Monitoring plankton and hydrography in Potter Cove: observing a changing system during 30 years

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Antarctic ecosystems are experiencing significant environmental changes, leading to shifts in hydrography, plankton abundance, and community composition, potentially affecting the entire food web. Since the early 1990s, the Coastal Ecology Programme of the Argentinian Antarctic Institute, in collaboration with the Alfred Wegener Institute from Bremerhaven, Germany, has been monitoring coastal hydrography and plankton dynamics. Over nearly 30 years, observations at Potter Cove (25 de Mayo/King George Island, South Shetlands) revealed notable transformations, such as the retreat of the surrounding Fourcade Glacier, and its evolution from a tidal to a land-terminated glacier in 2016, coinciding with a consistent rise in temperature. In addition, Potter Cove phytoplankton, characterized by sparse abundances and occasional blooms during colder seasons in the decades between early 1990's and 2010, evidenced a shift occurring post-2010, marked by more frequent phytoplankton blooms. However, in warmer-than-average years of the last decade, the plankton community composition skewed toward nanosized phytoplankton, including species typical of Subantarctic regions. It was demonstrated in summer 2020 during two marine heatwave events through *in situ* monitoring of plankton community. These findings underscore the necessity for ongoing monitoring and research to comprehend the implications of a warming climate on Antarctic ecosystems. In this sense, in January 2024, as part of the ROMA (Argentinian Network for Observations of Coastal Marine Systems), an automated coastal station was deployed in Potter Cove to gather hydrographic and meteorological data. Similarly, a station with additional sensors for chlorophyll and oxygen concentrations has been operational since 2023 in the Beagle Channel, a Subantarctic coastal area, augmenting our understanding of oceanic changes under global warming scenarios. Next year two Lander moorings will be deployed at 30 m depth in both sites, to collect data on salinity, temperature, dissolved oxygen, chlorophyll and currents. These initiatives are pivotal for bridging data and knowledge gaps and advancing our comprehension of oceanic shifts.