

a) **Changing processes of Arctic Ocean circulation and sea ice**

Why the Arctic Ocean and sea ice

The arctic is one of the most sensitive regions to global change. A series of distinct changes occurred in the Arctic Ocean in the past decades. The area and thickness of Sea ice decrease largely, seawater structure varied greatly and Arctic climate changes tremendously. These changes in the Arctic had an important influence to globe and China. Within the complicated Arctic system, ocean, sea ice and atmospheric system interact each other, and surrounding land and land-source matter affect the Arctic Ocean deeply. Thus Arctic ocean and sea ice process study will be important for better understanding of the influence of ocean and sea ice to climate at global and regional scale. The priorities of Chinese national Arctic research activities are as the following:

- Sea water structure, oceanic circulation changes and water exchange processes
- Sea ice change and its climate effect
- Fresh water transportation and its effect
- Relationship between biological and chemical processes and ocean/sea ice changes
- Response and feed back of Ocean and sea ice processes to global climate change

The objectives

- Better understanding of Arctic Ocean and sea ice change phenomena and regularity
- The significance of biological and chemical processes to climate change
- Enhancing the ability of modeling on the influence and response of Arctic ocean and sea ice processes to global change
- Understanding of the key process of the Arctic affecting China climate change via cold air activity

Research activities

CHINARE-I Cruises and land-based observations

In the summer of 1999, the first Chinese national Arctic Research Cruise had been conducted in the Chukchi Sea, Canada Basin and Bering Sea for the basic understanding of Arctic environmental, marine ecosystem structure and Arctic ocean/sea ice/climate feature and their interactions.

CHINARE-II Cruise

In the summer of 2003, the second Chinese national Arctic Research Cruise had been conducted in the Chukchi Sea and Canada Basin for further understanding of ocean/air/ice interaction and summer processes

Land-based observations

In the late of 2002, a new observation base was set up on Svalbard Island for the observation of high-latitude Arctic climate, environment and ecosystem

CHINARE-III ~ V

In the future 5 years, two to three national Arctic research cruises will be carried out for supporting the research activities of this national program