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Biogeosciences Discussions

Interactive comment on "Responses of lower trophic-level organisms to typhoon passage on the outer shelf of the East China Sea: an incubation experiment" *by* N. Yasuki et al.

Anonymous Referee #1

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Review on Yasuki et al: Responses of lower trophic-level organisms to typhoon passage on the outer shelf of the East China Sea: an incubation experiment. The authors conducted incubation experiments to simulate responses of lower trophic-level organisms to typhoon. I have important concerns on their experimental settings and assumptions:

1. The importance of response of lower trophic-level organisms to typhoon passage is exaggerated. Recently, a more comprehensive analysis by Lin (2012) shows that in 2003, only 2 out of 11 typhoons induced bloom. The condition to cause biological response depends at least on four factors: 1) wind speed, 2) typhoon size, 3) typhoon's

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translation speed, and 4) pre-existing condition. Even category 5 typhoons did not necessarily induce response of lower trophic-level organisms. In fact, in several papers discussing the typhoon-induced bloom, these case studies are specifically chosen but DO NOT represent the generality. That is, most of typhoons DO NOT induce response of lower trophic-level organisms.

2. The claim of "simulation" of a typhoon passage is not justified. Typhoon -induced mixed layer depth is a function of 1) wind speed, 2) typhoon size, 3) typhoon's translation speed, and 4) pre-existing condition. Again, see Lin (2012) and other papers discuss the physics. Even, similar category 4 typhoons can produce completely different mixing and upwelling regimes. I do not understand based on what kind of physical mechanism or evidence did the authors decide that their experiments could represent realistic physical conditions during the typhoon passage. They designed 3 types of experiments: UP (water from 110m), MIX (water from 10 m + SCM +200m), and SN (added nutrient for surface water). The authors need to provide strong evidence to convince readers that these experimental designs reflect realistic condition during any specific typhoon passage. Otherwise, the "simulation" is at best imagination and unrealistic; their results and conclusion may be even misleading.

3. In reality, during typhoon passage, there may be a series complex mixing and upwelling processes (given good combinations of the aforementioned four factors). I am not sure that the unrealistic experimental designs help understand the biological responses to typhoon. In situ experiments, such as Chung et al (2012), provide more realistic and unambiguous understanding of typhoon effects. Again, I suspect that the results shown in this work do not represent realistic biological responses to typhoons.

4. The succession of phytoplankton community critically depend on how the "mixing" (seeding) was conducted (Fig. 5 and 6). Because mixing dynamics can vary substantially among typhoons, I am not convinced that the authors' "simulation" experiments really tell readers the typhoon effects.

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5. Strong claim of experimental outcome requires strong evidence. In the manuscript, I found surprisingly no replicates in their experiments. As such, it is almost impossible to do statistical analyses on their data. That is why there is essentially no statistical analysis in this manuscript. Thus, whether their experimental results are representative or not cannot be evaluated. This manuscript is purely descriptive. Importantly, how much a reader is willing to believe the authors' description depends on one's subjective decision because it is impossible to evaluate their results.

6. No grazing effects of mesozooplankton are "simulated" in their experiment. Effects of mesozooplankton can be significant (Chung et al 2012). If the authors wish to claim that mesozooplankton are not efficient at grazing, they need to at least show mesozooplankton data using plankton tow during their experiments and this is very easy to do. Again, their claim is not convincing.

7. I have some suggestions on data analysis. The authors have pigment and phytoplankon composition data through time for each experiment. I suggest the authors carry out ordination or cluster analysis to illustrate the variation. See detailed in Legendre and Legendre (1998).

Reference Chung, C. C., G. C. Gong, and C. C. Hung. 2012. Effect of Typhoon Morakot on microphytoplankton population dynamics in the subtropical Northwes-Pacific. Marine Ecology Progress Series 448:39-49. Lin, I. I. 2012. Typhoon-induced phytoplankton blooms and primary productivity increase in the western North Pacific subtropical ocean. Journal of Geophysical Research: Oceans 117:C03039. Legendre, P. and L. Legendre. 1998. Numerical Ecology. 2nd edition. Elsevier, Amsterdam.

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