

Interactive comment on **“Photosynthesis–irradiance responses in the Ross Sea, Antarctica: a meta-analysis” by W. O. Smith Jr. and K. Donaldson**

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Received and published: 2 March 2015

NOTE THAT A REVISED MS AS WELL AS A FULL RESPONSE TO ALL REVIEWER COMMENTS IS PROVIDED SEPARATELY (I HOPE, AS I AM UNSURE AT THIS POINT OF THE ENTIRE PROCESS).

Responses to Review bgd-11-C8089-2015 We appreciate the comments of the reviewer, and have worked hard to improve the clarity and logic throughout. In response to his comments, we made the following changes: 1. The reviewer commented that the data in Figure 2 were inconsistent with the manuscript's comments. We have emphasized in the results that the irradiance effects observed in this controlled experiment

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were in fact very different from any observed in situ. The irradiances in Fig. 2 were in fact constant as well as different, whereas the irradiance in situ is obviously much more variable on a wide range of time scales. We have tried to emphasize this difference throughout (lines 205, 230, 321, 335). 2. The reviewer is correct (like the other two reviewers) that we inadvertently omitted the Fe data, and we have now done so. As we commented in our responses to the other reviews, we have attempted to clarify why the PRISM results appear to differ from the CORSACS results, and hope we have resolved this lack of clarity. 3. This reviewer commented, as did Reviewer 8014, that there was confusion about the statistical power of our conclusions from Table 5. We strongly believe that simply attributing the seasonal changes to solely phytoplankton composition is inappropriate, simply because all environmental variables (Fe concentrations, mixed layer depths, strength of stratification, temperatures) vary seasonally, in addition to composition. Indeed, we feel that it is the sum of all seasonal changes that induce compositional changes, and the differences in P-E parameters reflect all of these changes. However, based on both reviewers' comments, we have tried to clarify our logic and support our conclusions with additional literature references. Substantial changes have been made in the discussion (lines 291, 295) to reinforce this logic. Specific comments 1. We have corrected this inconsistency. Actually, we left port in late December but initiated sampling in January. 2. We understand the confusion, and to be honest, it has been confusing to others. An initial part of CORSACS was devoted to IVARS Year 5, although they were part of the same cruise. Internally we differentiated between them, and did so in this paper. We altered the statement on line 122 to accurately state that the analyses in this paper involved manipulations with natural assemblages. Changes are also made later (line 217). 3. The comparisons were indeed done by ANOVA tests, which is now specified (line 183). 4. We have checked all of these values throughout and believe any errors have been found. 5. The changes suggested have been made throughout. We are curious, however, at the insistence of using whole numbers for Ek values; is that based on the accuracy of measurement? 6. The values for R2 have been checked and modified to reflect two significant digits.

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7. Table 2 has been corrected as noted above. 8. Now provided. 9. Corrected as suggested. 10. Corrected as suggested.

Interactive comment on Biogeosciences Discuss., 11, 18045, 2014.

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