

Interactive comment on “Inverse modeling of European CH₄ emissions: sensitivity to the observational network” by M. G. Villani et al.

Anonymous Referee #2

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General comments

I thought that the paper was well structured and highlights a good method of testing an inversion method. Testing an inversion method is vital and the use of pseudo observations is an obvious first step.

Specific comments

- 1) P.21078 what was the magnitude of estimated “model representativeness error”? why 50%?
- 2) P.21080 control vector? Please explain.
- 3) P.21082 ‘a typical boundary layer station’ – during the day this will be true (i.e. when

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you take the observations) but during the night this could very easily be above the boundary layer. Therefore can a tower be described as a boundary layer station?

- 4) P.21084 units in ppb/(kg/s) – I assume this is per grid box?
- 5) P.21084 over all of Europe but can be effective on small regions.
- 6) P.21085 All of the values are reported in this page with no uncertainty. E.g. “are 45% lower than” etc. Surely there is not one single value? With all the sensitivity analysis this is shown very clearly. I think ranges would be much more appropriate.
- 7) P.21087 MHD, CB4 and SIL all show reasonable sensitivities in this region so I think it is a bit strong to say “no observational sites”.
- 8) P21088 The inability of the method to find the emissions in the North Sea is a limitation of the need to use a priori constraints.
- 9) P21089 As individual grid cells should not be “over-interpreted” could not the inversion be performed at a coarser scale and produce similarly accurate results?
- 10) Conclusion – this method of testing is good and useful but it should be noted that not all stations can be equally well modelled in reality e.g. mountain stations, coastal station etc.

Technical corrections

- 1) P21089 “The issue is currently investigated more closely” – please re-word.
- 2) P21090 “to design and optimal” – replace “and” with “an”
- 3) P21090 "In absence" - add a "the"

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 21073, 2009.

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