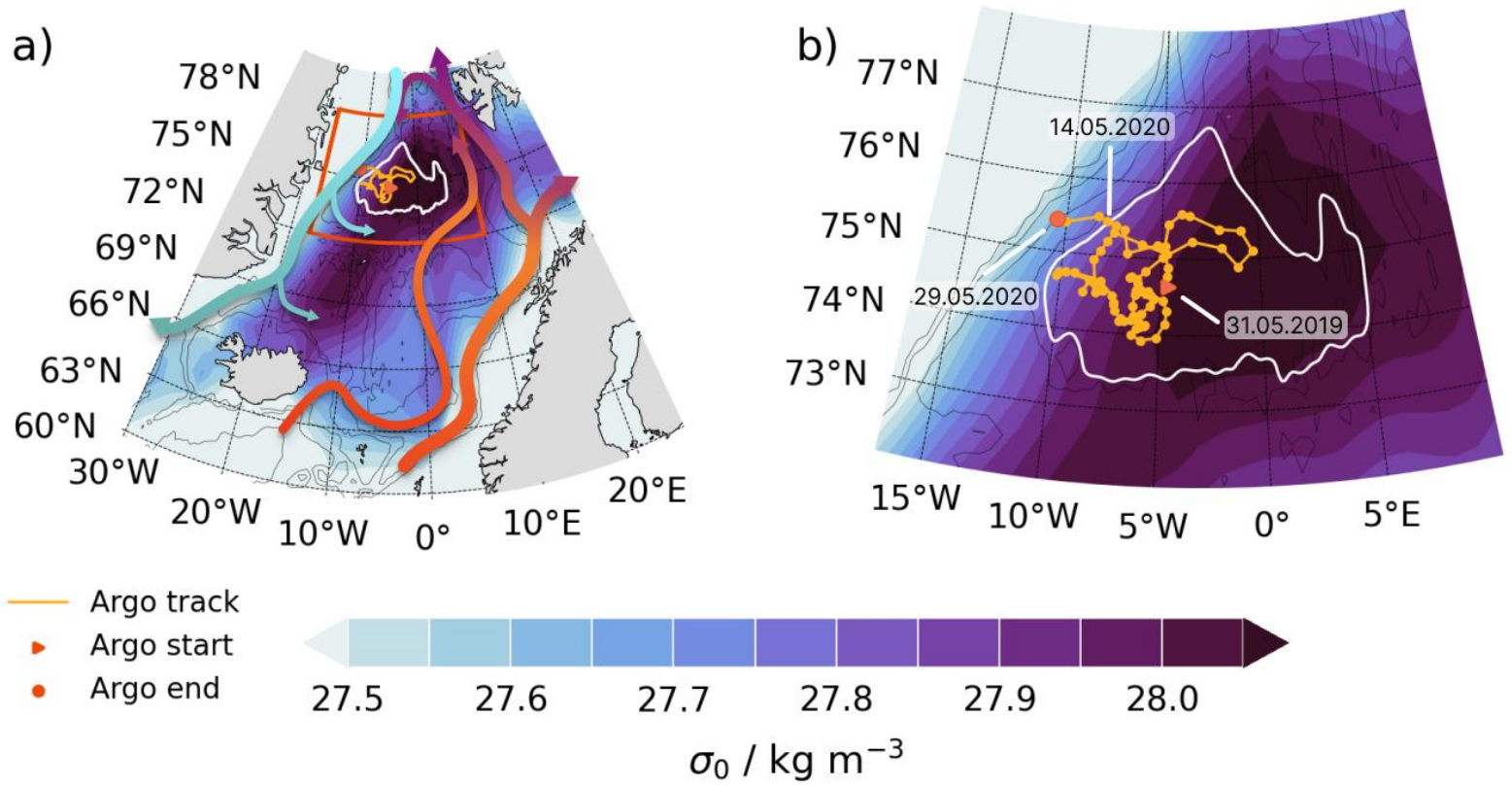
Supplementary material

# Net Community Production in The Greenland Sea:

## A Case Study Combining the PWP Model and Argo Data of Nitrate, Oxygen, and pH

I. Sælemyr*[,1,2], A. Olsen[1,2], M. Becker[1], S.K. Lauvset[3,2], K.A. Mork[4,2], A. Brakstad[1,2], F. Fransner[1,2]
*Corresponding author ingrid.selemyr@uib.no
[1]University of Bergen, Bergen, Norway, [2]Bjerknes Centre of for Climate Research, Bergen, Norway, [3]NORCE Norwegian Research Centre, Bergen, Norway, [4]Institute of Marine Research, Bergen, Norway

