

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

Tae Siek Rhee¹, Kyung-Ah Park¹, Doshik Hahm¹, Hyunduck Jeon¹, Young-Shin Kwon¹,
Hyoung-Chul Shin¹, SangHoon Lee¹, and Kyung Eun Lee²

1. Korea Polar Research Institute, Incheon, Korea
2. Korea Maritime University, Busan, Korea

The ocean plays a considerable role in the budget of long-lived greenhouse gases in the atmosphere: as a sink for CO₂ and a source for CH₄ and N₂O. 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, CO₂ was mostly undersaturated while N₂O and CH₄ were supersaturated in seawater. These typical features were reversed in the sea-ice region except for N₂O. In the Amundsen Sea polynya, CO₂ and CH₄ were depleted in seawater while dissolved N₂O was supersaturated with respect to the atmosphere.