

## ***Interactive comment on “The effects of topography and soil properties on radiocesium concentrations in forest soils in Fukushima, Japan” by Misa Yasumiishi et al.***

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Dear Referee #1 First of all, thank you so much for providing us your valuable comments. I will answer your comments below. The final manuscript will be revised, reflecting these answers.

1. In Abstract, 1 sentence. When the soil samples were collected? Better to add the years. As I understand from text, they are: 2016, 2017 and 2018.

Answer: Yes, that is correct. I will add the years to the abstract.

2. 3 line of Abstract. Instead “accumulation” better “distribution”.

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Answer: I will revise it.

3. LL 45. “Once released, Cs-137 takes two pathways in the environment. It may be dissolved in water (Iwagami et al., 2015; Osawa et al., 2018; Sakuma et al., 2018; Tsuji et al., 2016) or adsorbed into soil particles”. I suggest change to “Once released, Cs-137 may be dissolved in water (Iwagami et al., 2015; Osawa et al., 2018; Sakuma et al., 2018; Tsuji et al., 2016) or adsorbed into soil particles”.

Answer. I understand that you thought that ‘takes two pathways’ was too definite. I will revise the expression.

4. Section 2.1. In my opinion, at the Site description the additional information is required and need some rewriting. In the beginning, better to show clearly which type of trees are covered the study area (in present version is could be found only in the middle part of section) and their Latin names, their average height and density; which types of soil are presented in study site; the angles of slopes (their range and values), as well m.a.s.l.

Answer: Thank you for pointing out. I will provide additional information as much as possible. With regard to the trees, below is an excerpt from my dissertation draft. I will add forestry information from this part as well as additional data based on my observation and public record.

“These forests are not all ‘natural’ or ‘native.’ The Japanese government began tree-planting and land management projects in the late 17th century to mitigate the over-harvesting of lumber and land degradation due to the country’s increasing population. Two types of trees that the government recommended for planting in northern Japan were cedar and Japanese cypress (Ministry of Agriculture Forestry and Fisheries, 2013). In the study site’s forests, a few wooden sticks indicate when the most recent planting projects were completed and the number of trees planted. On the longest slope, where most of this study’s samples were collected, 6,300 cypress saplings were planted in May 1998, and the planting area was 1.81 hectares (18100 m<sup>2</sup>). On the

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hills on the east side, 74,100 red pine saplings were planted in April 1965, and the planting area was 14.83 hectares (148300 m<sup>2</sup>). In the region, there has been a history of charcoal production from the forests. According to a local farmer, the area was once cleared as pasture, and the forest hills were used as grazing ground for cattle. Cattle are still raised in the lowlands in this region. Whether the land-use history of the forests affects radionuclide behavior is an important question. However, since the radionuclide fallout happened recently, and no major forestry work (e.g., new planting) has been conducted since the accident, land-use history is not considered in the subsequent analysis. It would be interesting to compare radionuclide behaviors between 'natural' and 'planted' forests in future research."

5. LL. 120. I guess "however, the FDNPP is not visible from this ridge" could be avoided. The FDNPP difficult to see from 35 km.

Answer: I will delete the sentence. My intention was to demonstrate that there are natural obstructions (mountain ridges) between the plant and the study site. But I agree that the sentence was unnecessary.

6. Fig. 5c. On some of the contour lines need to add the values. Also if possible - the Bergstrich lines. Much better if the maps are shown with a coordinate grid or put in the corner of maps the coordinates.

Answer: A good point about the contour line values. I will add them. Regarding the coordinates, I intentionally did not add them. A farmer personally owns the study site. As you see in the manuscript, the contamination levels are high in the plot, and I do not want the farmer to suffer negative consequences because I disclose the exact location. If someone tries to find out the location, it will not be difficult (and some people know where the site is). But I would like to refrain from printing the exact coordinates.

7. LL. 175. ". . .dried in an oven for about 24 hours at 105\_C." I hope that this time were enough for drying. You could add that the samples were dried till constant weight.

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Answer: I did extended drying time for very wet samples. I will provide additional statements about drying procedure.

8. LL. 195. "In the top layer, the average water content percentage was above 100 % because some samples were very moist." Probably is a mistake. For example, the field capacity of soil is average 30-50% and depends of soil texture. The field capacity is a moisture of "wet" soil, 2-3 days after rain or irrigation.

Answer: Thank you for pointing out. Maybe I should not have used the term, 'moist.' Those soils were collected in wet areas, so they did contain those percentages of water when I measured their weights before drying. To make it clear, I can change the sentence to 'because some samples were collected in wet areas and contained water exceeding field capacity. All samples were weighted as collected in the field before drying.' I could have set aside those samples and let excess water evaporate for a few days. However, that would not reflect the natural condition. So I decided to go ahead and measure them.

9. Table 4. In the name of table ". . .in this article" could be avoided. The sentence could be changed to "Soil properties of the studied samples by depths."

Answer: Thank you. I'll change the title.

10. Table 4. Average water content (%). Does the values are correct? 1.22% is very dry for "wet" soil. It is near to hygroscopic moisture of soil.

Answer: Thank you for pointing out!! I'll remove the decimals. Sorry, it was an error.

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