



*Supplement of*

## **Zooplankton mortality effects on the plankton community of the northern Humboldt Current System: sensitivity of a regional biogeochemical model**

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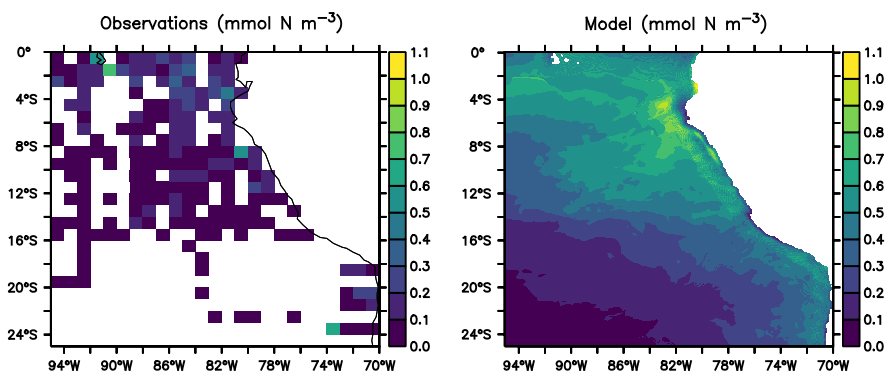
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**Abstract.** This supplement provides an additional comparison of the model large zooplankton with mesozooplankton observations, and additional information on the model temporal evolution.

## 1 Large zooplankton evaluation

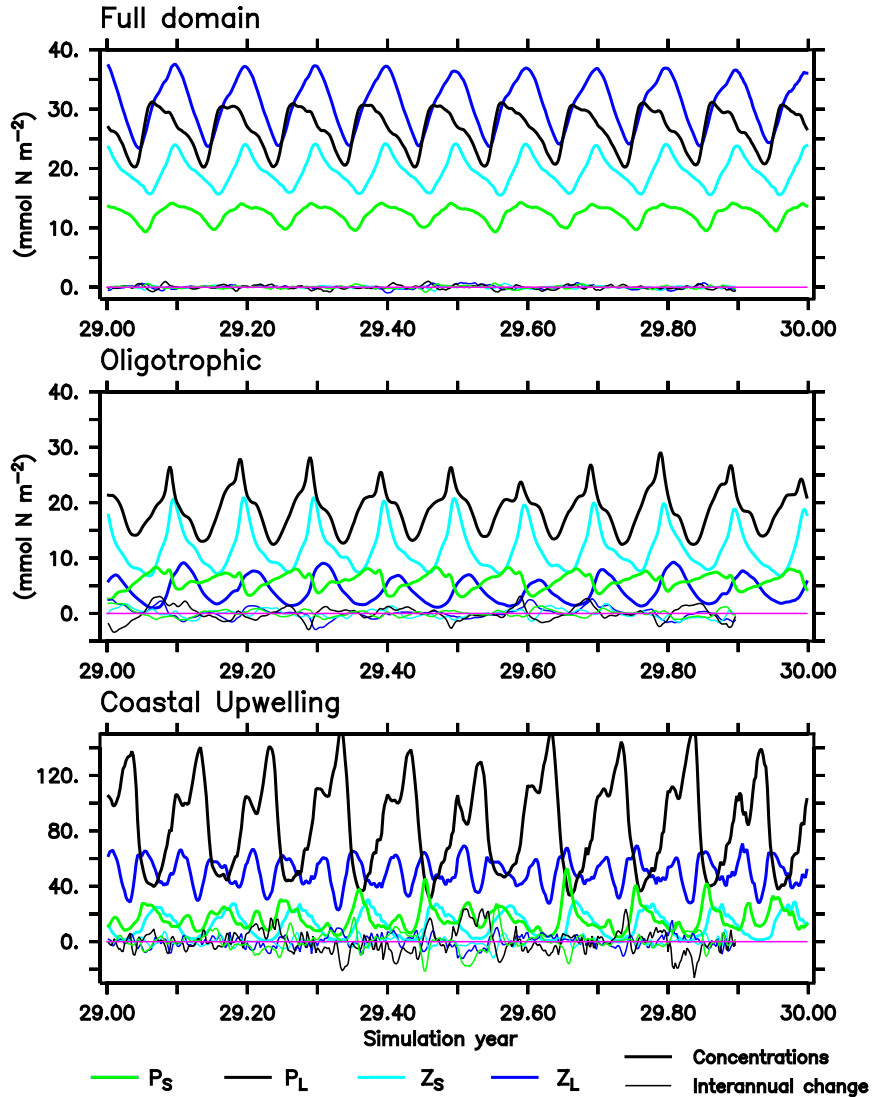
Fig. S1 shows a comparison between the model (right) and the Eastern Tropical South Pacific region of the global mesozooplankton dataset by Moriarty and O'Brien (2013); O'Brien and Moriarty (2012) (left). We transformed the observation values provided in the dataset to nitrogen units assuming a carbon to nitrogen ratio by weight of 4.9 (Kjørboe, 2013) and a nitrogen molar mass of 14 g/mol. Both model and observations are averaged over the whole year and over the upper 100 m depth. Model values are generally higher than observations. However, please note that the observations are sparse and in many cases there is only one data point available for the whole water column. Therefore, the averages may not be representative of the whole water column.



**Figure S1.** Comparison of mesozooplankton observations from the global dataset by O'Brien and Moriarty (2012), and model large zooplankton averaged over the upper 100 m depth ( $\text{mmol N m}^{-3}$ ).

## 2 Temporal evolution of experiment A\_high

Fig. S2 shows the temporal evolution of the four plankton groups of the model in each of the analysed regions (thick lines), as well as the interannual change (thin lines) in experiment A\_high. This was calculated by taking the percentage differences between every point in time and the same point one year later. There is no noticeable trend of increase or decrease in the plankton concentrations between year 21 and 30 of the model spin-up. However, there is some variability among the years which is especially high in the coastal upwelling region (bottom), and almost completely muted in the full domain (top). In all cases, the interannual variability is much weaker than the seasonal variability.



**Figure S2.** Time series from year 21 to year 30 of plankton concentrations (mmol N m<sup>-2</sup>) integrated over the upper 100 m and averaged over space (thick lines), and percentage difference between every point in time and the same date one year later (thin lines), on each of the analysed regions of the model.

## References

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- Moriarty, R., and O'Brien, T. D.: Distribution of mesozooplankton biomass in the global ocean, *Earth System Science Data*, 5(1), 45–55, <https://doi.org/10.5194/essd-5-45-2013>, 2013.

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