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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sulfur hexafluoride (SF_6) emissions in East Asia determined by inverse modeling" *by* X. Fang et al.

Anonymous Referee #1

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This paper aims at estimating SF6 emissions at every latitude-longitude grids as fine as 0.5x0.5 and at monthly time resoluton for alomost the whole Asia using continuous time series measurements at 3 sites, located at the eastern edge of their inversion region. On an average the major emissions footprint region barely touches the land regions (Fig. 1). Yes, occasionally the footprints do seem to be significant over the land regions too (Fig. S4). In fact, the colour scales are chosen close to logarithmic for the readers to get an impression that the footprints over wide areas are on the right half of the colour scale!

With this kind of network and footprint behaviour the authors took an audacious step to carry out such a high resolution inversion. There is nothing wrong about it (most would even support it for keeping the region aggregation error low), but to publish the derived

maps or to discuss trends in minute details are not expected in a journal publication. For me the detailed results are not statistically meaningfull. If the error bars are greater than 100% for most regions in Fig. 8, what are the errors associated with smaller regions or at 5x5 deg grids and then at 0.5x0.5 deg grids? Apparently there are some misconceptions too - did Rigby et al. estimated SF6 emissions specifically for the Japan region? What is the significance of your statement that your results compare well with theirs?

Thus I would recommend the authors to reorganise the manuscript completely and present the region aggregated results in the revised manuscript. That will avoid confusion among most of the readers, particularly, the new comers to this field of research.

======Comments above were submitted as my quick review==========

Not much has been changed in this published ACPD paper, as only technical corrections were allowed, so as my reviews.

Just a couple of additional notes: If we can track fine details about the SF6 emission increase and decrease within China at ultimate details (Fig. 8) from measurements outside the country, proposal should be extended for rethinking of the inland measurement programmes currently in operation (e.g., in Europe, USA) and/or developing optimal measurement networks.

If you are showing monthly/seasonal mean a posteriori SF6 emissions, you should show footprint maps at monthly/seasonal intervals. For saving space all sites can be combined. This will let the readers at least judge the seasonal dependence of observational constraints on the inverted emissions.

Because I could not believe in the results presented in the paper, no detail comments are provided.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 21003, 2013.