

## ***Interactive comment on “Natural and Fukushima-derived radioactivity in macroalgae and mussels along the Japanese shoreline” by Z. Baumann et al.***

**Z. Baumann et al.**

zofia.baumann@stonybrook.edu

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**General Comments** This manuscript is suitable for discussion in the Biogeosciences Special Issue on ‘Impacts of the Fukushima nuclear power plant discharges on the ocean’. It does provide new and recent data of radiocaesium, 40K, 210Pb and 210Po in macroalgae and mussels collected relatively locally to Fukushima. This dataset enables the authors to provide an ‘anthropogenic v natural’ perspective on marine biota samples. **Specific Comments**

1. Now that 210Pb data are included in Table 1, can the authors give some attention to the 210Po/210Pb ratios obtained and place them in perspective with previous marine

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work? e.g. Recent reviews by Fowler, S.W. *Journal of Environmental Radioactivity* 102 (2011) 448-461 and by Carvalho, F.P. *Journal of Environmental Radioactivity* 102 (2011) 462-472.

ZB: I will insert a sentence addressing 210Po:210Pb ratio into the discussion.

2. Sample preparation - if the periostracum (chitinous layer) is still intact on the outer surface of the mussel shell, then some radioactivity will be associated with the ‘total’ shell. If the periostracum is not present then the bulk matrix of the mussel shell will be very low in radioactivity.

ZB: Mussel soft tissue was separated from the shell prior to radioanalysis.

3. 40K is homeostatically controlled in humans therefore its role in dose delivery is limited. In UNSCEAR (1993), paragraph 61, page43, a description is given where the typical annual dose from 40K in the adult body is 165 microSv. Recommend concentrating on other radionuclides reported with regard to the human-health perspective rather than 40K.

ZB: I will insert a sentence on the dose derived from the beta emissions of 40K based on UNSCEAR 1993 (new reference will be added). As this paper is not dealing with doses, we are not going to focus on this topic. However, we are pointing out that 210Po is the radionuclide that should be primarily focused on for the radiological purpose due to its alpha-emissions that are more powerful than beta and gamma emissions.

**Technical corrections**

Abstract, line 7 - replace ‘Radioactivity from’ with ‘Activity concentrations of’ line 13 - insert ‘concentrations’ for ‘concentraitons’

ZB: will be corrected in the final version Introduction, line 21 - replace with ‘the Japanese public was anxious regarding the impact of radioactivity released from the damaged’

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