Referee 1

Comments from Referee	Author's response	Author's changes in manuscript
L46: Is it possible to mention here as well the average background value of ^{137}Cs in the region i.e. before the nuclear incident happened, so related to ^{137}Cs fall-out due to bomb-testing. (I guess it is ca. 100 Bq/kg as indicated in L136?	Background value of ^{137}Cs before the accident were under 100 $Bq.kg^{-1}$. This information was added	In this region, background levels of ^{137}Cs from fallout from atmospheric nuclear weapons testing were estimated to be under 100 $Bq.kg^{-1}$ (Fukuyama et al., 2005).
L53: Including a map showing the land use / land cover in the catchment would be nice (but not necessarily	A land-use map and an elevation map were added to Figure 1.	See Figure 1
L70: Can you specify what is meant by "amorphous minerals"?	An amorphous mineral is characterized by the absence of a defined crystalline shape. We provided examples in the text (i.e., allophane and imogolite).	[…] the high amount of amorphous minerals (absence of a defined crystalline shape - e.g. allophane or imogolite) in these soils (NIAES 1996; Vandebroek et al., 2012).
L86: Do you have an idea of the spatial distribution of precipitation in the study area.	No, there are only two rainfall stations available and the rainfall depths were similar at both stations during the study period.	
L99: Are these locations close to each other? (e.g. within X meters of each other?)	Dose rates were measured within 10 meters of each other, we added this information.	To be representative, dose levels were measured at 5 different locations on each field within 10 m^2.
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.	Rephrased.	We selected the fields to cover a range of dose rates (low, medium and high) in order to investigate migration of radiocesium in fields with different levels of contamination (Table 1).
L110: 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.	Density of the soil was determined by dividing the dry soil mass in each layer by its volume determined from the diameter of the soil auger and the thickness of the layer. This information was added to the text.	Density of the soil was determined by dividing the dry soil mass in each layer by its volume determined from the diameter of the soil auger and the thickness of the layer.

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.	This section was removed and measurement of TOC was detailed in the section dealing with sample collection and preparation using “dry combustion” terms.	Total organic carbon (TOC) content in soil was measured with the dry combustion method (VarioTOC, Elementar, IRSN/LAME, Fontenay aux Roses, France).
L 149-156: “So ^{137}Cs 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.	Rephrased.	Endo et al. (2013) investigated the Transfer Factor (TF) from contaminated soil to rice in the vicinity of the FDNPP and estimated that ^{137}Cs activity in polished rice is 1% of that in soil.
L165: Are you sure about “tilling by heavy farming machinery”? Because if so I would expect to find ^{137}Cs even deeper than 5cm (i.e. a homogenous ^{137}Cs value up to 20-30 cm).	In both tilled soil cores (P2 and P4), contamination was similar with depth but we observed a small difference between layers (approx. 200Bq.kg^{-1} – see supplementary material). In order to confirm that P1 was tilled, we should have collected deeper layers as level of contamination was very low (< 100Bq.kg^{-1}). To avoid misunderstanding, we removed this sentence	
L166-168: How did it decontaminate? Did people remove the topsoil layer or was it eroded?	Complementary information was added, these fields were decontaminated during the remediation effort that was concentrated in this area (probably in 2012)	According to Fig. 1, this field was contaminated following the dispersion of contamination, but it has been decontaminated by remediation efforts as the core displays ^{137}Cs concentration levels < 100 Bq.kg^{-1}.
L169: “fully disturbed” so classified as “tilled”? Please specify	References were added to clarify. These fields were tilled after the accident	P2 and P4 were disturbed after the initial radionuclide deposition resulting in a homogenization of activities in successive soil layers (Fig 4). These fields were most likely tilled by farmers (Endo et al., 2013; Matsunaga et al., 2013; Yamaguchi et al., 2012) […]
L172-173: So it might be worth to consider in the future a greater sampling depth? (e.g. when conducting a resampling campaign)	We added a sentence to clarify that.	Thus, a greater sampling depth should be considered for future investigations on radiocesium migration in Fukushima soils.

