

Supplementary material

S1. Nutrients in original and revised simulation.

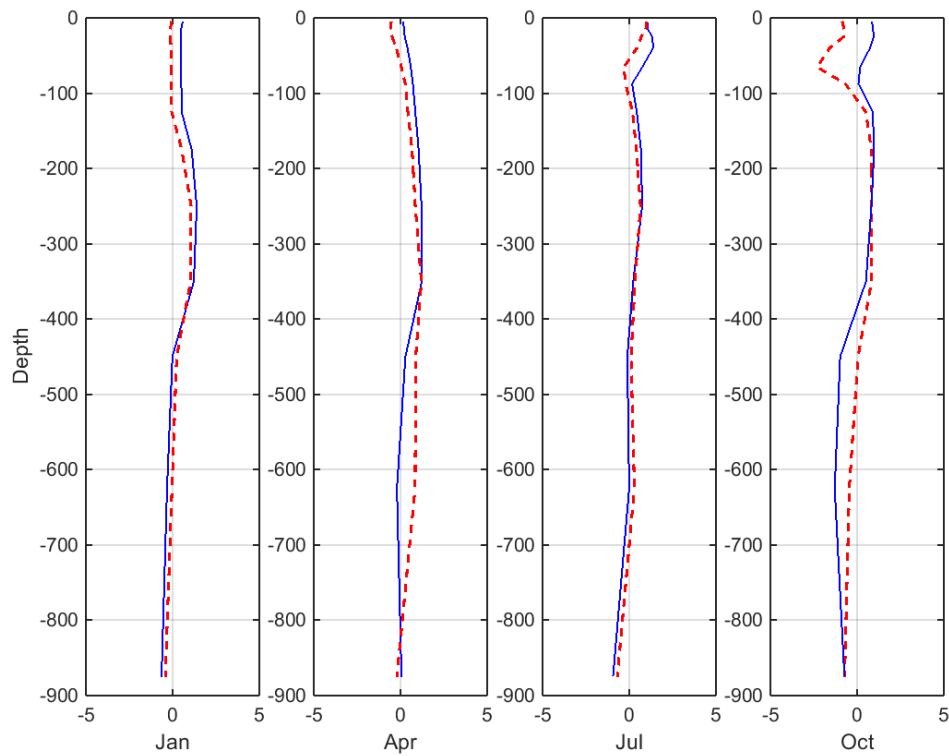


Figure S1. Profiles of difference between silicate [mmol/m^3] model and observations in different months in the Norwegian Sea box – solid lines (blue) are the revised simulation and dashed lines (red) the control run. All observations in the Norwegian Sea box between 1998 and 2001 have been used.

