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Biogeosciences Discussions

Interactive comment on "Initial Spread of ^{137}Cs over the shelf of Japan: a study using the high-resolution global-coastal nesting ocean model" *by* Z. Lai et al.

Anonymous Referee #1

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General Comments

This study conducted a numerical simulation of 137Cs released from the Fukushima Dai-ichi nuclear power plants using a high resolution FVCOM model. The results showed that the high resolution model is better than those coarse resolution models operated in previous studies to capture the initial spread of 137Cs. The topic is of interest. I have a few concerns and hope they can be clarified before publication of this manuscript.

Specific comments

The most important finding of this study is that the source point of 137Cs is critical to

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resolve the dispersion process. In front of the nuclear plant, there is a seawall structure. The power plant intakes water from inside of the seawall structure and discharges water outside the seawall structure on the north and south sides (namely, the north and south discharging canals), respectively. The two discharging canals were considered the point sources of the release of 137Cs (Tsumune et al, 2012; Estournel et al., 2012). In this study, however, the discharge point of 137Cs is located inside the seawall structure (Figures 2 and 7), rather than at the two discharging canals. It seems that this treatment of source point allows 137Cs to disperse farther seaward such that the modeled 137Cs concentrations match the measurements at the MEXT stations better than the previous studies. My concern is whether this setup of the source of 137Cs is reasonable, and I hope this can be confirmed by someone who is familiar with the study site.

Because the source term of 137Cs is determined by the inverse method, this study as well as the previous work (Kawamura et al., 2011; Tsumune et al, 2012; Estournel et al., 2012) can obtain reliable results near the power plant. This study further improved the results at MEXT stations, but still has relative large discrepancies between model and observation at the WHOI stations (Figures 10 and 11, and notice the log scale). Does this indicate that the high resolution grid actually didn't help improve much of the prediction, and the improvement at the MEXT sites merely comes from the setup of the source point of 137Cs?

Even though this is a short paper, providing some details of the inverse method might help understand the model results if it is not exactly the same as that of Tsumune et al. (2012). For example, the initial 137Cs concentration, the volume of water in which 137Cs was released, and the estimated release rate of 137Cs, etc.

Please add legends in Figures 4, 10, and 12.

Reference

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Interactive comment on Biogeosciences Discuss., 10, 1929, 2013.