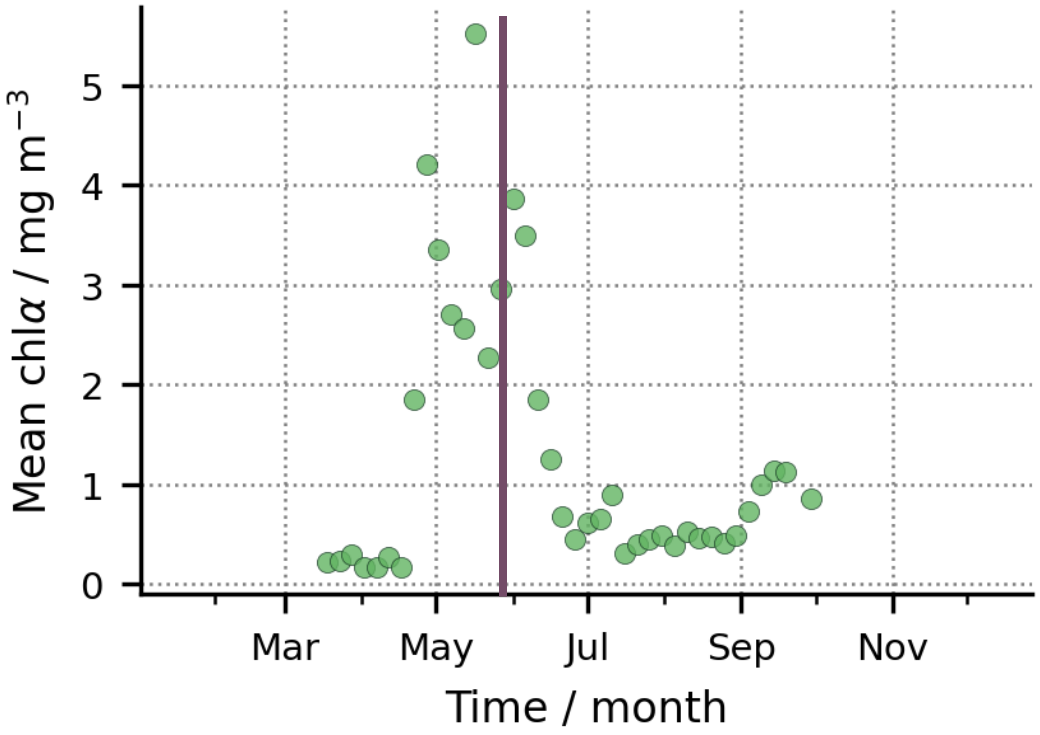
# Full map of the Greenland Sea and Argo track




a) Map of the Nordic Seas.The orange line indicates the Argo track, with a red triangle showing its deployment point and a red circle the final profile included in this work. Coloured contours show the potential density anomaly ($\sigma_0$). The white contour line indicates the central Greenland Sea. Arrows in orange to purple are warm, saline surface currents carrying Atlantic Water. Arrows in blue show the East Greenland Current and its branches carrying Polar Water. The red box indicates the location of b).

