

Biogeosciences Discuss., referee comment RC2
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Comment on bg-2021-296

Anonymous Referee #2

Referee comment on "Variations in and environmental controls of primary productivity in the Amundsen Sea" by Jianlong Feng et al., Biogeosciences Discuss.,
<https://doi.org/10.5194/bg-2021-296-RC2>, 2021

This study aims to provide an insight of primary productivity variation and its drivers in the Amundsen Sea Embayment using a bioregion approach based on cluster analysis. Such study could highlight the main physical and biogeochemical difference that drives the biology across the longitudinal and latitudinal gradient of the whole area. However, as mentioned by RC1, such difference can only be compared with consistency in the analysis method and report of full results, which is lacking here. On the other hand, the authors only describe their findings, without trying to explain the processes behind the variation of parameters leading to changes in phytoplankton primary production. As suggested, I concur with RC1 that this study needs major revision and improvement before being considered for publication. Specific comments are listed below:

1. Be careful about the use of the word "Significant". One can only use this term when it refers to statistical analysis, which is often not done. Changing the wording of performing the analysis is highly recommended.
2. Figures 7 to 10 should be centered around Austral summer (June to July or July to August) to ease the figures reading.
3. Figure 2: Bioregion should be listed according to a latitudinal gradient to ease the comprehension in your result description. Unless you justify your number listing, the bioregion number attribution seems random.
4. Figure 3 should have indication on the X axis if possible to understand where the coast/offshore areas are
5. Colorbars are missing on some plots
6. Do you obtain the same result if you integrate your primary productivity (in TgC y) across the whole time period for your bioregion? (e.g. sum instead of mean). For Figure 11 for example.
7. Overall discussion is lacking, especially line 355 - 356. You argue the variation of nutrients result in primary production increase in some bioregion, but you do not explain

what caused the variation of these nutrients and how it could have affected the PP.

Please also note the supplement to this comment:

<https://bg.copernicus.org/preprints/bg-2021-296/bg-2021-296-RC2-supplement.pdf>