

***Phaeocystis* blooms in the Belgian coastal zone - Routine phytoplankton monitoring with the Cytosense flowcytometer**

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Phytoplankton is a diverse group of photosynthesizing organisms which are accountable for roughly 50% of the primary production on earth. A subset of these phytoplankton species is capable of forming harmful algal blooms (HABs). During these HABs, phycotoxins can be produced, which can result in massive fish kills and pose a risk for human health. Furthermore, HABs can cause depletion of oxygen and block available sunlight for other organisms, through their rapid growth. Increasing our knowledge on phytoplankton dynamics, and specifically on factors involved in HABs, will provide the opportunity to initiate protective measures to ensure a healthy marine ecosystem. The prymnesiophyte *Phaeocystis* is such a bloom forming species, occurring in the Belgium coastal zone (BCZ). The blooms of *Phaeocystis* seem to be initiated by a change in nutrient load and the exceedance of an irradiance threshold. In 2016, the phytoplankton composition, including *Phaeocystis*, in the BCZ was monitored year-round, providing information on the location, timing and intensity of HABs.

Monitoring data was collected on board of the research vessel Simon Stevin, between February and December 2016, using the Cytosense flowcytometer (FCM), which is capable of semi-continuous automatic sampling. This device was used to determine species size and fluorescence characteristics of the phytoplankton present. This monitoring dataset was analyzed using specialized clustering software (Easyclus) and spatial packages in R, to determine the spatial and temporal phytoplankton composition. The 2016 monitoring data revealed an intense *Phaeocystis* bloom in spring, but also a small bloom at the end of summer. This innovative monitoring in the BCZ produces data of phytoplankton composition with a high spatial and temporal resolution, which is important for identifying potential high-risk areas and time periods for aquaculture and recreation. Furthermore, this research will improve our understanding of the environmental factors driving these HABs.

Keywords: *phaeocystis*; routine monitoring; cytosense flowcytometer; HABs; Belgium coastal zone