

Interactive
Comment

Interactive comment on “Modulation of ecdysal cyst and toxin dynamics of two *Alexandrium* (Dinophyceae) species under small-scale turbulence” by L. Bolli et al.

Anonymous Referee #3

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This study examines the effects of turbulence on cellular toxin content and cyst production in two species of *Alexandrium*. Results show that exposure of cells to a moderate-high level of kinetic energy dissipation rate ($0.4 \text{ cm}^2\text{s}^{-3}$) slightly favored growth and did not affect cyst dynamics and cellular toxin content. Exposure of cells to a higher level of kinetic energy dissipation rate ($27 \text{ cm}^2\text{s}^{-3}$), for a prolonged period (more than 4 days), resulted in lower growth rate, lower final biomass yield, lower cellular toxin content and in the inhibition of cyst production. The paper is clearly written and addresses a fundamental problem of understanding the interactions between planktonic microorganisms and their physical environment. The paper does not introduce novel concepts or ideas but introduce new data; data on small-scale turbulence and phytoplankton are limited.

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Interactive Discussion

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Although the results are interesting, I wonder about the relevance of the shaker experiments to natural populations as turbulent kinetic energy dissipation rate (ϵ) of $27 \text{ cm}^2\text{s}^{-3}$, is higher than reported values from the mixed layer and if “bursts” of high ϵ occur, their duration is much shorter than the period of exposure in the reported experiments. It is not clear to me how “these conditions may help to ascertain the underlying mechanisms of cell adaptations” (bottom of p. 889). Results for toxin levels do conflict with other studies and as the authors acknowledged effects of turbulence on toxin production requires further investigations. For GTX (figure 2c), given the large error (or small sample size, see comment below) in measurements I find the results to be inconclusive.

Other comments:

There is not sufficient information to evaluate the calculations of ϵ in the flasks. The authors provide an equation but no data or reference to other study to show how they arrived to this relationship (p. 896); where in the flask the ADV was positioned? How ϵ changes at different locations in the flask?

p. 900 line 10: The authors reported that both species reached higher growth rate and biomass yields in the control Plexiglas vessels than in the Pyrex flasks: except for the second experiment with *A. catanella*, the differences are not significant.

Statistically, standard error (standard deviation) does not have much meaning when $n=2$. The use of statistics helps to reduce data, but in this case only replicates were taken (for most part). A better presentation of the data would be to plot all the data points and draw a “guide line” crossing the mid values of two data points.

Interactive comment on Biogeosciences Discuss., 4, 893, 2007.

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