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# Decadal variability of winter nutrient concentrations in the northern North Sea

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A biogeochemical North Sea Climatology (NSBC) for a suite of biogeochemical parameters in the wider North Sea Region has been constructed for 1960 – 2014 based on observational data from different data centers. Standardization of the observational data in terms of data format and physical units of the parameters was necessary to be able to merge the observations to a final data set without duplicates. Furthermore, quality control of the merged data set was required to eliminate erroneous observations that would bias the final result. The final data set consists of monthly averaged vertically resolved data on a 0.25° x 0.25° grid.

The decadal and inter-decadal variations of the position of the eastern Subarctic Front correlate with a time lag of about 2 years with salinity in the central and northern North Sea. It is based on different water masses entering the North Sea at its northern boundary. When the front shifts westward more subtropical high saline water is transported towards the northern boundaries. When the front shifts eastward more subarctic low salinity water is transported towards the northern boundary.

Winter nutrient concentrations in the northern North Sea exhibit similar but reversed correlation with the position of the Subarctic Front without time lag. One explanation for this temporal discrepancy and the reversal correlation is a strong horizontal nutrient gradient positioned along the Faroe Islands and the Hebrides.

We examine these correlations using the global EN4 hydrographic dataset and the new biogeochemical North Sea Climatology (NSBC) with strong horizontal aggregations.