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Biogeosciences Discussions

Interactive comment on "Reducing the model-data misfit in a marine ecosystem model using periodic parameters and Linear Quadratic Optimal Control" *by* M. El Jarbi et al.

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Comments to referee #1: Thank you for your comments. *** We will make the following changes:

-(1) to (6)– I think that the comments from (1) to (6) are important, we will edit all points in a final version.

- Introduction: please split into multiple, well-organized paragraphs. *** will be modified.

- Page 10211, lines 1-10: this intro is not needed. *** will be omitted.

- Page 10211, line 22: please introduce specific mapping between 1,2,3,4 and N,P,Z,D.

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Interactive Discussion

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You will be better off refereeing to obs and variables by their names (N,P: : :) rather than numbers.*** will be corrected, we will used the names (N,P,Z, D) as indices instead of numbers.

- Page 10212, line 20: Give credit for data you are using here and in the acknowledgment section. Give information about frequency of sampling and time period of observation. Present a table with numbers of observations.*** data are available from the BATS, as a part of the U.S. JGOFS project (Michaels and Knap, 1996). The BATS data are provided by the Bermuda Biological Station for Research (BBSR). [BATS extraction site http://www.bbsr.edu/users/ctd/], a table with numbers of observations will be presented in a final version.

- Eq. (3): please explain where these numbers come from? *** they weigh the different measurements and state variables, they can be interpreted as variance, they are used by Markus Schartau and Andres Oschlies in paper :Schartau, M. and Oschlies, A.: Simultaneous data-based optimization of a 1d-ecosystem model at three locations in the north Atlantic: Part I – method and parameter estimates, J. Mar. Res.,61, 765–793, 2003a. 10212, 10224, 10229,*** page 774.

- Page 10216, line 4: Please give reference and credit to the OCAM model *** reference to the OCAM model will be added *** The OCCAM model data were provided by Bablu Sinha and Andrew Yool at the National Oceanography Centre, Southampton:: Sinha, B., Yool, A., 2006. Extension of the occam 1âÚę general circulation model to include the biogeochemical cycles of carbon and oxygen, Part I: Technical description. Research and Consultancy Report No. 5, National Oceanography Centre, Southampton.

- Section 3.2: a plot of your linearization and time horizons will help, *** we have made a plot of the linearization and time horizons, will be added for a final version

- Section 3.5: Give us an intuitive sense for R and Q. My understanding is that they are connected to your uncertainty in the magnitude of parameters and state vectors?

BGD

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*** actually, R and Q reflects the relative importance of the periodicity of the parameters and the quality of the fit of the data during the optimization, Generally speaking, selecting Q large means that, to keep J small, the difference between state x and the observational data must be smaller. On the other hand selecting R large means that the difference between the parameters of two successive years must be smaller to keep J small.... *** we will add this text for a final version.

- Section 4, lines 1-4: intro not needed, *** will be omitted.

- Page 10222, line 12: did you mean “the” instead of “these”?*** will be changed.

Interactive comment on Biogeosciences Discuss., 9, 10207, 2012.