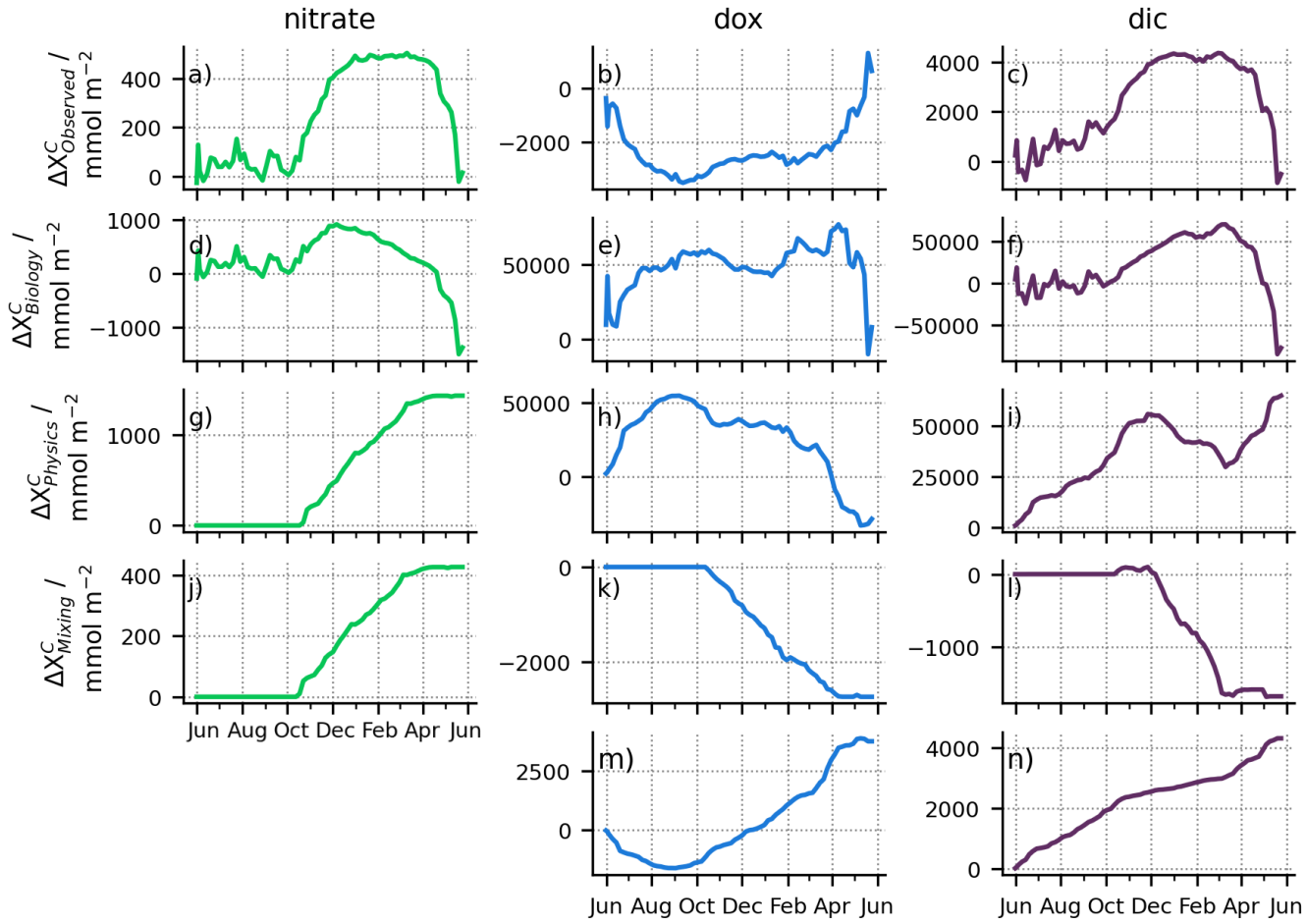
b) Same as a), but zoomed in on the central Greenland Sea. Deployment date and date of the final included profile are indicated, as well as the date when the float crossed the Central Greenlad Sea boundary.

# Satellite chlorophyll-α in 2019




Satellite chlα for 2019 shows that the spring bloom had reached its maximum by the time the Argo float was deployed (31st of May 2019), and that it started in late April.

# Euphotic zone budgets




Columns: cumulative budget components for nitrate, dissolved oxygen (dox), and dissolved inorganic carbon (dic)

