Biogeosciences Discuss., 9, C6944–C6945, 2012
www.biogeosciences-discuss.net/9/C6944/2012/

Biogeosciences Discussions

Interactive comment on "Radium-based estimates of cesium isotope transport and total direct ocean discharges from the Fukushima Nuclear Power Plant accident" *by* M. A. Charette et al.

Anonymous Referee #2

Received and published: 31 December 2012

Review of the manuscript of Biogeosciences MS No.: bg-2012-512 Title: Radium-based estimates of cesium isotope transport and total direct ocean discharges from the Fukushima Nuclear Power Plant accident Author(s): M.A. Charette, C.F. Breier, P.B. Henderson, S.M. Pike, I.I. Rypina, S.R. Jayne, and K.O. Buesseler

Major comments: In this manuscript the authors used radium isotopes to help to derive vertical and horizontal transports of Cs from NPP. The results may be used to estimate transports of other radionuclides released from NPP and evaluate the impacts of NPP. From this perspective this manuscript fits the special issue. However, a few terms have to be clarified before the results are accepted for publication.

There is a mixed use of 'water age', 'mixing rate', and 'replacement time' in this manuscript. 'Water age' was defined as the time the water parcel left NPP, so it is based on Lagrange observation, while 'replacement time' and 'mixing rate' are terms based on Euler observation. Water age is reflective of replacement time or mixing rate. But they may not be equivalent in values to each other. In terms of the water age, the correlation between the numerical model age and the Ra water age was not good enough to state they are consistent with each other. On Page 11 Line 17, the authors stated that the oceanographic numerical model also suggests a good correlation (Fig. 6) between the Ra-based water age and Cs age. But Fig. 6 shows that at 9 out of 26 stations there are big differences (greater than 10 days, about 1/3 of the average ages) between the two ages. Therefore, uncertainties for the ages and fluxes should be provided to help evaluate the consistency of the two ages.

Minor comments: On Page 2 Line 22, "FNPP" is not consistent with what was defined on the same page Line 5. On Page 3 Line 17, Why was 'NPPs' used here, not 'NPP'? On Page 4 Line 15, 'pump from 0.5 m' should be 'pump from a water depth of 0.5 m'. On Page 6 Line 4, 'FNPP' should be 'NPP'; Line 6, '. . .was roughly the same. . .' should be changed to '. . .were roughly the same. . .'; Line 9, 'The outer box stations were significantly lower ranging from <2-333 Bq m-3' is suggested to change to 'The outer box stations had significantly lower Cs activities ranging <2-333 Bq m-3'. On Page 10 Line 9, 'station' should be capitalized; Line 20, the first 'flux' should be removed. On Page 12 Line 25, 'of' should be added before 'the local. . .'. On Page 13 Line 10, ', which have proven useful. . .' should be changed to ', which have been proven useful. . .'. On Page 17, texts in Fig. 1A are too small to read, especially the station IDs. On Pages 20 & 22, there is no station with an ID of non-integer as shown in Fig. 1A, but on the x-axis there are some non-integer Station IDs. Please correct it or better explain it. On Page 21, the peaks in 228/226Ra ratio and 134Cs (or the lower values near the surface) were not explained in the text.

Interactive comment on Biogeosciences Discuss., 9, 16139, 2012.

BGD

9, C6944–C6945, 2012