

Review to “NW European shelf under climate warming: implications for open ocean – shelf exchange, primary production, and carbon absorption”
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Specific minor comments

Introduction

P16627L23-P16628L6 these processes are indeed characteristic for the NWE shelf, but not all of them are relevant for the shelf break. Please be more specific here. Please also make clear what processes can be resolved by your method and how sub-grid scale processes are treated in the model (maybe in the method section).

Model description

Since, the carbon cycle is one of the main aims of the study I think a few more details on the carbon module would be interesting.

Experiments

River loads: Please include maybe a graph on river loads that indicate the magnitude of the change and the control level.

Page 16630 L24-25 : are those 5yr averages or is a 5yr period repeated?

Experiment MARKER: what exactly has been done here? Please add scenario description here.

Model Validation (see also comment above)

Global Ocean

The whole paragraph does not only describe the model-data comparison, but also gives a number of explanations that can't be derived from the figures referring e.g. to different water types. Please include references and make clear what conclusions are drawn from your model.

Fig. 2: Obviously the model doesn't perform equally well for all model regions, which I guess can't be expected from a global model. Nonetheless, this requires a thorough discussion.

-is there a data gap at 0deg ?

-it would be better to plot the difference between data and model (or a relative difference) to identify the performance within specific areas since it is difficult to see this by visual comparison only (same for Fig. 3).

- What about nitrate?

P 16632 L14 Antarctic Bottom Water

North Sea (see comment above)

The following points need clarification:

-Please include an introduction and details about the datasets used.

- Primary production: I don't think that atmospheric wet deposition would account for more than half of the production. What other reasons are possible?

Fig. 4:

- Why has the analysis performed only for May? It would be better to assess winter nutrient conditions (pre-bloom) and summer nutrient conditions separately.

- Nitrate should be included in the analysis.

Table3: - what exactly was assessed here? Dataset, time period, data handling.

- Taylor diagrams are a method to display the statistics presented not a method to derive statistics from. So, why not showing the diagram?

Stratification on the shelf and along the shelf break

Fig 5 & 6 Fig5 cannot be used to explain Fig. 6.

Fig. 5 is showing NS average values for T & S, thus when averaging S over the NS you include the coastal areas and the Norwegian Trench region, which probably account for most of the S changes in the NS seas surface, but have no effect on the density profile at the shelf edge. Please include an analysis that supports your explanation. Obviously in the NS itself there is no change in winter MLD.

Again please include references for parts of the discussion (e.g. on atmospheric transports).

P16634L22 cycle, which

P16634L27 PSU – please use SI units

Decline in biological productivity

P16636L16/17 this conclusion is only true for the considered scenario and model configuration.

Potential Implications for industrial fisheries

Here the authors include a rather speculative review paragraph concerning fisheries. The paragraph seems misplaced and not really related to the model simulation and scenarios. I would recommend excluding this paragraph and including a proper discussion instead.

Appendix

P16643 L23 light absorbing particles

P16644 to other studies

Figures:

Fig. 1 NT lies on land

Fig. 4 is very small, difficult to read

Fig. 5 make labelling consistent

Fig. 9 labels are difficult to read. Month abbr. check for German spelling (e.g. DEZ)