

Interactive comment on “Depth distribution of radiocesium in Fukushima paddy fields and implications for ongoing decontamination works” by H. Lepage et al.

Anonymous Referee #1

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General Comment:

This is an interesting and well written article presenting a study investigating the influence of land use management, soil type and SOC content on ¹³⁷Cs depth distribution in contaminated soils near Fukushima Dai-Ichi Nuclear Plant. This is novel research as it has clearly the potential to contribute significantly to our understanding of how ¹³⁷Cs migration in soil's depth profiles. Moreover, the outcomes of this study are very relevant in the domain of health (food) security, especially as the transfer of ¹³⁷Cs contamination to crops (rice) is considered and the authors translate the scientific output to specific soil management measures combatting potential ¹³⁷Cs contamination risks.

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Although I strongly believe that this article is acceptable for publication in SOIL-journal I would like to communicate following specific comments.

Specific comments:

L46: Is it possible to mention here as well the average background value of ¹³⁷Cs in the region i.e. before the nuclear incident happened, so related to ¹³⁷Cs fall-out due to bomb-testing. (I guess it is ca. 100 Bq/kg as indicated in L136?)

L53: Including a map showing the land use / land cover in the catchment would be nice (but not necessarily)

L70: Can you specify what is meant by “amorphous minerals”?

L86: Do you have an idea of the spatial distribution of precipitation in the study area.

L99: Are these locations close to each other? (e.g. within X meters of each other?)

L104-105: It's not entirely clear what the authors mean with this sentence. From seeing table 1 I guess they did select fields along a wide range of dose rates? Please clarify.

L 110: how did you obtain “density of the soil”. I guess you took undisturbed soils by hammering in a cylinder in the soil so the sample's volume represents exactly the in situ soil's volume and hence by dividing the mass of the sample by the volume of the sample you obtained the density? Please clarify.

L125-128: I guess the “dry combustion” method (using an element analyser) was used to analyse TOC. It's good to use this term (as it is widely used in international literature and so there is no need to mention all these technical details.

L 149-156: “So ¹³⁷Cs in rice is 1% of that in the soil (up to 15 cm)”? I guess this is a much shorter way to explain this section.

L165: Are you sure about “tilling by heavy farming machinery”? Because if so I would expect to find ¹³⁷Cs even deeper than 5cm (i.e. a homogenous ¹³⁷Cs value up to

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20-30 cm).

L 166-168: How did it decontaminate? Did people remove the topsoil layer or was it eroded?

L169: "fully disturbed" so classified as "tilled"? Please specify

L172-173: So it might be worth to consider in the future a greater sampling depth? (e.g. when conducting a resampling campaign)

L176: How did you distinct tilled soils from managed soils? Is it based on the 137Cs depth profile results are is it based on information of actual land management practices?

L183: "e.g. Tanaka et al. 2013"?? I yes, please ad this reference.

L186-189: Did you make graphs plotting TOC versus alfa-parameter? Because r is a linear correlation coefficient and hence it's trill possible that there is a (strong) relationship between TOC and the alfa-parameters but a non-linear one.

L190: What kind of differences do you mean?

L190: With "soil group" you mean "Andosol" versus "non-Andosol"?

L199 – 201: Can you explain why?

Line 204 "These fields" = P1, P3 and P10? (or as well P8, i.e. not clear from the context – especially, after reading the previous sentence)

Line 209: Not sure how I can obtain this information about migration in top 3cm from table 3? Is it the alfa-coefficient?

Line 220: So SOC is not importantly related to migration. I think you should underline that fact here as well. Do you know other studies relating SOC with migration in this region? If yes, it would be good to compare your results with them (enriching your discussion).

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L 225: But 10-15 cm 137Cs value is probably lower than that in the 5-10 cm layer. So, you may make an over-estimation. But I can see that this won't affect the results in a large extend, especially given the fact that it's only 1% you will add. Nevertheless, I think it is worth to clarify this.

L259: Do you mean: "contaminated soils that has been eroded, transported and deposited on top of already decontaminated soil?"

L263-265: I suggest deleting this first sentence as in a conclusion one should only repeat most important results (not study aims ect. . .)

L279: I guess it will be good to specify here that you recommend (based on your results) "at least 15cm" (see Line 240)

Table 2: It would be good to add a column to the table giving the "soil Type"

Figure 1: This is a nice map, but it might be a good idea to integrate altitude, i.e. by contour-lines. The contour-lines can be in brown and the rivers/streams in blue (in order to make clear distinction between both).

Figure 4: Why is there a dotted line in the "undisturbed soils" (representing the fitted depth distribution) but not in the "managed soils"? Because in Table 2 you indicate that you fitted depth distributions in both (i.e. given by alfa and h0 parameter values)

Interactive comment on SOIL Discuss., 1, 401, 2014.

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