Water mass characteristics and associated fauna of a recently discovered Lophelia pertusa (Scleractinia: Anthozoa) reef in Greenlandic waters

The first living sample of Lophelia pertusa from Greenlandic waters was inadvertently collected at 60.3675°, −48.45528°, entangled together with other corals to a seawater sampler and property sensor (CTD) package. We collected in situ photographs taken at two sites in the same area in order to determine whether a reef was present. We identified reef-like structures formed by living and dead L. pertusa at 886–932 m depth on a steep slope. We assembled and analyzed hydrographic data to characterize the reef environment in order to facilitate future localization of other reefs and predictions of the impacts of climate change. We showed that the reef was located in a layer of modified Atlantic Water of relatively stable bottom temperature (4.1–5.0 °C) and salinity (34.90–34.98) with density slightly higher (27.62–27.71 kg m⁻³) than that reported for the occurrence of reefs in the northeast Atlantic, and in an area with exceptionally and persistently high currents of >15 cm s⁻¹ at 1000 m. The intermediate-depth salinity maximum was found in the depth range where the corals were found. We discovered signals of consistent vertical and horizontal transports at 700–900 m over the reef area. Although this area is not directly influenced by intermediate and deep convection in the Labrador Sea, the seasonal evolution of near-bottom temperature, salinity and density for the 700–900 m depth range revealed strong seasonal patterns with both temperature and salinity reducing to their annual minimal values at the end of March and staying low for 1 month with an indication of a second minimum in June, 3 months later. The occurrence and temporal extent of these minima likely arose through a combination of local convection from the surface and advection of cooled and freshened waters at depth from the Irminger Sea. A diversified associated fauna was described; the short list of species compiled from our limited sample comprised species common in the area, as well as rare species, species new to Greenland, and species new to science.