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Drivers of the variability of dimethylsulfoniopropionate (DMSP) and dimethylsulfoxide (DMSO) in the Southern North Sea

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The influence of abiotic and biotic drivers on the concentration of dimethylsulfoniopropionate (DMSP) and dimethylsulfoxide (DMSO) was investigated and compared during two annual cycles in 2016 and 2018 within the Belgian Coastal Zone (BCZ, North Sea) at five fixed stations chosen to cover both the near-offshore gradient and a longitudinal gradient from the stations close to the Scheldt estuary to the most marine stations. Due to differences in light and temperature, significant differences of Chlorophyll a (Chl a) concentrations were observed between the two years with higher values in spring- and, to a lesser extent, in summer 2018 compared to 2016. The higher springtime phytoplankton biomass in 2018 compared to 2016 seemed to be related to better light conditions in early spring coupling with colder winter. Nevertheless, the seasonal and spatial DMS(P,O) patterns were nearly identical in 2016 and 2018. We then tested if the phytoplankton diversity based on genomic data and Chl a concentration could be used to predict the DMS(P,O) concentration and better understand the observed variability in the field. The phytoplankton composition was characterized with high DMS(P,O) producers (mainly Dinophyceae such as *Gymnodinium* clade and *Prymnesiophyceae* with *Phaeocystis* sp.), occurring in spring, and low DMSP producers (various diatom species), occurring in early spring and in autumn, that influenced the most the DMS(P,O) concentrations observed in our field samples. We were able to estimate the DMSP concentrations with DMSP:Chl a ratio (mmol:g) for the main observed classes but the DMSO concentration was not properly assessed. The ratio used was not enough accurate to reproduce faithfully the interactions between the sulfur compound and the environmental stress.