

Long-term phytoplankton monitoring data (1970-2015) from the Belgian North Sea reveal shifts in community composition and seasonal dynamics

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Long-term monitoring programs are essential for detecting trends and changes in marine ecosystem species composition and biomass in view of climate change and other anthropogenic impacts (such as eutrophication and modified nutrient cycles). Long-term monitoring programs however are time-consuming and costly and are therefore generally rare, not really 'long-term' or miss a sufficient temporal resolution (Wiltshire et al. 2010). While in our neighbouring countries (the Netherlands, Germany and France) phytoplankton monitoring programs have existed for several decades, Belgium lacks a coordinated program. In the framework of the 4DEMON (www.4demon.be) BRAIN-be project, we have compiled and intercalibrated all available datasets on phytoplankton species composition and biomass from the Belgian part of the North Sea from the 1970s onwards. Because there is a lack of data from the 1980s and 1990s, we compared phytoplankton species composition and biomass data between the 1970s and 2000s. We uniquely focused on diatoms and dinoflagellates, which are two important components of the phytoplankton in the BPNS. First analyses have shown that diatom and dinoflagellate abundances have increased during the last decades. The dinoflagellate to diatom abundance ratio has increased in favour of dinoflagellate species. The seasonal distribution patterns also reveal remarkable shifts. While diatoms exhibited in the 1970s two defined blooms, a large spring peak and a smaller peak in late summer, the diatom winter abundances have increased significantly in later years and can reach abundances similar to the spring and late summer blooms. Also dinoflagellates showed two peaks in the 1970s, a small peak in late spring and a second bigger peak in late summer/early autumn. In the 2000s, dinoflagellates revealed variable seasonal cycles with years with only one single bloom. Furthermore, our data shows an upward trend of several phytoplankton genera (e.g. *Pseudo-nitzschia*, *Guinardia*, *Thalassionema*, *Prorocentrum*, *Protoperdinium* etc.).

References

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