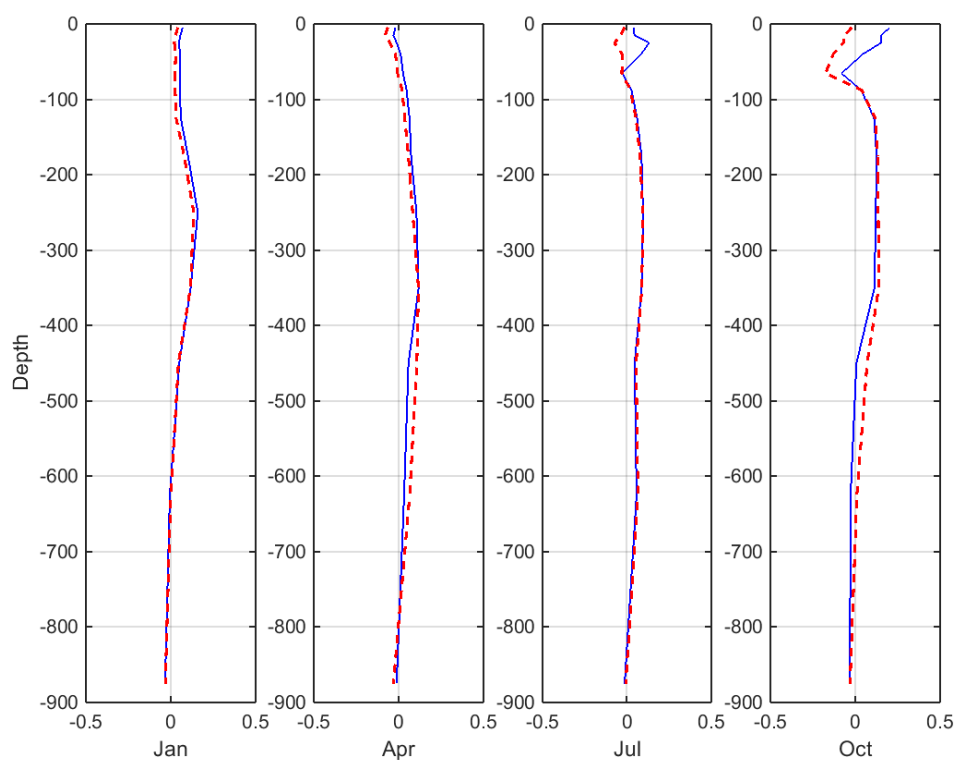


Figure S2. Profiles of difference between phosphate [mmol/m^3] model and observations in different months in the Norwegian Sea box – solid lines (blue) are the revised simulation and dashed lines (red) the control run. All observations in the Norwegian Sea box between 1998 and 2001 have been used

S2. Zooplankton mortality functions.

