

Atmos. Chem. Phys. Discuss., referee comment RC3
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Comment on acp-2020-1129

Ondřej Tichý (Referee)

Referee comment on "Quantification of uncertainties in the assessment of an atmospheric release source applied to the autumn 2017 ^{106}Ru event" by Joffrey Dumont Le Brazidec et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1129-RC3>, 2021

The manuscript presents interesting study based on estimation of atmospheric release from ambient concentration measurement coupled with atmospheric model. Few prior models of a release are presented, discussed and evaluated on Ruthenium 106 case from 2017. Here, there is consensus on release location and approximate release time-profile which makes this case very interesting and a playground for model testing. The manuscript is nicely written and clear to understand. What I lack is clarification and verification of some statements. I also recommend to extend conclusion (or discussion) by some suggestions and recommendations for future cases, see specific comments below. In sum, I would recommend the paper for publication after these clarifications.

Specific comments:

p. 5, line 115: Although I understand the importance of lower values in measurements, there might be a good reason for high significance of higher values since they may bring more confident information with lower uncertainty, especially in case with spatially and temporally long transport.

Figure 2: I am curious whether similar results are obtained for latitude. Considering the dominant direction of the atmospheric transport is probably in longitude axis, it is maybe different in latitude axis. Please, comment.

p. 14, line 375: Regarding temporal profiles of the estimated release, what is exactly the time-resolution of the posterior, is it one day? Is it possible to plot the release profiles somehow, e.g. using medians or similar? Did you estimate some significant activity also in other days except 25th and 26th September?

p. 17, line 398: Could you please clarify the choice of reference source in [60, 55] while

Ozyorsk (near where the plant is located) is located at 60°43' E 55°45' N and modelled spatial resolution is 0.5 degree? Shouldnt it be closer point [61.5 55.5]? Or maybe you have different numbering, please, clarify.

In general, I lack discussion and recommendation what settings should one choose when situation similar to the Ru-106 case occur in the future and, let say, one location and one total of the release need to be reported. Also, are your findings rather general, or case specific?

Technical corrections:

p. 3, line 63: S should be defined in term \mathbf{y}_S , probably S th obsevation

Eq. (2): the \mathbf{x} is used as the source term previously while \mathbf{q} it is used here. Please, clarify whether they are the same of have different meanings.

Eq. (5a-5c): norm with two indexes in subscript should be defined (although clear for many readers, for many may not).

p. 5, line 141: "Secondly, a location term appears..." I am not sure what you mean by this statement, please, clarify.

p. 6, line 163: there sould be (5c) instead of (6), probably.

Figure 8: there are missing labels (a) - (f) in subplots.