



## Predicting nitrate on the North-West European Shelf using neural networks

We have trained a neural network model to predict nitrate from a number of directly observable structural, atmospheric, riverine discharge and oceanic variables (e.g. SST, surface chlorophyll, short-wave radiation, bathymetry). Using the neural network model we have generated a gap-free bi-decadal (1998-2020) product for the surface nitrate on the North-West European Shelf (NWES). We demonstrate that the data-set validates nicely against the independent observations. We have used the data to address questions related to eutrophication status on the NWES, identifying eutrophication vulnerable areas, trends and drivers. Finally, we discuss how this data-set can be potentially used to improve model biases in the operational forecasts on the NWES.

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