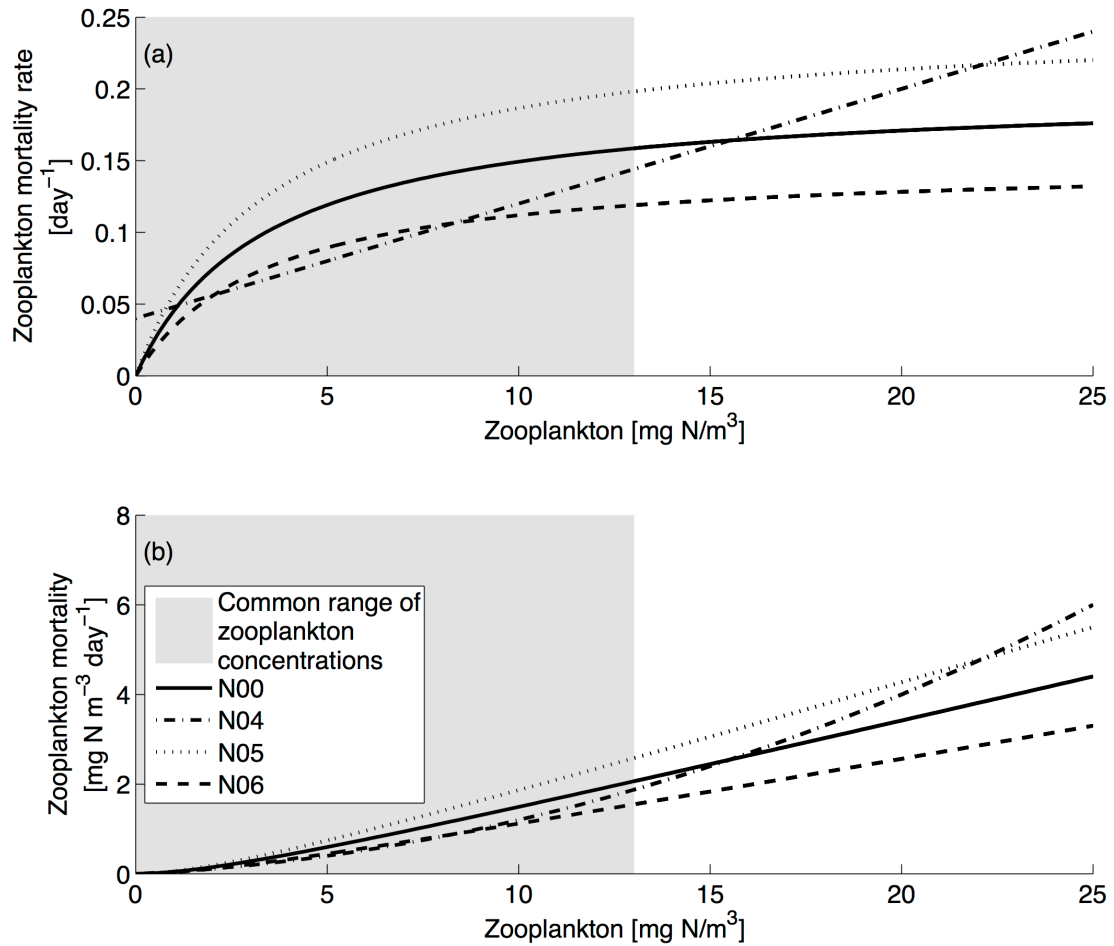


Figure S3. The zooplankton mortality rate (a) and zooplankton mortality (b) as a function of zooplankton concentration for runs with different zooplankton mortality. The gray shading indicates the range of common values for zooplankton concentration. This range was determined by computing the 10th and 90th percentile values for the monthly mean micro- and mesozooplankton fields of the reference run - NA0 - in the period 1998-2001. Then the minimum of the 10th percentile values and the maximum of the 90th percentile values were used as the range of common value.

S3. Representation of water masses and fronts in the physical model

Although the physical model produces the large-scale currents, temperature and salinity, the water masses and location of fronts are not always correctly represented in the physical model. This will affect the ecosystem model as well, and will be particularly visible when validating the model with point measurements observed close to a front. Below, two sections model along the Norwegian coast from the high-resolution model run (TP1) have been compared to observations. The fronts are generally more diffuse in the model and the thermo- and halocline are not as well defined. Close to the coast the lowest salinity coastal water is not present and from the TS-diagram it is clear that the warmest, most saline water cannot be found in the model. The former may stem from inaccurate river runoff along the coast and the latter from excess mixing as well as coarse vertical resolution.

