

## ***Interactive comment on “Short-term dispersal of Fukushima-derived radionuclides off Japan: modeling efforts and model-data intercomparison” by I. I. Rypina et al.***

**Anonymous Referee #3**

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This paper tries to simulate dispersion of Cs-137 from the Fukushima Daiichi Nuclear Power Plant (FDNPP) into the northwestern Pacific Ocean. Particular focuses are on comparison of the simulated results with observed values, taken during the KOK cruise, and on estimation of magnitude of the source terms. Although, there are several papers considering the same topics with similar methods, in this paper, the authors are trying to use flow fields derived from satellite-observed sea surface height, which provides a new result to our understanding on this issue. However, I see some parts of the article that need further discussions and calculations. Those are listed below, and I believe the following comments help to strengthen arguments of this article.

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Page 1524, line 24-28 (the end of section 2.3): To agree with the authors' comments on sensitivity of the results to the number of released particles, it is good to add one figure or table showing this tendency.

Page 1526, line 28 – Page 1527, line 4 (the second paragraph of section 3.2): This mixed-layer depth argument is problematic in the following two points. First, the authors mentioned that some part of Cs-137 is transported to the layer below the mixed-layer, which is no longer contributing to the surface (or mixed-layer average) concentration of Cs-137. However, the authors use a constant value for the mixed-layer depth during the whole period of calculation. In this case, the above detrainment effect is not included, resulting in increase of surface Cs-137 concentration. Second, as the authors also mentioned in the text, the mixed-layer depth gets shallower from March to June. If we use the constant mixed-layer depth of March or April throughout the calculation, this creates underestimate tendency of the surface Cs-137 concentration, simply because  $Z_{ml}$  is overestimated. Relatively large number of the source amplitude, especially for direct discharge component of 16.2 PBq, seems to be related to this uncertainty of the mixed-layer specification. Do the results differ with different values for the mixed-layer depth? How sensitive the results are to the  $Z_{ml}$  values?

Page 1529, line 22 – Page 1530, line 7 (the first paragraph of section 3.3): The source estimations are performed with only the KOK observations. There are some more Cs-137 concentration values observed by TEPCO and MEXT, Japan. Why these other data are not utilized for the error minimization procedure? If these data are used as well as the KOK observations, how do the results change? I think the near coastal values, with the direct discharge source magnitude of 16.2 PBq, may be overestimated. Comparisons with other observed data should be conducted.

Fig.8: I do not understand the meaning of line-connected figure. Instead, I suggest to make a scatter diagram of the observed vs simulated values for this kind of point-to-point comparison.

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