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Comment on acp-2022-243

Anonymous Referee #2

Referee comment on "Factors influencing the temporal variability of atmospheric methane emissions from Upper Silesia coal mines: a case study from the CoMet mission" by Justyna SwolkieŃ et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2022-243-RC2>, 2022

Review of SwolkieŃ et al., Factors that influence the temporal variability of atmospheric methane emission from Upper Silesia coal mines: A case study from CoMet mission

General comments

The work presented here includes a methodology for estimating methane emissions from mining ventilation shafts using a methane fire teletransmission monitoring system which would be useful to publish, as it could be widely applied to other mining sites and improve emissions quantification. It also addresses the temporal variability in mine emissions which it is important to consider in future measurements of fluxes.

Specific comments

In the introduction the explanation for the motivation for this work could be improved. Are there discrepancies between the inventories and top down studies for this source? Is this a demonstration of a method for emissions quantification that could be widely used in other mines?

I think a little more information could be given on the sensors used to make the methane measurements. Many readers will be unfamiliar with the types of sensor used in the SMP-NT/A monitoring systems. Are the large fluctuations in concentrations at individual sites real, or related to measurement precision? Is there any potential to use other higher precision sensors for methane concentration measurements? Would there be much gain in doing so?

Technical comments

There are a number of grammatical errors throughout this manuscript that should be corrected before publication to make it clearer to the reader.

Line 22 – add 'the' before CoMet

Line 29 – what was the uncertainty in the number 142.68 kt/yr?

Line 29 – officially (correct spelling)

Line 34 – change 'in the' to 'are'

Line 43 change 'is' to 'are'

Line 60 – change 'involve' to 'are used to create'

Line 72 – add 'the' before European and before E-PTR

Line 83 – not clear what you mean by 'both' – do you mean both top down and bottom-up

Line 110 – do you mean individual rather than particular?

Line 138 – for which year?

Line 139 – add 'the' before 'country's'

Line 144 – what is meant by the levels of methane concentrations – is that atmospheric

methane concentrations, or concentrations within the mines?

Figure 1 isn't a particularly useful figure, these numbers could just be given in the text.

Figure 2 needs a more detailed caption to explain it. How was methane emission found in the previous studies. Could you add a scale to the map?

Figure 3 – synclinal not syncinal

Line 193 – what is meant by 'the last parameter'?

Line 299 – this is an incomplete sentence

Line 306 – I think you give the dates of the CoMET mission 4 times in the paper – it doesn't need repeating.

Line 307 – 'preparatory' not 'prepatory'

Line 320 – what is the reference for these emissions?

Line 329 – sentence doesn't make sense. Delete 'employs'?

Line 342 – do you mean high frequency concentration measurements would be a helpful tool to measure emissions?

Line 371 – what is the high and low concentration range?

Line 390 – what is meant by 'joint exhaust'?

Figure 5 – pressure not preassure (in 2 places)

Figure 6 – it would be useful to annotate this.

Equation 2 – how can it go from m^3/min on the left hand side to m^3/s on the right hand side (need to add a conversion factor)?

Line 427 – ventilation (spelling)

Line 434 – than not then

Line 435 appropriate (spelling)

Line 436 – analyses (spelling)

Line 453 – mentioned (spelling)

Is the air flow velocity sensor in the middle of the flow. Does it make any difference if it's positioned near the edges or not?

Table 2 – why are some concentration measurements hourly and some daily averaged?

Figure 9 – most of the measurements have 0.1% precision, but there are some measurements that appear to have a smaller precision. Why is this? Is there any information available about operations at the mine that would account for some of the variability seen?

In table 4 it's not clear why 2 of the sites have 2 different values in the temporal data column. i.e. it looks like there are 2 measurements for Zofiówka and Knurów. I think you've grouped together some of the shafts and added their emissions in the second column but that needs to be clearer.

Line 631 – according to table 4 some of the mines had emissions lower than 60.02 kg/min. Where did this number come from? I think these are the 2 highest emissions of

the mines, not the range in emissions.

Line 647 – from not form