**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

Interactive comment on "Methane and nitrous oxide emissions in The Netherlands: ambient measurements support the national inventories" *by* S. van der Laan et al.

Anonymous Referee #1

Received and published: 16 October 2009

General Comments

This paper uses a radon ratio method to estimate the methane and nitrous oxide emissions of The Netherlands and surrounding countries for the period 2006-2008. The paper is well written and explores some new thoughts with regards this method but is also clear on its limitations.

Specific Comments

Para 3, section 3.2, page 6: stable implies low wind speeds and low boundary layers (inversion heights), this is not consistent with increasing wind speeds especially to over 8 m/s. In this instant it is the wind direction changes that drives the event.

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Para 4, section 3.2, page 6: there is always an atmospheric inversion (boundary layer) they are just at different heights at different times. This needs to be re-worded to be correct.

Para 1, page 7: This assumes that the wind speed is constant during the transit. It should also be noted that it assumes no change in the wind speed with height, this is clearly a significant simplification. Clearly there must be some vertical mixing to mix the surface emission to the inlet height of 60m. Usually the vertical mixing is constant within the boundary layer.

Para1, page 8: The cut-off of 0.7 is arbitrary, it would be interesting to understand the sensitivity to this parameter by say calculating the emissions with say a 0.6 and a 0.8 cut-off. Para3, page 8: You could argue that by only accepting r>0.7 the impact of big point sources has been removed and therefore using the lognormal distribution is double counting this effect. I am not convinced that the median result is not a reasonable estimate. I agree that the mean is affected by outliers but the median is not. I would include the median results in table 1 as well and not be negative to this method.

Equation 2, page 9: Surely this should be applied per observation during the event as each has a different time of influence. For example if there were 3 obs in an event taken at times t1, t2 and t3, Obs at t1 could be corrected using eq2 but with tmax set to t1, similarly for the other obs. The total length of the event would only be correct for obs at the end of the event.

Page 11, para 1: Median is not heavily influenced by a few very high fluxes. In fact the median estimates agree much better to the UNFCCC inventory than the lognormal estimates.

Technical Comments

line 2, page 2: "are significant contributing" to "are significantly contributing"

para 2, pag2: change "obliged" to "encouraged"

para 3, page 3: change "data is" to "data are"

para 4, page 3: remove reference to "middle European", it does not aid understanding and is confusing.

para 4, page 3: surely easterly winds also sample continental air?

Line 2 section 3.1, page 5: remove "is used"

Para1, section 3.2, page 6: An event will also terminate when wind direction changes.

Para 1, page 7: again add "or wind direction change"

Para1, page 7: what was assumed an (un)acceptable variation in trajectory during an event?

Para2, page 7: what is the "resp." for ?

Para2, page 8: Add an extra bit to add understanding. "The Netherlands (i.e. those used in the short range analysis), as well" Section 4.1.1., para 1 page 10: change "and longer events" to " and long range events"

Section 4.1.1. , para 2 page 10: change "chapter" to "section"

Page 11, section 4.1.2.: change "similar as CH4" to "similar to CH4".

Page 11, section 4.1.2.: same comment as above.

Section 4.2, page 11: change "data which is" to "data which are".

Page 12, para 2: What baseline is used for the long range analysis. This is not made clear.

Page 13, para 2: What is "resp." for?

Page 13, para 2: Missing reference to Eckhardt 1990.

Page 14, para 2 last line: Change " asses " to " assess ".

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Figure 1: Add that met taken from top of 60m mast.

Figure 3: What do the dots signify? Hourly points on the trajectory?

References: No reference to Forster 2007 or Maas 2008 (or maybe I missed them?)

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 18867, 2009.

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