

Interactive comment on “An inverse modeling method to assess the source term of the Fukushima nuclear power plant accident using gamma dose rate observations” by O. Saunier et al.

Anonymous Referee #3

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This paper describes an estimation method of source term in a nuclear accident by using gamma dose rate measurements. The method is very useful for emergency situation where sufficient information cannot always be provided. The authors applied this method is applied to the atmospheric discharge of radionuclides during the accident at the Fukushima Dai-ichi nuclear power plant in 2011 and the validity of the estimated source term was checked with proper comparison of air dose rates, concentration and surface deposition between calculations with the source term and measurements.

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Although the paper is well written, comments for better understanding of this research (except for those by other persons) are as follows;

- 1) Page 15574, Line 5-6 and Page 15581, Line 12: Definitions of parameters in equations should be provided clearly. For example, E , m_1 , k_1 , and I .
- 2) Page 15587, Line 15-17 and 25-27: Line 15-17 “From 15 March onwards, the simulations significantly underestimate the dose rates of the North zone monitoring stations close to the Pacific coast and overestimate those of the stations further inland” and Line 25-27, “The fact that the results for the stations located on both sides of the mountain area (see Fig. 6) are incompatible is due to the distance and time lag affecting the precipitation and wind data” – It is difficult to understand that which graph in Fig. 6 the above descriptions explain.
- 3) Page 15589, Line 16-19: “On average, the ^{136}Cs activity concentrations are slightly overestimated by a factor of 2 to 3, and the simulation results are most consistent with the measurements in the case of ^{137}Cs . The ^{131}I activity concentrations are overestimated but remain within a factor of 2 of the observations.” – This description dose not correspond to Fig. 7. If you explain overall feature, other comparison results such as scatter plot will help readers to understand it. The same can be said for comparison of surface deposition in Section 4.2.3.
- 4) Table 2: Total emissions estimated by Terada et al. (2012) may be wrong. For example, the release amount until 31 March of ^{131}I and ^{137}Cs are 1.2×10^{17} Bq and 8.6×10^{15} Bq, respectively in Hirao et al. (2013).
- 5) Table 3: Explanation of “Quality index” should be provided in the caption as well as in the text for better readability.

Reference

Hirao S., Yamazawa H., and Nagae, T. (2013): Estimation of release rate of iodine-131 and cesium-137 from the Fukushima Daiichi nuclear power plant. J. Nucl. Sci.

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