

## ***Interactive comment on “Small-scale spatial structure in plankton distributions” by A. Tzella and P. H. Haynes***

### **Anonymous Referee #2**

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The authors demonstrate that phytoplankton and zooplankton exhibit similar filamentous structures at small scale, while at larger scales phytoplankton is smooth and zooplankton remain filamentous. They also successfully discuss why their results contradict Abraham (1998) and how their model is more appropriate to resolve smaller scale.

The paper is well written, clear and well illustrated.

As stated by the authors in the 'Conclusion' section, I am convinced that their result provides an additional step toward the understanding of complicated dynamics of plankton in the presence of fluid motion.

This is a critical issue for the future of marine science. However, I am concerned with the possibility of applying their simulations to what actually happens in the real ocean.

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This issue is mainly related to their consideration that plankton particles are only dependent on the fluid parcel history. While this might be ok for purely passive, neutrally buoyant particles, I wonder which effect consideration of phytoplankton buoyancy regulation and zooplankton swimming behavior could have on the simulations. I appreciate that introducing such behavioral parameters would heavily increase the computation time and cost, but this should at least be explicitly discussed in the final manuscript to avoid ignoring a great amount of the oceanic biological literature. In particular, it is now evident from the literature that zooplankton can easily overcome local turbulent velocities and then don't only dependent on the history of the fluid parcel they are embedded in. Dealing with the complicated dynamics of the plankton also need to deal with the biological (here behavioral) complexity, not only the physical complexity mainly driven from the fluid flow.

With the issue clearly addressed and discussed and the manuscript carefully edited (e.g. Kiorboe should be written as Kiørboe), this paper will definitely be very useful to the marine science community.

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Interactive comment on Biogeosciences Discuss., 3, 1791, 2006.

**BGD**

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