LONG-LIVED GREENHOUSE GASES (CO₂, CH₄, N₂O) IN THE PACIFIC SECTOR OF THE SOUTHERN OCEAN AND THE AMUNDSEN SEA BETWEEN 2009 - 2012

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The ocean plays a considerable role in the budget of long-lived greenhouse gases in the atmosphere: as a sink for CO_2 and a source for CH_4 and N_2O . The high latitude of the Southern Ocean is particularly important as the change in the sea ice extent and melting glaciers will influence the ecological and physical settings that govern the content and flux of dissolved gases in seawater. In order to investigate the impact of the change in the cryospheric environment to the fluxes of these trace gases, we visited the Pacific sector of the Southern Ocean and the Amundsen Sea during the austral summer between 2009 and 2012. In the open ocean, CO_2 was mostly undersaturated while N_2O and CH_4 were supersaturated in seawater. These typical features were reversed in the sea-ice region except for N_2O . In the Amundsen Sea polynya, CO_2 and CH_4 were depleted in seawater while dissolved N_2O was supersaturated with respect to the atmosphere.