Biogeosciences Discuss., 12, C1193–C1195, 2015
www.biogeosciences-discuss.net/12/C1193/2015/

Biogeosciences Discussions
Open Access

Interactive comment on "Seasonality of sea ice controls interannual variability of summertime Ω_A at the ice shelf in the Eastern Weddell Sea – an ocean acidification sensitivity study" *by* A. Weeber et al.

N. Bednarsek (Referee)

nina.bednarsek@noaa.gov

Received and published: 14 April 2015

Due to the predicted impacts of OA on the Southern Ocean, this is a very interesting paper that illuminates the dynamics of the seasonality and inter-annual variability. It describes the effects of the physical changes (rate of thawing, changes in mixing related density etc.) on chemical processes (aragonite saturation state) through the sensitivity type of analyses. It is teasing out and constraining some of the factors as the drivers with the major impact on the chemical process, the mechanism that is much needed for future understanding of OA. It also concurs with the findings from other studies

and puts it in the perspective of concurrent observations. This is a good first draft of interesting study but it needs quite a lot of further improvements, in three directions:

Firstly: it needs to describe processes in the more quantitative, statically-correlated way (I am referring to the text more specifically below).

Secondly: The biological section is its weakest part . It is very loosely delineated and needs much more details in order to be relevant and make use of the chemical observations for the biology implications. Authors need to explain when in the season and how the chemical changes relate to the life cycle of pteropods (which is something that is known). Relating chemical dynamics and vital bio processes, authors could identify the main stressors and bottlenecks for pteropod population. This sections needs to be expanded, more detailed and put into perspective.

Thirdly: writing style is too loose, unstructured and repetitive. It really needs some restructuring for the sake of reader's clarity and understanding. Grammatical errors need to be reduced. Abstract also does not capture the content of the manuscript and should be rewritten in the next rounds. In general (and I will be explicit where further in my comments), I have noticed that the author first brings the conclusion or even cites the other study without first presenting her own results - on this basis, it does not create a credible statement for the reader to follow, understand and support the argument. This needs work in this manuscript and should be rechecked at the next round of revisions (see e.g. page 1661, line 15-25). I also noticed interchanged use of seasonal vs interaannual.

1655: line 28: Limacina helicina in italics 1656: line 8-15: make comparisons with the other vulnerable regions, e.g. Arctic and upwelling line 22: expand from here, provide results.

1659: lines 1-25: in all this text it is unclear to me it this is referring only to the surface? int he same paragraph: describe in which papers the same methods have been described and accepted before? This is not novel, provide evidence that the use of the

BGD

12, C1193–C1195, 2015

method here has been used before and is acceptable.

1660: lines 6: to the surface? 1660: lines 5-10: quantify this!

1661: first paragraph doe not belong to the results section. next paragraph: I would like the author to demonstrate which is it, the magnitude or phasing that will have more impact and carry-over effects on the biology. line 10-25: this sections needs much more explanation of details a coherent though in this section lacking- rewrite can you include magnitude difference for Temp, salinity in Table1? line 20: where is this seen in figure 4g, h?

1663: lines 10-25: please, constrain how biological processes impact saturation state. 1664, line 1-5: provide some quantification line 15-20: where are this data corroborated?

1665, line 7-20 (25): provide more detailed quantification 1666, line 3: what about year 2011? line 20-30: where is the rate of thawing explicitly quantified? elaborate on this.

1667: lines 5-25: define error and variability extent of the changes in density. 1668: bio effects: needs to be stressed out that this is all on surface, sub-surface undersaturation states will have even more impact on biology

1669, line 17-18: what about anthropogenic CO2? 1670: line 20 and below: compare to the studies that are showing increase in phyoplankton production 1671: line 13: repeated text line 25: where is omega value of 1.5 coming from? here define how will feeding impact pteropods, see Seibel et al., 2012 study, compare the years for pteropods.

Good luck with corrections.

Interactive comment on Biogeosciences Discuss., 12, 1653, 2015.