Monitoring the seasonal cycle of *Emiliania huxleyi* populations in the subantarctic Southern Ocean

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Anthropogenic CO_2, which has been accumulating in the oceans since the industrial revolution, decreases carbonate-ion concentrations and the pH of the surface ocean. Polar and subpolar regions can be expected to experience the most severe impacts of ocean acidification. Increased CO_2 concentrations in laboratory cultures often have a negative effect on the physiological processes of the most abundant calcifying phytoplankton species, *Emiliania huxleyi*. However, a few studies have found no trend, or even elevated calcification, in *E. huxleyi*. A possible explanation for this may lie in the genetic diversity in *E. huxleyi*. Laboratory experiments are often focused on single strains, and are unable to reproduce the complexity of natural ecosystem features. Therefore, it is of critical importance to assess the response of *E. huxleyi* populations to changing environmental conditions in their natural habitat.

Here, we report on seasonal variations in the abundance and composition of *E. huxleyi* assemblages that were collected using an autonomous water sampler and four moored sediment traps deployed in the Australian and New Zealand sectors of the subantarctic zone. The combination of morphometric and taxonomic analyses, together with in-situ measurements of environmental parameters, allowed us to monitor, with unprecedented detail, the seasonal cycle of *E. huxleyi* morphotypes in the pelagic waters of the subantarctic zone. Additionally, seasonal changes in coccolith weights were estimated using circularly polarised micrographs. A similar seasonality was found in all the time-series analysed, which suggests that the observed seasonal succession of *E. huxleyi* morphotypes must be a circumpolar feature of the subantarctic zone. Finally, the contribution of other coccolithophore species to carbonate export fluxes is discussed.