The variation of environmental profiles during harmful algal bloom in Sepanggar Bay, Sabah, Malaysia

ABSTRACT

Harmful algal bloom (HAB) events that lead to paralytic shellfish poisoning, fish fatalities, and seawater discolouration have been documented in Sabah's coastal waters. Studies on nutrient analysis during HAB have been carried out periodically in Sabah's waters; however, observation on variations of environmental parameters, primarily colour-producing agents' (CPAs) concentrations, associated with HAB have not been carried out. Hence, this study aims to document environmental parameters and the CPAs over a period of 1 year. The study was conducted along the coastal waters of Sepanggar Bay, Malaysia, where in-situ environmental parameters and sea surface water samples were collected every month for 1 year of monitoring from November 2018 until December 2019. During the study period, the following three HAB events were reported: the first bloom (Bloom Event 1, BE1) in November 2018, the second bloom (Bloom Event 2, BE2) in July 2019, and the third bloom (Bloom Event 3, BE3) in October 2019, all of which were dominated by Margalefidinium polykrikoides species. Two HAB species, M. polykrikoides and Pyrodinium bahamense var. compressum, found in the BE3 were ten times higher than the previous two bloom events. The measured environmental parameters indicated a similar fluctuation in both bloom and non-bloom events. However, during BE3, the CPAs parameters showed larger values. Based on the 1-year monitoring, the fluctuating trend of the recorded environmental parameters exhibited no discernible pattern during pre- and post-bloom occurrences in the studied area. Chlorophyll-a and CDOM, on the other hand, increased during bloom occurrences as compared to non-bloom readings.