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Biogeosciences Discussions

Interactive comment on "Influence of elevated CO_2 concentrations on cell division and nitrogen fixation rates in the bloom-forming cyanobacterium *Nodularia spumigena*" *by* J. Czerny et al.

Anonymous Referee #2

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This is a very nice short paper presenting new results about rising CO2 effects on the heterocystous cyanobacterium Nodularia spumigena. The authors carried out laboratory perturbation experiments simulating rising CO2 levels which resulted in reduced nitrogen fixation rates and growth rates as well as altered C/N/P cell stoichiometry. The experimental results are concisely presented and clearly interpreted, followed by an interesting discussion comparing these new results with previous studies. The authors summarize in their introduction the different responses observed to rising CO2 within the same functional group (nitrogen fixers), which emphasizes that experimental work

needs to adress a large variety of species and that one single species response can not be extrapolated to the entire functional group.

I recommend publication of this paper with very minor comments :

P4282 L15-16 : the references cited are scarce and several other papers could be cited both for cultures and natural communities.

- Do Nodularia blooms occur in other forms than dense aggregates ? If not, can the authors reconcile their statement that CO2/O2 conditions within these dense blooms might significantly alter CO2 related physiological effects with their experimental results based on unaggregated filaments ?

-Please specify the volume in which the semi-continuous cultures were grown in ?

-The authors chose to perform acid addition for CO2 control of their experiments. Two papers were recently published in the same journal exposing the potential issues with this method (Shi et al. 2009, Gattuso et al. 2009). The authors might want to justify their choice of CO2 control as this has been a controversial issue lately.

P4283 L 25 : this sentence is a bit ackward in its formulation and I don't understand how the pre-acclimatation was done precisely. Please make this section a bit more explicit.

P4284 L17 : TAlk and DIC were measured after filtration of the media : Is filtration and air bubbles not a problem for DIC measurements ?

P4285 L 20 : correct flourometer

P4287L21 : why assume that the data is normal ? there are some very simple tests to run to check for this, some are even available on line. I suggest the authors verify this assertion with the appropriate normality test.

I found the discussion overall very interesting and my main concern is the justification for experiments on mixed unaggregated filaments. At the end of the discussion the au-

thors conclude that the adverse effect of CO2 on cell division might delay the formation of the large surface bloom of Nodularia, which may be in turn outcompeted by other species. But this comes a bit late as the reader wonders throughout the article whether this experiment can be extrapolated to in situ conditions. I would state in the introduction (P4283, first paragraph) more clearly that this experiment allows to investigate pre-bloom conditions of Nodularia, when filaments are scarce and unaggregated.

Interactive comment on Biogeosciences Discuss., 6, 4279, 2009.