

The Biological, Physical Marine Foundation and Development Status of Biological Resources near the Prydz Bay, South Atlantic Ocean (Subareas 58.4.2)

Shuai Chen, Hongliang Huang ^a

Key Laboratory of Oceanic and Polar Fisheries, Ministry of Agriculture; East China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences, Shanghai, China;

^aCorresponding author e-mail: yangpu79@hotmail.com

Abstract

Under the current situation of severe decline in fishery resources, understanding the situation of living resources in District 58.4.2 is an urgent need. In terms of biological basis, the survey of phytoplankton in the adjacent waters of the Prydz Bay in the Antarctic in summer has been conducted. The results showed that there were 3 species of phytoplankton and 37 species and 86 species of phytoplankton in the relevant sea area. Among them, diatoms accounted for absolute superiority in species and cell abundance, followed by dinoflagellates. The phenomenon of spatial regionalization of physical oceans in the Prydz Bay is highly significant.

Keywords

Antarctic krill; Biological Resources; Prydz Bay.

1. Introduction

With the severe decline of fishery resources, the potential of the Southern Ocean's fishery resources is increasingly receiving attention from all parties. (FAO) China began the development of the Antarctic krill and other resources in the Southern Ocean in 2009, but it was limited to the sea near the Antarctic Peninsula (48 fisheries). In recent years, the fishing intensity that accompanies countries has been increasing. The development and utilization of China's Antarctic krill and other biological resources in the Southern Ocean has also been increasingly affected by the CCAMLR fishing quota management (CCAMLR, 2017). Since the fishing area has been harvested When the quota is reached, the situation where the fishing boat is forced to transfer occurs from time to time, bringing great obstacles to the development of the biological resources of the Southern Ocean.

2. Development Status

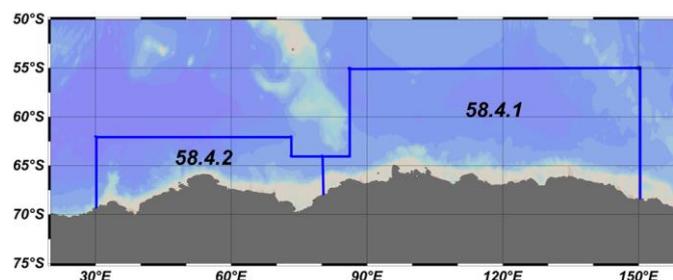


Fig.1 The sketch map of fishing area 58

The search for new potential fisheries has become the top priority in the current exploration. In this regard, the waters near the Bay of Pritz (58 fisheries, see above) can be said to have considerable advantages. In the 1980s, countries all over the world have achieved considerable yields in this area (see the figure below). For example, South Korea entered this fishery from 1978 to 1979, and during the period from 1978 to 1984, it caught 9,000 tons during the fishing operations in the Subareas 58.4 . In 1981 and 1982, the total catch of the entire 58 districts once reached close to 190,000 t (Kim S, etc. 2017, Quetin, etc.2007, Hewitt, etc. 2000).

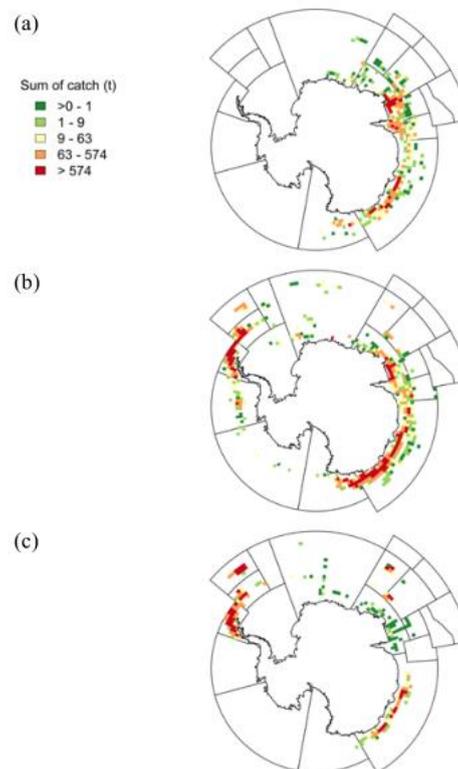


Fig. 2 Interannual variation of total antarctic krill fishery resource development
(a) 1970 to1979, (b) 1980 to 1989, (c) 1990 to 1999

Note: After 1995, Antarctic krill are all concentrated in Area 48 (the northern Antarctic Peninsula waters), which may be related to the marine environment (especially the distribution of sea ice), development difficulties, etc. This also means that 58 areas have larger Biological resources development potential.

In the past ten years (2005-2014), Norway developed 41% of Antarctic krill resources in the Southern Ocean, and South Korea and Japan separately developed 21% and 11% (CCAMLR, 2017). Although our country entered the development of biological resources in the Southern Ocean relatively late, it has developed rapidly. At most, there are five Antarctic krill fishing vessels in 48 areas (north coast of the Antarctic Peninsula) for resource development. In 2016, China's three Antarctic krill fishing vessels, Mingkai, Longteng and Kaifu, applied for fishing licenses for the Subareas 58.4.1 and 58.4.2 in 2017, in particular, the Subareas 58.4.2, compared with Subareas 58.4.1. The Antarctic krill resources may be even more abundant. Understanding the situation of biological resources in this area is an urgent need.

3. The Biological, Physical Marine Foundation

In terms of biological basis, the investigation of phytoplankton in the adjacent waters of the Prydz Bay in the Antarctic during the summer (Sun Jun et al., 2003). The results showed that there were 3 species of phytoplankton and 37 species and 86 species of phytoplankton in the relevant sea area. Among them,

diatoms accounted for absolute superiority in species and cell abundance, followed by dinoflagellates. The main dominant species are *Fragilariopsis kerguelensis*, *Pseudo-nitzschia lineola*, *Fragilariopsis curta* and *Trichotoxon reinboldii*. Unique species and common species. The cell abundance of phytoplankton is closely related to the nitrate concentration.

In terms of zooplankton, according to the survey data of zooplankton and environment in the Prydz Bay and nearby seas of the Southern Ocean, the preliminary studies on the distribution and abundance of krill larvae and tunicate nucleides in the Prydz Bay were conducted (Yang Guang, 2010). The results showed that deep-sea waters (water depth > 1000m) in the north of continental shelf were mainly composed of *Thysanoessa macrura* and *Euphausia superba*. The sea ice retreat time was earlier in 2006 compared with 2002. The average temperature and chlorophyll a concentration of the seawater in the survey area were relatively high, and the abundances of the larvae of the large-scale krill and long-armed cherry krill were relatively larger and the maturity was higher.

The main reason for this is the spatial regionalization that occurs in the Prydz Bay and its adjacent waters (Ning et al., 1998). Prydz Bay and its adjacent waters are difficult to spread to the bay due to the blockage of the four women's shoals at the east side of the bay, and the accumulation of icebergs. There is very little water exchange inside and outside the bay, and the westward flow in the bay is affected by the Flam bank in the west of the bay. Blocking, weaker deep water exchange, increased water stability. In the continental shelf shallows in the northern part of the bay, wind waves are difficult to spread due to the accumulation of icebergs and ice floes, which also increases the stability of the water body. A high degree of stability of the water contributes to the growth of phytoplankton. At the same time, due to the summer sun's radiation, ice floes are melted, ice algae are released, and blooms form in large numbers. Environmental factors such as sea ice ablation time, ice lake, and feed concentration have important effects on the distribution and abundance of biological resources in and around the Prydz Bay area.

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