Detection and long-term quantification of methane emissions from an active landfill

Overall Comments:

This paper uses ground based atmospheric measurement techniques to asses methane emissions from a landfill. Landfills are diverse environments and relatively understudied sources of methane. Given the current global focus on methane this paper offers important and timely information about how to potentially measure emissions from a landfill. While measurements and inversion from MGL are not particularly novel, it is rare that this has been used on a single landfill and with so many measurements and therefore the overall scientific contribution is novel and important.

There are some interesting conclusions reached however I think that the authors could do a better job summarizing and highlighting results that this reviewer thinks are significant. For example, they can identify the spatial sector on the landfill where the majority of emission are coming from (A-6) however they do not highlight this as a finding. This reviewer recommends highlighting that as well as value the ABC road measurements provided in general to understanding of the spatial distribution of emission on the landfill. In addition, more discussion on the activities in each of those spatial sectors would be interesting. They also were able to discover an important aspect of measuring total emission from landfills (you need to be far enough away that your measurement is not significantly influenced by the topography of the landfill, but the increased distance means that the spatial distribution of emissions are difficult to discern.) This is also could be highlighted more.

I believe the methods are well detailed and seem valid but the reviewer is not an expert in inversion and do not feel comfortable giving critical feedback on the details of the inversions.

Overall the paper is well written and organized.

Detailed Comments:

A brief summary of results might be a nice addition to the introduction.

In section 5.1 the authors state some of the most important findings. They use the data from the ABC road to isolate what sectors of the landfill were emitting the most and then they tell us what activities were happening in each sectors. This reviewer thinks this results should be highlighted in the discussion and conclusion. Even if the actual fluxes are uncertain given the topography of the landfill.

Please add a full description in figure 8 so it can be interpreted alone.

Discussion

What activities were happening in A-4, A-5, and A-6 that would cause, what did the sniffer find in these areas. Can you relate the sniffer data, the ABC road, and the EF road data to tell one story about what was causing the methane emissions on this landfill. It seems like you have bits and pieces but it's not consolidated nicely and it is hard for the reader to get what is going on in a holistic way

It would be nice to see some discussion about what might be driving the variability in the emission observed each day from the EF road. For Example, in figure 9 why was Dec 1 so much larger than Feb 5. Is there any data on the activity of the landfill that that might explain this?
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