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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 #2

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General Comments: Using numerical modeling, the author conducts a tracer experiment to simulate the CS-137 dispersion released from the Fukushima nuclear plant as a result of the 2011 Tohuku earthquake. By comparing with the circulation field generated by a coarser global model (Global-FVCOM), as well as observed CS-137 concentration at several near-shore and offshore stations, the author concludes that the high resolution model presented in this paper (JC-FVCOM) could better simulate the physical processes controlling the dispersal of CS-137. The expression of the article is clear and concise. However, I do not think this manuscript is acceptable at current stage mainly due to its lack of model skill assessment.

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Specific Comments: First of all, for any modeling effect, no matter it is physical oriented or a tracer/biogeochemical application, there should be model validation information regarding the model's capability of reproducing the circulation field. Surprisingly, there is not any such information presented. The cited "Chen et al. 2013" paper is only in "PREPARATION" status, which should not be used as model skill assessment.

Secondly, the author spent a lot of context and figures to compare their high resolution version of model (JC-FVCOM) against the coarse resolution one (Global-FVCOM). There is no surprise that the high resolution model will generate some finer scale dynamics (e.g. eddies off the canal) that cannot be reproduced by a global model. However, without validation information, how can the author know that such small scale dynamics are true and are important for CS-137 dispersal on a large spatial scale?

Thirdly, comparison of simulated and observed CS-137 concentration is not persuasive. Although the model reproduces the temporal changes (concentration peak followed by a dilution) of the CS-137 concentration around the power plant, the difference at the offshore stations (MEXT) is significant (fig.5 and 11, also pointed out by the other reviewer). The sediment absorption and releasing of CS-137 itself is of great scientific interests, however the discussion is not conclusive without analysis in conjunction with local oceanographic conditions.

At last, indicated by the other reviewer as well, more information of the inverse method is needed and the symbology and legend of figures 3,4,5,10,12,13, and 14 is not clear. In addition, there should be at least some background oceanographic condition of the study region in the introduction session.

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