

Interactive comment on “Potential sources of variability in ocean acidification mesocosm experiments” by Maria Moreno de Castro et al.

Anonymous Referee #2

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General comments Variability in responses and interpretation of the results of acidification experiments is a relevant problem and the topic of this paper is interesting. However the title does not accurately reflect the content of the paper, as it is general enough to have a reader believe the article treats variability in all kinds and types of mesocosm experiments using acidification treatments while in fact the focus of the paper is an in depth analysis of the cause of variability in two specific experiments and only dealing with primary producer responses.

The paper is well structured and clear and easy to follow.

Specific comments The modeling approach described is interesting and novel as a tool for investigating the source of variability in acidification experiments. With this approach the authors prove that variability in initial conditions can generate the observed

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variability and specify which are important to maintain similar as starting values (nutrient concentration, cell size and biomass in this case). Interesting as this is, this might be very difficult to control in field-based experiment where the environment is naturally patchy while increasing the number of replicas is usually not an option either.

Useful suggestions for the interpretation of effects of OA are evaluating differences between the slope of the growth phase and a complete characterization of phytoplankton biomass loss. However, these suggestions are limited to OA experiments with primary producers.

As indicated on page 15, line 13-14 the described model should be seen as a starting point and can be applied to any perturbation experiment with highly variable responses: "With this study we established a foundation for further model-based analysis for uncertainties propagation that can be generalized to any kind of experiments in biogeoscience." The described modelling exercise on primary producer responses to OA in a specific mesocosm set-up is interesting but should be presented as such with an appropriate title.

Technical corrections

Introduction Line 5 – sever should be severe line 9 – mesocosm should be plural (mesocosms as in line 7)

Method Line 7 – not coupling should be no coupling?

Discussion Page 11, line 25 – bound should be bind

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