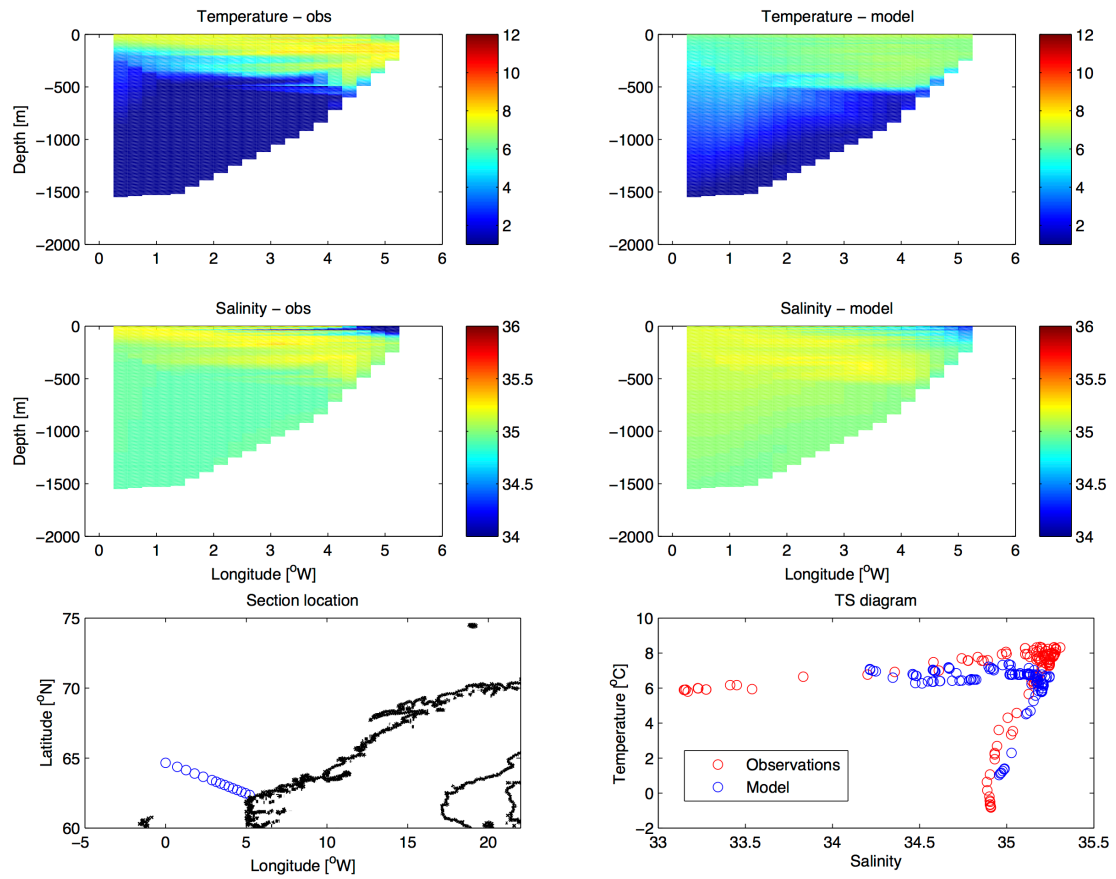


Figure S4. Gridded salinity and temperature from observations and model along the Svinøy section on 27. and 28 of May 2001. The section location is show in the lower left panel and the TS-diagram from these stations in the lower right panel.

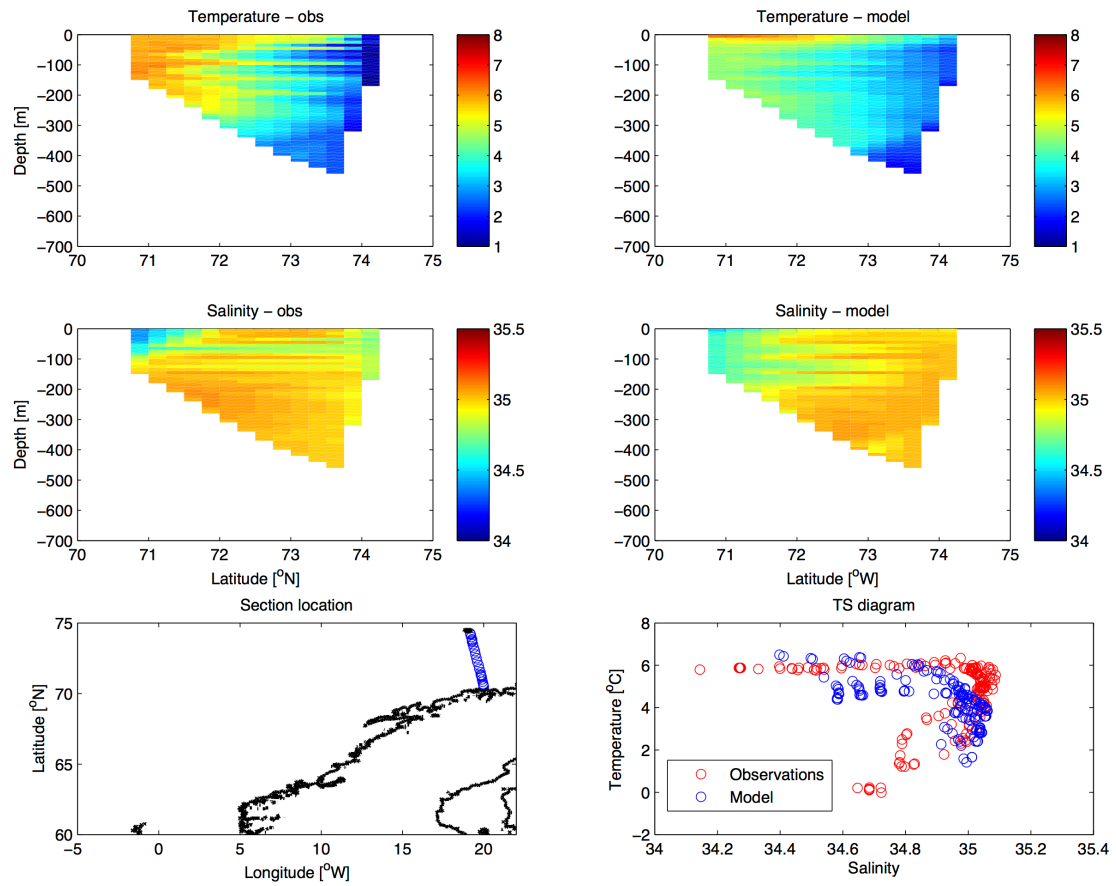


Figure S5. Gridded salinity and temperature from observations and model along 20°W. The section location is show in the lower left panel and the TS-diagram from these stations in the lower right panel.