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Variability of planktonic structuration in the Northeast Atlantic in response to dynamics: influence on production and export

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Located in the region of subpolar mode waters formation, the POMME program aims at understanding the interactions of biological and physical processes which drive mode waters characteristics and regulate the fate of exported organic matter. Quantifying primary production and export raises the issue of phytoplankton community composition. Growth, remineralization and sedimentation rates are, indeed, linked to this composition. In this framework, a complex biogeochemical model has been developed and coupled with 1D and 3D dynamical models.

The annual cycling in the POMME area has been simulated using the 1D version of the model. Results have been analysed in terms of species succession, production and export fluxes. The model predicts a middle range spring bloom with maximum primary production of 10mmolN/m^2/d. Spring bloom is dominated by nanoplankton whereas the largest class only shows a peak at the beginning of the bloom and picoplankton dominates during the oligotrophic period, in summer. This succession and the associated fluxes are in good agreement with averaged observations in the area. Nevertheless, the 1D configuration underestimates the amount of particulate matter during the pre-bloom period and, thus, regenerated fluxes.

The 3D configuration highlights a spatial distribution of phytoplankton due to dynamic features of the area. Dynamic not only constrains total biomass but also the

population structure, hence, the fate of organic matter. Our results exhibit, a strong mesoscale variability of the planktonic community composition, in addition to a north-south patchiness.