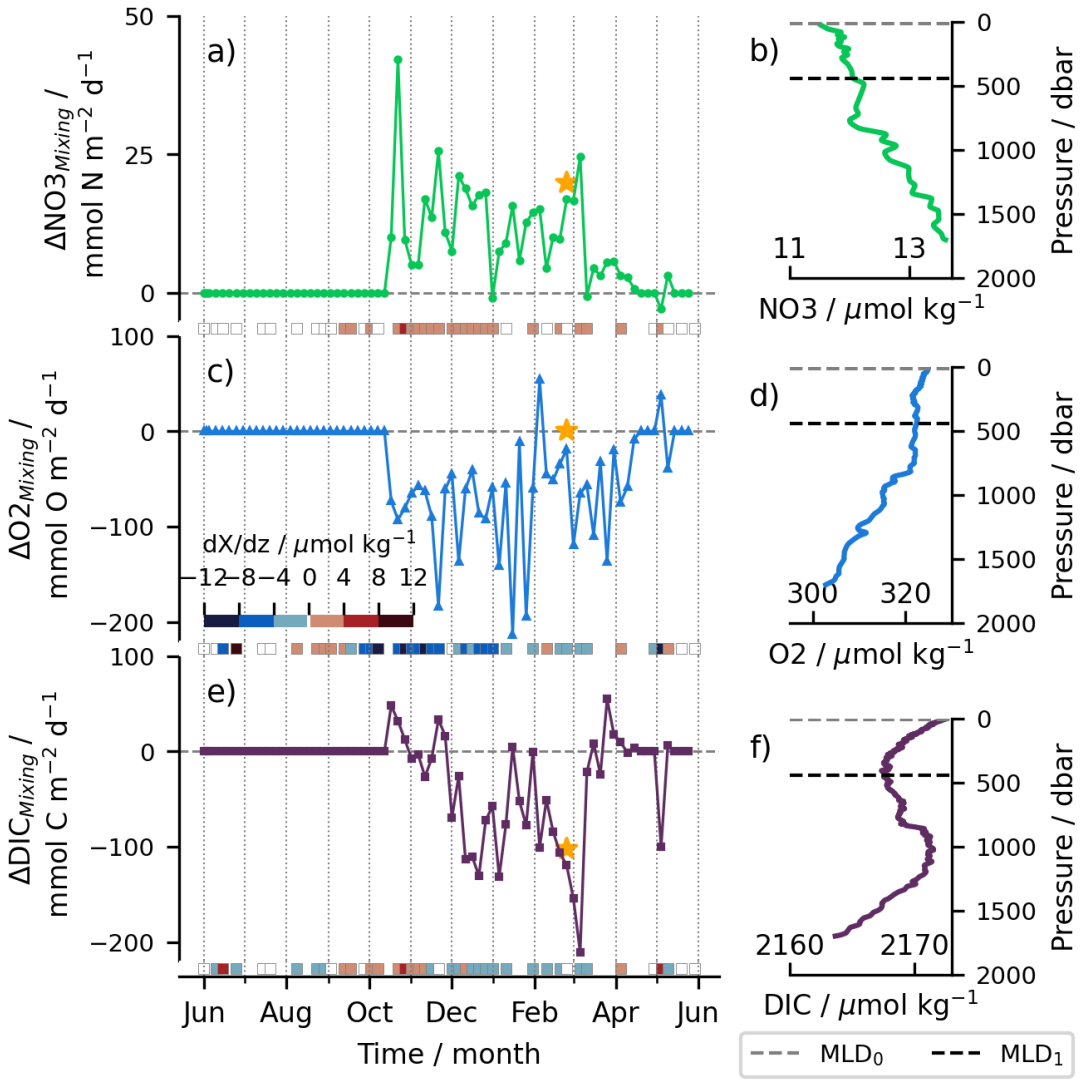
Rows: a-c) Cumulative observed changes
d-f) Cumulative changes caused by biology
g-i) Cumulative changes caused by all physical processes in the PWP model
j-l) Cumulative changes caused by mixing in the PWP model
m,n) Cumulative changes caused by air-sea gas exchange in the PWP model

All components were integrated to 48 dbar.

# A closer look at mixing

a,c,e) The mixing term of the budget integrated to 48 dbar. A yellow star indicates the time of the profiles in b,d,e). Coloured squares indicate the gradient of a property X with depth z. It is negative if the mean concentration in the mixed layer at reinitialization (MLD0) is higher than the mean concentration in the layer between MLD0 and the model MLD at the end of a 5 day period (MLD1), and positive if lower. If MLD1>MLD0, it was neglected.

b,d,e) Representative winter profiles of each property. MLD0 (gray, dashed line) is the MLD at reinitialization, and MLD1 is the MLD in the model after running for 5 days (black, dashed line).



