To
Editorial support team
Copernicus Publications

12 July 2023
Answer to reviewers for **egusphere-2023-245**

Anonymous Referee #1, 26 May 2023:

Hanfland et al. present an extensive evaluation of a Lagrangian radionuclide transport model, incorporating sensitivity analyses, tests of adherence to the well-mixed criterion, and comparisons against real-world observations downwind of power plant emissions. Overall, the analyses are solid and the presentation is fine.

I only have minor comments before suggesting the paper for publication:

Answer to Reviewer #1:

We thank the reviewer for her/his interest in the presented paper and his/her help to improve the quality of this manuscript.

We answer the comments below.

Comment 1: Line 15: reword to "allow evaliation of model performance"

Answer to Comment 1: Corrected.

Comment 2: Line 95: "Sensitiviy analysis (SA)..."

Answer to Comment 2: We thank the reviewer for his/her comment which results in a better understandability of the text. We added the abbreviation in the text.

Comment 3: Line 171: "correspond to typical"

Answer to Comment 3: Corrected.

Comment 4: Line 346: what is meant by "quite high"?

Answer to Comment 4: We apologize for this imprecise formulation. We replaced it by "with source heights of mainly 100 m to 200 m" in the text to make the meaning clear.

Comment 5: Line 386: "As tracer 14C in its bounded form as CO2 is used" doesn't seem to make sense

Answer to Comment 5: We corrected the formulation to "As tracer CO_2 with the radioactive isotope ^{14}C is used.". In combination with the previous sentence it makes clear that ARTM only works with predefined radionuclides that may appear in different chemical compounds.

Comment 6: Line 459: "simulations' uncertainties"

Answer to Comment 6: Corrected.