

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

Anonymous Referee #1

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This is a nice article which publishes new data well under built description of methods. It also gives some interesting conclusions. However, I have some concerns about the back calculation to concentration in the water and comparisons to dose.

First the back calculation. It is an interesting and good approach to use organisms as a measurement converter to estimate the water concentrations. The authors also recognize that there is some uncertainty due to the variation of CF. However, I think that a 4 fold variation is too small as an uncertainty when eg Beresford et al(2007) or eg ICRP/IUR wildlife database (<http://www.wildlifetransferdatabase.org/>) gives a 3 orders of magnitude variation for CF of mussel and Cs, thus the IAEA 2004 reference seems

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a little outdated. I fully understand that the 3 orders of variation depends on many more factors (e.g method, where in world, exposure scenario) than just a variation on a spot. My suggestion is to extend the range and /or discuss why it should be so narrow. Another pitfall in this back calculation is the integration time of the organism. For *Ulva* sp, I can imagine that the biological half-life is short because the biomass turnover is quite rapid, thus it gives maybe a weeks integrated water concentration. Unfortunately the brown algae is not specified, for filamentous brown algae (e.g *Pilayella* sp or *Ectocarpus* sp.) the turnover is as rapid as *Ulva* sp., while for kelp-like brown algae (e.g *Laminaria* spp., *Fucus* spp) the turnover is considerably longer, but no conclusion can be drawn since the species is not determined. The biological half-life for Cs in *Mytilus* is quoted seem to be very short and in a later report by Dahlgard (1989) to be 14 days and longer. Thus these longer half-lives will interact with the rather short pulse from Fukushima. Still a complication regarding mussels is that they feed on planktonic matter. Thus their time-dynamic will indicate the time-dynamic and concentration in plankton rather than directly the dynamics of the water turnover. I think the article would benefit on a discussion of this, because the measured water concentration seem to be up to one order of magnitude higher than the estimated ones from CF.

The other concern is the comparison to dose, the comparison with K-40 seems little odd when actually a comparison could be made in Sievert (Sv) instead, weighting the radionuclide more properly and compare e.g to background radiation.

There are some minor comments on typographic errors.

Page 2618, Row 13 Abstract “concentrations” should be concentrations.

Page 2623 row 29 I would help to give the latin name of the green mussel also *Perna*?

Page 2628 references to Dahlgard is not complete, IAEA conference.... is missing

Table 2 footnote a and b seems to be mixed up.

References to comments above:

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Beresford N A, Brown J, Coplestone D, Garnier-Laplace J, Howard B, Larsson C M, Oughton D, Pröhl G, Zinger I (eds), 2007. D-ERICA: An integrated approach to the assessment and management of environmental risk from ionising radiation. Description of purpose, methodology and application. EC contract number FI6R-CT-2004-508847, European Commission, Brussels

Dahlgaard, H. (Risoe National Laboratory, Roskilde (Denmark)); Nolan, C. (International Atomic Energy Agency Marine Laboratory, Monaco (Monaco)) Long-term loss rates of radioisotopes of cobalt, zinc, ruthenium, caesium and silver by *Mytilus edulis* under field conditions http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/30/038/30038723.pdf - Text Version

Source/Report International Atomic Energy Agency, Vienna (Austria), Intergovernmental Oceanographic Commission of UNESCO, Paris (France), United Nations Environment Programme, Nairobi (Kenya), International Maritime Organization, London (United Kingdom), Commission Internationale pour l'Exploration Scientifique de la Mer Mediterranee, Monaco (Monaco), International symposium on marine pollution. Extended synopses, 739 p, 1998, p. 29-30, International symposium on marine pollution, Monaco (Monaco), 5-9 Oct 1998, IAEA-SM-354, IAEA-SM-354/17, 2 refs, 1 fig., 1 tab Record Type Report Country/Org. International Atomic Energy Agency (IAEA) Publ. Year 1998 Volume 30 Issue 34

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