

## **Report 1**

« I am happy with the revision and think that this paper will make a valuable contribution. I congratulate the authors on their work.

My only comment is that, in the revised manuscript, the title is no longer grammatically correct. I suggest:

Quantification of uncertainties in the assessment of \*an\* atmospheric release source \*applied\* to the autumn 2017 106Ru event »

The title has been modified. We thank again for his/her kind words, constructive comments, and technical corrections the reviewer.

## **Report 2**

« Very nice revision of the manuscript, see few technical comments:

p. 20, l. 442 and 445: I suggest to use "the first step" and "the second step".

p. 20, l. 449: Finally, in order to incorporate into the sampling process the uncertainties related to the meteorological fields and the transport model,... --> Finally, in order to incorporate the uncertainties related to the meteorological fields and the transport model into the sampling process,...

p. 22, l. 461: missing i in "meteorological"

p. 29, l. 647: Please, cite the published version, see <https://doi.org/10.5194/amt-14-803-2021> »

Technical corrections have been applied. We thank a lot again for his/her valuable comments, technical corrections and recommendations the reviewer.

## **Report 3**

We thank again for his comments Dr. De Meutter.

## **Report 4**

« The manuscript is improved, particularly by clarifying the language around key points throughout, and by adding content to the summary and conclusions. I think it is fit for publication as is (so long as the technical corrections are made).

Specific Comments

Section 1.2: Just a suggestion, but I think a hint at what strategy you will use for weighting ensemble members is appropriate here. The reader cannot tell whether you will do something ordinary or novel. »

We have added :

"We proposed in this paper a new technique to estimate the weights associated to the ensemble members."

« Line 117: Your argument against a Gaussian likelihood is still a little bit wanting, in my opinion. When you say that "We think that the whole measurement set should bring information" what

you are really saying is that it is more important to learn from a larger count of measurements than it is to learn from the smaller count of the largest errors. Or that relative error is what matters. Those are not self-evidently true, to me. So I think you should provide some concise statement about the benefits of learning from a larger number of observations (less sensitive to outliers?), or just say that it is worth testing. »

We have added

"The whole set of measurements should provide information: if the inversion is dominated by the few measurements with the largest errors (which may possibly be outliers), valuable information provided by the other measurements may be missed."

« Technical Corrections

Line 10: "suitable" instead of suited

Line 372: Correct typo and clarify what you mean

Line 441: Indent and expand this paragraph? Or combine it with the following paragraphs. »

Technical corrections have been made. Thanks a lot. Previous comments have been checked and taken in account as well.

For line 372, we have added

"Therefore, the variances are only representative of observations with high uncertainties in their subset."

We thank again the reviewer for his/her comments/revisions that improved the quality of this manuscript.