

Interactive comment on “Element and radionuclide concentrations in soils and wildlife from forests in north-east England with a focus on species representative of the ICRP’s Reference Animals and Plants” by Catherine L. Barnett et al.

Anonymous Referee #3

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Review of Element and radionuclide concentrations in soils and wildlife from forests in north-east England with a focus on species representative of the ICRP’s Reference Animals and Plants

Overall, this work provides an important set of data for the ICRP Raps. This effort is in line with what is needed to support and improve on the ICRP framework for assessing radiological impacts to the environment.

This reviewer has no major issues with the manuscript. Suggested below are several

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areas where additional information is needed. This paper may be referenced often, and may serve as a guide to others (potentially students or new researchers to the field in the future) and I believe the points raised below should be clarified.

Comments:

Line 48, ICRP's Line 60. The text above says that dose assessment is the underlying motive. Should mention here (or in discussion later) whether the radionuclides/elements chosen for this study are in fact important for dose assessment. Line 60. If radionuclides of importance to biota dose were excluded (e.g. Ra226), it should be noted and discussed. Some readers may consider this study as a pattern for future studies and they would benefit from a statement about the need to prioritise data gaps on the radionuclides important for dose. Line 128. Need a bit more on soil sampling methods. The word "approximately" is used when describing the "15 cm x 15 cm x 10 cm deep" samples.

–Need to state that the soil samples were gathered using a method that ensured all depths 0-10cm were equally represented.

–If a coring device/tube wasn't used, the authors should acknowledge and estimate the potential uncertainty on CRs that result. For example, if the soils were gathered using a shovel/spade it is likely the surface layers were over-represented (by mass) which could influence study results for Cs-137 and other anthropogenics. Line 129. "locations corresponded to the sampling sites of the animals and plants collected." Describe distance between plants and soil samples and if they were 1:1 soil-plant pairs or 3:1 pairs, etc.

Line 129. How organic vs mineral soils are sampled may influence the calculated CRs. Describe if organic material was removed from the ground surface before soil sampling, and if so, how much was removed. Fallout radionuclides accumulate in detritus and organic soils (numerous references). How did you determine where the organic detritus ends and soil begins?

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Line 135. “Once dry a sub-sample was manually homogenised and” This seems backwards. The entire sample should have been homogenised before a subsample was removed.

Line 144. “Three water samples (each of approximately 1 litre) were collected from the Kielder main sampling site on 16 March 2015. The samples were collected from three areas within the. . .” Describe the water body. River, pond, lake?

Line 183. “. . .paper to allow for gut evacuation.” State the length of the depuration period.

Line 269. “. . .both leaf and flower stems were collected.” State how close to the roots/ground the grass samples were cut.

Line 563. “This perhaps raises a question with regard to using stable element CRwo-soil values, especially when they are used to represent shorter-lived radioisotopes, within radiological assessments that typically aim to be conservative.” Thank you for the discussion on stable Cs vs radiocaesium. Your statement here can/should be more definitive. Your data does more than raise the question (not perhaps).

–Suggest you state that your data demonstrate that the elemental Cs and anthropogenic Cs-137 uptake are not equal as has been assumed in some past studies.

–Suggest you state that your data indicate use of stable element data may introduce further CR uncertainty when applied to radionuclides.

–Your discussion explaining the above focuses on half-lives, when (as I know the authors know) it should focus on physico-chemical differences between the stable elements vs anthropogenics.

Line 567. “4.1 Use of data” Somewhere in this discussion on use of data, it would be fair to point out that these CRs of this study are specific to/representative of a temperate forest ecosystem and that it has been indicated that CRs developed for other ecosystems may vary (e.g. higher CRs for arid system were indicated in Hirth et

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al. 2019, some differences were reported for uptake in Japan vs Europe in Tagami et al. 2017).

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