (just for clarity).

29208, L14 - Could correlated errors arising from transport errors be accounted for in the R matrix? This would de-weight the influence of the observations, of course.

29209, L24 - How was the correlation length scale chosen? Would it be the same for all emissions? For example, what if emissions from use as blowing agents is very local, but emissions from leaking refrigeration is more distributed?

29210, L10-14 - Does the iteration become necessary because of the non-linearity arising from the use of ln(e)?

29211, L14-20 - Is the parameter describing the transport error in the footprint the same for both sites? Wouldn't this differ between Mace Head and Jungfraujoch?

29213, L1-4 - How are the aggregation errors computed?

29218, L6 - Is the lower limit set by a minimum? 5kg/mˆ2/yr is not twice as low at 10kg/mˆ2/yr, so this must be the case?

29222, L22-27 - Since the locations of the coastlines are very well-know, shouldn't this be assumed as a priori information? The change for France with the coastlines accounted for is about the same as the reported increase at the bottom of page 29219, while the inversion without the coastline gives a much lower change. Could this difference be partially resolved by considering the coastlines in more detail?

29224, L19 - Add "lower" after 46% for clarity.

Figures 3,5,9 - In some of these figures it's hard to see the country outlines, particularly under darker colors. Maybe the country outlines could be thicker.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 29195, 2011.