

DISTRIBUTION OF $p\text{CO}_2$, CARBON FLUX AND ITS MAIN DRIVING FORCES IN THE PRYDZ BAY IN THE ANTARCTIC

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Prydz Bay is a key survey area in the Southern Ocean due to its unique geographic feature and plays an important role in the carbon cycle in the Southern Ocean. The distributions of $p\text{CO}_2$ in the air and the surface water were described and the air-sea fluxes of carbon dioxide were well calculated. Main driving forces to control the $p\text{CO}_2$ distribution are also discussed. Based on the $p\text{CO}_2$ distribution, the Prydz Bay could be divided into two parts, the northern Bay with higher $p\text{CO}_2$ and the southern Bay of the bay with lower $p\text{CO}_2$ in the surface water. In the southern Bay, $p\text{CO}_2$ presents a good relation with chlorophyll-a, suggesting that the biological pump would be a main driving force in the Marginal ice zone in the Southern Ocean in summertime. However, in the Antarctic Divergence zone of the Prydz Bay (about 64°S), the hydrological process would still be one of the significant driving forces. This may be contributed to the effect from the circumpolar deep water (CDW) and upwelling to bring enrichment CO_2 to the northern Bay. However in general for the most part of the Prydz Bay, the $p\text{CO}_2$ distribution would appear a biological pump as driving force in the summertime, even in some parts a strong physical pump could be found.