

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2020-1014

Anonymous Referee #4

Referee comment on "Quantification of CH₄ coal mining emissions in Upper Silesia by passive airborne remote sensing observations with the Methane Airborne MAPper (MAMAP) instrument during the CO₂ and Methane (CoMet) campaign" by Sven Krautwurst et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1014-RC2>, 2021

The manuscript "Quantification of CH₄ coal mining emissions in Upper Silesia by passive airborne remote sensing observations with the MAMAP instrument during CoMet" by Krautwurst et al report on coal-mine related methane emissions in Upper Silesia. The manuscript is well written and presents an analysis of a highly relevant European region in terms of methane emissions, which totals almost 1Tg/yr (if I am not mistaken). Thus, the paper is certainly worthwhile publishing. I do have a few minor comments/suggestions for improvements, as outlined below. I also want to apologize for the delay, there is no good excuse for this apart from increased absent-mindedness during the Pandemic.

Minor comments:

While the paper is very well written, I sometimes had the feeling that the narrative is overly long, with relatively low information density at times. This is admittedly a rather vague point and I can't put my finger on how to exactly address this but I would urge the authors to just go through every sentence and see whether some parts can't be explained more concisely or even be removed.

Line 33: "atmospheric surface temperature" which is it? Also, the surface temperature is related to Climate, why not just skip it here?

Line 67: 820kt CH₄/yr, to make it easier, you could also state the equivalent total in units of ktCH₄/hr in brackets

Lines 109-114: Why describe all the details about things that aren't being used here? This is your specific study, not a general campaign report overview. For the sake of general readers, just focus on topics relevant to your study and shorten/cut the rest, it will make

it much easier to read (at times it reads like a campaign overview report)

Line 123: back scattered. Suggest to change to "reflected"

Line 126: Please provide the relevant numbers for MAMAP in terms of total FOV (and across track pixel size) as well as integration time (and this along-track pixel size)

Line 149: Well, you also measure methane above the aircraft. also, what does "typically" mean in this context here? Are there untypical conditions in which you rotate the aircraft upside-down?

Line 209: Speaking of units, shouldn't you have a "CH₄" in there as well related to your "t"?

Line 254, Consequently, ...

Line 258: "The annual emissions". from CoMetv3? Be specific

Figure 5 (and previous ones): I sometimes had a hard time orienting myself as to where these submaps are located on the larger maps (2++) in the beginning. I am not sure how to salvage thus but it might be easier to use identical lat/lon ranges for almost all subplots here, even if a few details are lost. at least a-e can be done that way. In addition: You plot each measurement as a circle, which all overlap in most plots. Can you actually plot them in a way that they won't overlap (or leave gaps as in b)? This would make the along-track gradients more obvious? The color-scale is also a bit unfortunate, all I can basically see is no, medium, high methane, with almost no chance of further degradation. Why have a symmetric value-range if there are almost no negative values? What are the highest values overall (most pixels are saturated). This figure is a key and powerful plot, all your main results (or the basis of them) are located here and I have the feeling that I just see necklaces that switch colors from green to red. Consider <https://colorbrewer2.org/#type=sequential&scheme=OrRd&n=9> (or similar) and make sure not most values are saturated please.

Line 376: Hourly emissions: This is very interesting! Any chance you can create time-series of those? Are there Day/night variations?

Line 481: Is this sentence relevant for your study here? Please make your science topic the core of the paper, not other future instruments or envisioned studies. (a few of these

comments are OK but given that the paper is long and the message relatively simple, it could be more concise imho).