I have reviewed the manuscript "Photosynthesis-irradiance responses in the Ross Sea, Antarctica: a meta analysis" by Smith and Donaldson. The manuscript could be improved in several respects. The authors show in Tables 3 and 5 that changes in nitrate concentrations (greater than or less than 20 μM), temperature (greater than or less than 0°C), and the composition of the phytoplankton community (diatoms or *Phaeocystis Antarctica*) have no effect on the photosynthetic parameters P_S^B, α, and E_K. However, they discover (Table 4) that P_S^B and α are significantly higher in the spring than in the summer. They then say (p. 18056), "The macro-environment of the Ross Sea continental shelf changes markedly from spring to summer, with increased temperatures and vertical stratification, decreased macro- and micronutrient concentrations, and an altered assemblage composition. . . . As such, it is not surprising that the P-E parameters also changed." Given the results in Tables 3 and 5, why would we expect changes in temperature, macronutrient concentrations, and the composition of the phytoplankton community to lead to a change in the P-E parameters? On the contrary, I would say that the results in Tables 3 and 5 provide no clue as to why the P-E parameters changed. The review of results also includes some discussion of iron limitation, but the results are presented in a very disorganized way. On page 18053 the authors say that P_S^B values were significantly greater at iron concentrations less than 0.1 nM and refer the reader to Table 3, but there are no results related to iron in Table 3. In contrast, Fig. 2 shows results related to iron, but both sets of bar graphs related to iron say "Hi Fe". If the order of the graphs is the same as the order for light and CO_2, then the left-hand set of bars is the high Fe set of results, and the right-hand set of bars is the low Fe set of results. These graphs indicate no difference between high and low Fe, and the P_S^B values are actually higher (albeit not significantly higher) for the "Hi Fe" results. The authors correctly point out (p. 18051) that $E_k = P_S^B/\alpha$. It follows that if one of these parameters changes, at least one of the other two must also change. However, on page 18052 the authors report that P_S^B values were different in December and February but that E_k and α were not significantly different. Obviously P_S^B could not have changed while E_k and α remained constant. The authors based their conclusions on *t* tests, which assume normally distributed variables. The product or quotient of two normally distributed variables is not normally distributed, so all three of these parameters cannot be normally distributed. The information in Table 2 is sufficient to allow the reader to determine that the difference in E_k values is significant at $p = 0.083$. I think it would be worthwhile for the authors to take a look at the distributions of the parameters to determine whether a transformation might make one or another of the distributions more normal and reduce the type I error rate associated with the *t* tests. The type I error rate (*p* value) for the *t* test of P_S^B values is 0.0171, so it seems very likely that either E_k or α (or both) differed between December and February. According to page 18054, the nitrate concentrations varied from 9.5 to 31 μM. People have known for literally decades that nitrate concentrations that high are far above limiting concentrations. One could cite Caperon and Meyer (1972), but there are numerous other studies of nitrate-limited phytoplankton growth. I think it is belaboring the obvious to ask whether nitrate concentrations above 9.5 μM have any effect on photosynthesis.

Table 2 includes numbers in parentheses, but there is no indication what the numbers mean. I am guessing that the numbers are the number of replicates. Table 2 should clarify what those numbers are. Table 2 should also indicate what the error bounds are. I guessed that they were standard deviations. Table 2 should clarify what they are. Finally, I would like to suggest why the P_S^B and α values are different in the spring and summer (Table 4). I think the reason is the difference in he composition of the phytoplankton community. Based on Table 5, the authors conclude that there is no difference in P_S^B, E_k, and α between *P. Antarctica* and diatoms. However, the data in Table 5 is based on an analysis of results from a total of 20 stations. If I take the P_S^B and α values in Table 4 and assume that they are means and standard deviations of 10 (rather than 159 and 268) replicates each, the differences between spring and summer are not significant at $p = 0.05$. I think the reason the authors cannot see differences in Table 5 is that they do not have enough replicates. With 61 replicates for each of the *P. Antarctica* and diatoms, the means in Table 5 would be significant at $p = 0.05$. This is more-or-less consistent with the conclusions of the paper. The algorithms that use integrated chl, irradiance, and P-E response as a function of temperature actually do a reasonable job in the Ross Sea because in fact there are not big differences between spring and summer in the P-E response. However, there are differences, and with a total of 417 samples you can see them (Table 4). However, you cannot see them with a total of 20 samples (Table 5).