L176: How did you distinct tilled soils from managed soils? Is it based on the ^{137}Cs depth profile results are is it based on information of actual land management practices?	Our main criteria to classify the soils was the radiocesium distribution with depth. Observations in the field provide additional but inconclusive information.	
L183: "e.g. Tanaka et al. 2013"?? I yes, please ad this reference.	Information added.	These results confirm those found for undisturbed soils located under different land uses in the vicinity of the FDNPP (Fig 5) by previous studies (see references listed in Table 3).
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.	When plotting TOC and alpha parameter (or H0 parameter), there is no correlation (even non-linear). You can find the plots in the attached file (*Additional plots*)	
L190: What kind of differences do you mean? L190: With "soil group" you mean "Andosol" versus "non-Andosol"?	Rephrased to clarify.	As the migration depth of radiocesium in soils does not vary with the soil type, the different radiocesium migration observed between undisturbed and managed fields is most likely explained by the type and frequency of farming operations carried out between the nuclear accident and the sampling campaign.
L199 – 201: Can you explain why?	This soil core was heavily contaminated and contained a high level of organic matter. This could explain the migration of radiocesium but the level of contamination was very low (<1% of the total contamination of the soil core). Complementary information added.	This is likely due to the natural migration of radiocesium as this soil core was heavily contaminated (155 $kBq.kg^{-1}$) and contained 8.5% of TOC. Nevertheless, level of contamination corresponded to less than 1% of total contamination of P9, as observed in the other undisturbed soil cores.
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)	"These fields" correspond to the four fields, information added.	These four fields have been continuously managed since the accident […]

Line 209: Not sure how I can obtain this information about migration in top 3cm from table 3? Is it the alfa-coefficient?	There is no information about migration in top 3 cm in Table 3. Please refer to the literature cited for complementary information (we removed the reference to Table 3).	
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).	Complementary information added.	Similarly to our results, Takahashi et al. (2014) did not find any significant correlation between α and TOC content ($r = -0.23$) in soil profiles sampled under different land-uses contaminated by FDNPP fallout. In this context, TOC is not likely related to ^{137}Cs migration in this region. Koarashi et al. (2012) investigated different soil profiles in the vicinity of Fukushima city and found a strong negative correlation ($r = -0.79$, $p < 0.005$) between the percentage of retention of ^{137}Cs and the ratio of TOC content on Clay content suggesting that organic matter inhibits the strong adsorption of ^{137}Cs on clay minerals.
L 225: But 10-15 cm ^{137}Cs 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.	Rephrased to clarify	This will over-estimate the contamination in the rice.
L259: Do you mean: “contaminated soils that has been eroded, transported and deposited on top of already decontaminated soil?”	Rephrased to clarify	Furthermore, contaminated soils that have been eroded and transported by the river could be deposited on top of already decontaminated soil (Sakai et al. 2014).
L263-265: I suggest deleting this first sentence as in a conclusion one should only repeat most important results (not study aims ect: : :)	This sentence was removed	

L279: I guess it will be good to specify here that you recommend (based on your results) “at least 15cm” (see Line 240)	Sentence were rephrased.	Fields with ambient dose levels higher than the permissible level should not be tilled or at least the top 15 cm of the soil profile should be removed to avoid the contamination of rice in the future.
Table 2: It would be good to add a column to the table giving the “soil Type”	Table 2: information added, the soil types were determined using the soil map provided by the Ministry of Land, Infrastructure, Transport and Tourism of Japan (MLIT).	
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 1: The elevation map was added as a separate subfigure (Figure 1c)	See figure 1
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)	Figure 4: Dotted lines that correspond to an exponential relationship were on the undisturbed class as ^{137}Cs inventory with depth were described very well by an exponential relationship. For the managed class, the similar level of contamination in the top layers was not described by an exponential relationship but we added the dotted line to highlight the difference between managed and undisturbed class.	