

Earth Syst. Sci. Data Discuss., referee comment RC4  
<https://doi.org/10.5194/essd-2021-351-RC4>, 2021  
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## Reply on AC3

Anonymous Referee #2

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Referee comment on "Primary productivity measurements in the Ross Sea, Antarctica: a regional synthesis" by Walker O. Smith Jr., Earth Syst. Sci. Data Discuss.,  
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Thanks for the update. My questions are addressed except the statistical test.

The real question is to test whether the effect of categorical factor (dominant phytoplankton group) was significant in the two-factor model (the other factor is Chla) for euphotic depth. But t-test cannot do the job, ANOVA can (<http://sthda.com/english/article/s/40-regression-analysis/163-regression-with-categorical-variables-dummy-coding-essentials-in-r/#example-of-data-set>).

It's difficult to transform the nonlinear Eq1 into a linear one. Maybe we can assume 29.6 is a known constant. Then, the linear form of the regression would be:

$$\text{Log}(\text{ZE1}\% - 29.6) = a * \text{Chla} + b * \text{group} + c$$

Where a, b, and c are coefficients to be addressed. ANOVA will test whether the group effect is significant or not (not is expected in this case).