

Geosci. Model Dev. Discuss., referee comment RC3
<https://doi.org/10.5194/gmd-2021-20-RC3>, 2021
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Comment on gmd-2021-20

Anonymous Referee #3

Referee comment on "The Lagrangian-based Floating Macroalgal Growth and Drift Model (FMGDM v1.0): application to the Yellow Sea green tide" by Fucang Zhou et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-20-RC3>, 2021

The authors created a new drift and growth model, determining trajectories with Lagrangian particle tracking driven by current and wind data, and determining growth with an ecological model driven by temperature, salinity, and irradiation. The model was applied to an application in the Yellow Sea to track *Ulva prolifera* floats during 2014 and 2015. Overall, the paper presents a holistic study from start to finish and explores a novel concept with relevance to present day challenges. However, the paper is missing some important details and background information. Here are some specifics:

- Windage is assumed to be 1.5% to 3.5%, but the authors do not explain why this value was taken. As the authors pointed out with the simulations without wind, wind plays a crucial role in determining trajectories. Please cite references and detail your reasoning behind this selection. The authors should determine if the surface layer of the hydrodynamic solution already represents some movement due to wind. The authors may consider looking at analagous studies with large floating objects (e.g., tsunami debris) or drifter studies to calibrate windage.
- Most trajectory models also include dispersion to represent forcings not caused by wind or currents. This dispersion is often a stochastic component. If the authors determine not to include dispersion in their model simulations, there should at least be acknowledgement of the absence of dispersion and resulting implications.
- Model initialization is also important. The authors note a May 1 start time, several starting locations, and that 47 particles were used. More detail needs to be provided as to why the model was initialized this way. For example, 47 is far fewer particles than are typically used with trajectory modeling, so was computational cost the reason for so few particles?

Consider the following relevant papers:

- Maximenko, N.; Hafner, J.; Kamachi, M.; MacFadyen, A. Numerical simulations of debris drift from the Great Japan Tsunami of 2011 and their verification with observational report. *Mar. Pollut. Bull.* 2018, 132, 5–25.
- Whiting, J.; Wang, T.; Yang, Z.; Huesemann, M.; Wolfram, P.; Mumford, T.; Righi, D. 2020. Simulating the Trajectory and Biomass Growth of Free-Floating Macroalgal Cultivation Platforms along the U.S. West Coast. *Journal of Marine Science and Engineering*, 8, 938.