

Interactive comment on “Investigation on the trophic state of the North Sea for three years (1994–1996) simulated with the ecosystem model ERSEM – the role of a sharp NAOI decline” by H. J. Lenhart et al.

H. J. Lenhart et al.

Received and published: 20 February 2005

Response on the interactive comment by anonymous Reviewer 2 on "Investigation of the trophic state of the North Sea for three years (1994-1996) simulated with the ecosystem model ERSEM – the role of a sharp NAOI decline" by Lenhart et al.

General remarks

According to the recommendation of reviewer 2 we made a major revision of the ms. Especially we took into account all the formal and editorial hints the reviewer gave. We reorganized the text in a proper way and extended the discussion markedly. The main objections made by reviewer 2 were: firstly, the use of a box model for budgeting would be inappropriate, because it neglects the mesoscale processes, and secondly,

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

the winter NAOI would not dominate the annual transport of water (and consequently, of biogeochemical material). In the following we comment on this and reply to special remarks of the reviewer.

1.) We agree that using relatively coarse scales (spatial boxes and daily forcing) the model neglects variations on the mesoscale level. Even though it could not be excluded that such variations attribute to variations on the coarse scale (eddy pumping, etc), various studies (e.g. Pätsch and Radach, 1997; Lenhart et al., 1997) came to the conclusion that on the coarse scale ERSEM with its complex trophic net was able to reflect the main basin-wide features and their interannual and decadal variations. 2.) Not only that the spring NAOI for the years under consideration exhibited a similar pattern as the winter NAOI (see the following point), the lower SST in 1996 until July compared with the years before clearly shows the long-lasting impact of the meteorological situation in the early year.

page 727 line 7 We decided to use the winter NAOI values given by Jones et al. (1997) which do not differ substantially from those we had used. The latter paper, however, stressed the drastic jump from a very high value in winter 1994/95 to a very low value in winter 1995/96 and, additionally, gave time series of seasonal NAOI values. These time series show that a similar decrease as seen for the winter NAOI can also be found for the corresponding spring values, though less pronounced.

page 732 line 24 The correlation between the winter NAOI and the strength of the annual circulation was caused by the dominance of interannual variations in wind-driven advection in winter. We found a drop of the Norwegian Trench outflow during winter (January – March) from 1995 to 1996 of 25%.

page 736 line 18 The values for the net primary production of the southern as well as for the northern North Sea exhibit comparatively low interannual variations. This is mainly due to the fact that ERSEM allows for varying C:N ratios for the production as well as for the decomposition of organic matter. A pure nitrogen-based model would

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

show a higher level of interannual variability. Also in our investigation the interannual variation of the total nitrogen uptake amounts to +/- 9 %, while the (carbon-based) primary production varies by only +/- 2 %.

References Jones, P.D., Jonsson, T. and D. Wheeler, *Int. J. Climatology* 17: 1433-1450
Lenhart, H. J., G. Radach and P. Ruardij, *J. Sea Res.* 38: 249-274
Pätsch, J. and G. Radach, *J. Sea Res.* 38: 231-241

Interactive comment on Biogeosciences Discussions, 1, 725, 2004.

BGD

1, S529–S531, 2004

Interactive
Comment

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper