

Geosci. Model Dev. Discuss., referee comment RC2
<https://doi.org/10.5194/gmd-2020-438-RC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on gmd-2020-438

Anonymous Referee #2

Referee comment on "Plume spreading test case for coastal ocean models" by Vera Fofonova et al., Geosci. Model Dev. Discuss.,
<https://doi.org/10.5194/gmd-2020-438-RC2>, 2021

Authors have done a lot of experiments, and some of them should be useful. While some of them duplicated with previous plume modeling, such as Xia's Cape Fear River Modeling (North Carolina State University, 2007) to discuss how the numerical scheme to impact plume's structure modeling, which is the key part of this manuscript. The horizontal resolution and vertical layers were given discussion in Xia et al., 2007 and other papers which were listed below. Numerical mixing can be considered as numerical errors, and authors need be carefully to utilize the error for the physical explanation. Please re-format this work and do a more than major revision to provide insight the plume community. Please remove most experiments which was conducted from these papers below and other literatures, make this manuscript concise and useful. I will provide more comments after new version, not this long, wordy unclear one. Also did authors simulate the internal wave (line 68?)

Niu, Q., Xia, M. (2021) "The behavior and wind-driven dispersions of two dynamically distinctive limnetic river plumes in a semi-enclosed basin," *Estuarine, Coastal and Shelf Sciences*. (In press)

Niu, Q., Xia, M., Ludsin, S.A., Chu, P.Y., Mason, D.M., Rutherford, E.S. (2018). "High turbidity events in Western Lake Erie during ice-free cycles: Contributions of river-loaded vs. resuspended sediments," *Limnology and Oceanography*, 00, 1-18.

Jiang, L., & Xia, M. (2016). "Dynamics of the Chesapeake Bay outflow plume: Realistic plume simulations and its seasonal, interannual variability," *Journal of Geophysical Research: Oceans*, 121, 1424-1445.

Xia, M., Xie, L., Pietrafesa, L.J., Whitney, M.M. (2011). "The ideal response of a Gulf of Mexico estuary plume to wind forcing: Its connection with salt flux and a Lagrangian view," *Journal of Geophysical Research*, 116, C08035.

Xia, M., Xie, L., Pietrafesa, L.J. (2010). "Winds and the orientation of a coastal plane estuary plume," *Geophysical Research Letters*, 37, L19601.

Xia, M., Xie, L., Pietrafesa, L.J. (2007). "Modeling of the Cape Fear River estuary plume," *Estuaries and Coasts*, 30(4), 698-709.