

# ***Interactive comment on “Spatial variability and the fate of cesium in coastal sediments near Fukushima, Japan” by E. Black and K. O. Buesseler***

## **Anonymous Referee #3**

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General comments: In this paper, the authors provide comprehensive dataset of radio-cesium in seabed sediment observed 13-30 months after the accident of Fukushima Daiichi Nuclear Power Station. They show reasonable estimation on abundance of the sedimentary radiocesium off the coast of Japan, and indicate that coastal sediments near Fukushima has been long term reservoir of the accident-derived radiocesium. This paper will make a useful contribution to our understanding of the radionuclides in the ocean. I was wondering if the authors could elaborate the following points either in this or a future paper. 1. In subsection 3.7, the authors mention that the abundance of sedimentary radiocesium is relatively small in NCZ region from larger grain size of sediment in the region. The well-grained coarse sediment would make high perme-

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ability of contaminated bottom water into deeper sedimentary layers. In such a case, significant concentrations of radiocesium are detected even in the bottom end of the sampling layer ( $\sim 20$  cm) in the NCZ, and the abundance in this region would be larger than the estimation and approaches to that in SCZ. The authors should estimate the potential of penetration or provide data for the deeper sedimentary layers in the NCZ. 2. I strongly agree with the authors that bioturbation is a key controlling temporal change in vertical distribution of radiocesium in sediment core. The estimated time needed for 50% decrease of the surface activities by bioturbation (0.4~26 years) seems correspond to decreasing trends of  $^{137}\text{Cs}$  monitoring data for surface (0~3 cm) sediment (MEXT and Nuclear Regulation Authority, Japan). Regarding the decreasing rates, the authors have applied the values in “adjustment for mixing” in subsection 3.9 for validation. Although the mixing does not affect the general distribution and total inventory of sedimentary radiocesium, I think it is necessary to elaborate how the authors applied the values for the validation.

Specific comments: P7240 L5 “R/V Daisan Kaiyu Maru”: “R/V Daisan Kaiyo Maru”; P7245 L6 “38.50 S”: 38.50 N; P7245 L6 “38.5S”: 38.5 N; P7257 L20: “R/V Daisan Kaiyo Maru”;

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