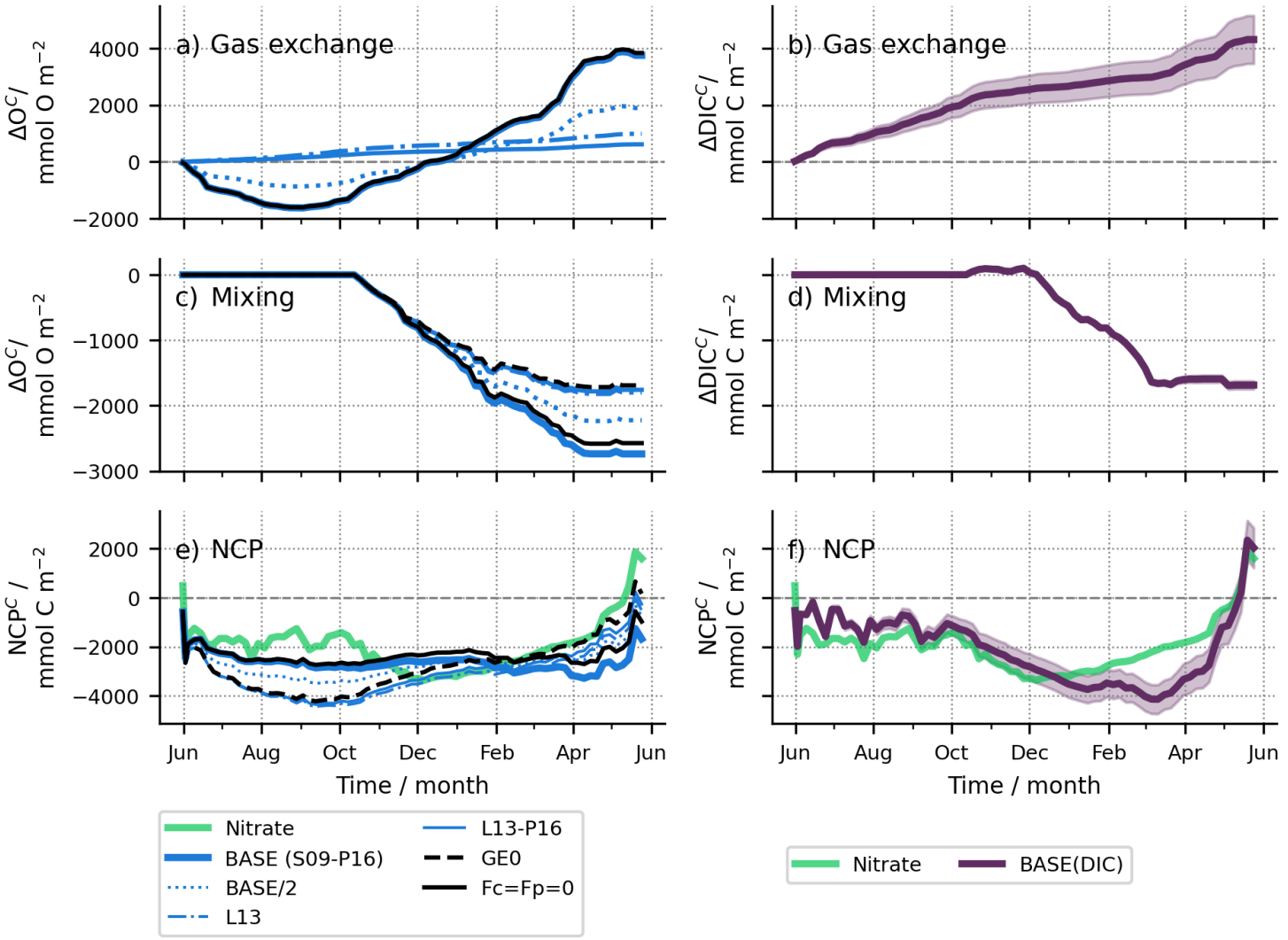
# Gas exchange sensitivity

Cumulative gas exchange (a), mixing (b) and net community production (NCP; c) integrated to 48 dbar for oxygen (left column) and DIC (right column). Oxygen runs were done with the following parameterizations:

- BASE (S09-P16): Stanley et al. (2009) as amended by Plant et al (2016)
- BASE/2: As above, but tuning coefficients halved
- L13: Liang et al. (2013)
- L13-P16: Liang et al. (2013) as amended by Plant et al. (2016)
- GE0: No gas exchange of oxygen
- Fc=Fp=0: No bubble parameterization

DIC sensitivity was tested by increasing and decreasing the transfer velocity by 20%, which is shown as the shading in each plot on the right hand side.

NCP from nitrate is shown in thick green as a baseline comparison.



Thank you for checking out my poster and/or supplementary material!

**Contact me at ingrid.selemyr@uib.no**