Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2016-270-RC3, 2016

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term assessment of airborne radiocesium after the Fukushima nuclear accident: Re-suspension from bare soil and forest ecosystems" *by* M. Kajino et al.

Anonymous Referee #1

Received and published: 21 May 2016

The paper assesses redistribution events of Cesium from different sources in Japan in the following years after the Fukushima accident. It tackles the scientific topic very well from many different directions and I think it would be suitable for publication to ACP.

I have some minor comments / suggestions that I hope they would help the authors to make this publication more comprehensive to the readers.

Specifically,

- Page 1, Line 20 (hereafter it will be P1,L20): Substitute "the contaminated ..." to "a contaminated"

- P1,L22: "The assessment period ... 2012". I don't understand what you mean here.

The assessment period is 2013, but the field experiments were carried out in December 2012?? Could you please clarify?

- P2,L3: Correct "to reducing" to "in reducing"

- P2,L11: Put a full-stop after "remain unknown". Continue the sentence as: "This is the first study that provides a crude estimation ..."

- P2,L12: In the next sentence correct as: "Additional research activities on this direction are needed ..."

- P3,L6: Add the recently released reference after Draxler et al.(2015): Kristiansen, N. I., Stohl, A., Olivié, D. J. L., Croft, B., Søvde, O. A., Klein, H., Christoudias, T., Kunkel, D., Leadbetter, S. J., Lee, Y. H., Zhang, K., Tsigaridis, K., Bergman, T., Evangeliou, N., Wang, H., Ma, P.-L., Easter, R. C., Rasch, P. J., Liu, X., Pitari, G., Di Genova, G., Zhao, S. Y., Balkanski, Y., Bauer, S. E., Faluvegi, G. S., Kokkola, H., Martin, R. V., Pierce, J. R., Schulz, M., Shindell, D., Tost, H., and Zhang, H.: Evaluation of observed and modelled aerosol lifetimes using radioactive tracers of opportunity and an ensemble of 19 global models, Atmos. Chem. Phys., 16, 3525-3561, doi:10.5194/acp-16-3525-2016, 2016.

- P3,L14: "... are of particular concern." Add the reference before the full-stop: Evangeliou, N., Balkanski, Y., Cozic, A., Møller, A. P. (2014), "Global and local cancer risks after the Fukushima Nuclear Power Plant accident as seen from Chernobyl: A modeling study for radiocaesium (134Cs & 137Cs)", Environment International, 64, 17–27.

- P3,L21: Put "Tsukuba" in parentheses instead.

- P4,L7: You say that you considered sources (1) and (4) in your study. But source (4) refers to releases from the Chernobyl sarchofagus, which is a different thing comparing to the situation in Fukushima. So, how did you considered this source in your study. I think you must reformulate your sentence here and make it clearer.

- P4,L9: Change "low chance of ..." to "low risk of ..."

- P4,L22: "The current study is the first but crude estimation of the spatial budget ...". You said the same in a previous line in the ABSTRACT. Please remove or change your sentence.

- P4,L30: I am not sure if this 4-line paragraph is needed in the beginning of each chapter.

- P7,L9: Change "... a maximum estimate of 137Cs ..." to "... the upper boundary of 137Cs ..."

- P7,L17: Please move the web reference to the list of references at the end of the manuscript

- P8,L17: There is a mesh with your figures and the way they are placed in the text. First of all, I think that ACP requires format of the full word inside the manuscript, so instead of "Fig." you should change to "Figure" everywhere in the manuscript. Second, Figure 4a is referred in this line, but Figure 3 is referred after!!! This is completely confusing. Either change the sequence of your figures, or reformulate the text. I noticed this may happen more than once, so you need to scan the manuscript carefully.

- P8,L30: "Unlike re-suspension from soil, precipitation might not suppress re-suspension from the forest ecosystems since substantial amounts of K-containing particles were observed in the wet season in the Amazon (Pöhlker et al., 2012 and references therein)." Could you please explain this further and link it a little bit more to the paragraph? It does not seem relevant or I am having trouble to understand it.

- P10,L8: Since you speak about measurements, I think you must be more precise. You only mention that "At both sites,ambient aerosols were collected using a high-volume air sampler and 134Cs and 137Cs concentrations were obtained by γ-ray spectroscopy using a Ge semiconductor detector." YOU MUST MENTION: (1) Relative efficiency of the Ge detector relative to NaI, (2) Resolution energy at the photopeak of 60Co, (3) How the energy calibration was performed, what range of energies was covered and

what the resolution per channel was, (4) How the efficiency calibration was performed, what radioactive solution was used, who the provider was, (5) what the geometry was, (6) what the measurement time was, and (7) what the relative statistical error of your measurements was.

- P11,L13: Change "scattergram" to "scatterplot". In the same sentence change also "the observational and simulation results, respectively" to "the simulation results and observations" and remove "respectively".

- P11,L17: Change "employs" to "uses"

- P12,L3: Change "a quarter to one third" to percentages

- P12,L4: Change "sixty percent" to "60%"

- P12,L10: "After the screening ...". How did you perform the screening? I am afraid I did not understand that. Could you please explain it better inside the paragraph in order to be clearer?

- P13,L5: "The model successfully reproduced ...". I think you need a more moderate sentence here. Your results are in a logarithmic scale and the discrepancies are rather large to say that your model reproduced the plumes well. I am quite sure that if you perform the same comparison as a scatterplot and not as 2 timeseries, you will see that there is no correlation at all. But I admit that it is rather difficult to reproduce the plumes much better. Please reformulate though!

- P13,L16: "Note that resuspension flux ...". This is a bit obscured or I have miss it from the text. Please explain and rationalise your decision to multiply by a factor of 10 here.

- P15,L1: Change "... total deposition amount ..." to "... total deposited amount ...". Please do the same in the next sentence as well.

- P15,L7: Please explain the unit %/y2. I do not understand its meaning.

- P17,L23: Change "Eighty to 90% ..." to "80 to 90%"

- P18,L27: Put the web reference to the list of references.

- P18,L31 and everywhere in the text: Change "... toward ..." to "... towards ..."

- P19,L7: Change "... from the biota ..." to "... from biota ..."

- P20,L7: The conclusion number 2 starts with a sentence that goes on for more than 3 lines. This huge sentence makes the meaning being hard to follow for the reader. Please reformulate this sentence and split it to smaller sentences.

- P21,L3: "toward" should be changed to "towards"

FIGURES

- Figures 1 & 2: Please make them coloured like the rest of the contour plots you have in the manuscript.

- Figure 5: Change "scattergram" to "scatterplot" in the caption

-Figure 7: Could you please sum up all the resuspension sources (blue, red, green) and compare the result with the observations? It would be good to show this in a scatterplot IN ADDITION to the existing Figure 7. You can plot it below or on the right of Figure 7.

- Figure 9: Change "Time series of (black) the observed and (colors) the simulated 137Cs ..." to "Time series of observed (black) and simulated (colors) 137Cs ..." in the caption

- Figure 11: Change "... were run ..." to "... ran ..." in the caption

- Figure C1: You should probably consider putting Figure C1 as Figure 12 or include it to a supplementary chapter together with the Appendix, but this is up to the ACP journal.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-270, 2016.