

We thank the reviewers for their comments. We hope that we have addressed these concerns appropriately. Our point-by-point response is given below, highlighted as blue text.

Reviewer 1

The authors have clearly addressed each point posted by two reviewers. I recommend it to be published after minor changes.

1, Line 36: I assume that “CH₄ mixing ratio” here is “XCH₄”.

No, here we are describing the observed mixing ratios measured at the tall tower measurement sites, so XCH₄ is not appropriate in this case.

2, Figure 3: Some lines for BIR and HTM are truncated. Why not show the whole range?

We did consider this option and there are advantages and disadvantages in both cases. We have now updated the BIR panel to show the whole range. However, we prefer to truncate the y-axis at HTM so that the observed variations (black line) can still be clearly seen. This would not be the case if we extended the y-axis further.

3, Line 353: “in inaccurate” should be “inaccurate”

Yes, thank you.

4, Line 420: If I remember correctly, Saunio et al. (2020) built a bottom-up emission inventory at a resolution of 0.1°.

Yes, they record a bottom-up estimate for fossil fuel emissions of CH₄ of ~135 Tg yr⁻¹. We have adapted the sentence as follows:

“According to Saunio et al. (2020), total global CH₄ emissions from fossil fuels amounted to 108 Tg (top-down estimate) or 135 Tg (bottom-up estimate) in the year 2017, approximately 300-370 Gg day⁻¹.”

5, Line 430: I don't get the idea why the authors added “These values are close to the value used in the ‘modelled’ prior, based on the work by Poursanidis et al. (2024).”

Does it help to better explain the conclusions than previous version?

We have updated this sentence to clarify:

“These values are close to the value used in the ‘modelled’ prior, based on the work by Poursanidis et al. (2024), indicating that their model provides a good overall estimate of the flux totals.”

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Reviewer 2

I think the authors should specify (e.g. in the introduction) that the NS1 and NS2 pipelines are in fact double pipelines (so four pipelines in total). I do not think this is currently mentioned in the manuscript, however, it should be.

Yes, this is true. We have now included this information on line 46:

“The network is made up of two sets of double pipelines (NS1 and NS2; i.e. four pipelines in total), each originating in Russia and running through the Baltic Sea to Lubmin, Germany (Figure 1).”