

MEMBER COUNTRY: P.R. China
National Report to SCAR for 2010-11

(Only needed if different from the those listed on the SCAR web site <http://www.scar.org>)

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| Scientific Research Program | | | | | | |
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| ACTION GROUPS | | | | | | |
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| NATIONAL ANTARCTIC DATA CENTRE | | | | | | |
| National Arctic and Antarctic Data Center of China | | | | | | |
| SCAR DATABASE | | | | | | |
| insert name of database for which your country has responsibility | | | | | | |
| National Arctic and Antarctic Data Center of China | | | | | | |

A BRIEF SUMMARY OF SCIENTIFIC HIGHLIGHTS:**National SCAR Committee**

Title Chinese Advisory Committee for Polar Research

Address No.1, Fuxingmenwai Ave., Beijing, 100860, China

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Chairman/President Convener: Chen Lianzeng

Representatives: to SCAR

| | Name | Address |
|----------------------------|--|-----------------------------------|
| Permanent Secretary | Delegate/SCAR Prof. Yang Huigen | 451 Jinqiao Road, Shanghai 200129 |

National Operating Agency

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Chief Executive: Qu Tanzhou

A BRIEF SUMMARY OF SCIENTIFIC

1. Introduction

The 27th Chinese National Antarctic Research Expedition (CHINARE-27, 2010/2011) was composed of 193 personnel, including 50 Chinese scientists. In the early of NOV. 2010, some of the team member flew to Antarctica, and others went there by Chinese vessel "Xuelong". The over-wintering team of CHINARE-26 and the summer team of CHINARE-27 returned to China in the end of March, 2011.

| | Great Wall Station | | Zhongshan Station | | Kunlun Station |
|--------------------|--------------------|---------------|-------------------|---------------|----------------|
| | Summer Season | Overwintering | Summer Season | Overwintering | Summer Season |
| Scientists | 12 | 2 | 7 | 7 | 5 |
| Logistic Personnel | 11 | 10 | 36 | 10 | 9 |
| Others | | | 84 | | |
| TOTAL | | | 193 | | |

2. Stations in Antarctica

Wintering Station

| Name | Location | Coordinates |
|-------------------|--------------------|-------------------------|
| <i>Great Wall</i> | King George Island | 62°12'59" S 58°57'52" W |
| <i>Zhongshan</i> | Larsemann Hills | 69°22'24" S 76°22'40" E |

Summering Station

| Name | Location | Coordinates |
|----------------|-----------------|-------------------------|
| <i>Kun Lun</i> | Dome A | 80°25'01" S 77°06'58" E |

3. Main scientific activities

The People's Republic of China

National Programs/Projects by Working Group 2009/2010

Geodesy and Geographic Information

| Subject | Investigation | Locality | Duration | Principal Investigator | Add |
|-----------|---------------------------------------|------------|-----------|------------------------|-----|
| Surveying | 2011 International Epoch GPS Campaign | Great Wall | 2009/2010 | | 1 |

Physics and Chemistry of the Atmosphere

| Subject | Investigation | Locality | Duration | Principal Investigator | Add |
|-------------|---------------|------------|-----------|------------------------|-----|
| Meteorology | Observation | Great Wall | 2009/2010 | Liu Fubing | 2 |
| AVHRR | Receiving | Great Wall | 2009/2010 | Liu Fubing | 2 |
| Meteorology | Observation | Zhongshan | 2009/2010 | Li Haifeng | 2 |
| AVHRR | Receiving | Zhongshan | 2009/2010 | Li Rongbing | 2 |
| Ozone | Observation | Zhongshan | 2009/2010 | Li Xiangjun | 2 |
| UAP | Recording | Zhongshan | 2009/2010 | Liu Jianjun | 3 |

Geomagnetism

| Subject | Investigation | Locality | Duration | Principal Investigator | Add |
|--------------|---------------|-----------|-----------|------------------------|-----|
| Geomagnetism | Recording | Zhongshan | 2009/2010 | Bai Lei | 4 |

Other Programs/Projects

| Subject | Investigation | Locality | Duration | Principal Investigator | Add |
|-----------|---------------|----------|-----------|------------------------|-----|
| Traversal | Sampling | Dome A | 2010/2011 | Xia Limin | 5 |

(S)= Summer project only

The list of principal investigators & responsible authorities 2009/2010

| | |
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| | |

Major Progress and Results of Polar Scientific Projects 2010/11

The year of 2010 witnessed the successful fulfillment of the mission by the 26th CHINARE, completion of the China's Action Plan for the International Polar Year (IPY), new achievements made by the Chinese fourth Arctic expedition, new progress made in the development of polar research soft science, and the steady advance in the special Arctic and Antarctic comprehensive environmental investigation and new icebreaker building project. What is particularly noteworthy to be mentioned is: China successfully launched a comprehensive expedition on the Antarctic inland icecap for the third time and built the world's leading inland icecap observation system; the fourth Arctic scientific expedition created a new record for China's marine survey and shipping history, and China relied on its own ability to reach the North Pole to conduct scientific expedition for the first time, having realized the dream of China's several generations of polar expedition and marine investigation workers. These achievements laid a solid foundation for the implementation of China's National Twelfth Five-Year Plan for polar expedition.

Space Physics

(1) Observational Study on Aurora

Observational study on the strengths of the dayside aurora at different wave bands were carried out by using the three wave lengths (427.8nm,

(2) Analysis of Corresponding Events of aurora on Dayside Magnetosphere Interconnection

Relevant analysis was carried out for the three classic flux transfer events (FTEs) observed by Cluster satellite and the radar aurora structure of the polar motion (PMAFs) observed by the Yellow River Station by using cooperated observation data observed by the multi-wavelength whole sky imaging system of the Cluster satellite and Yellow River Station during the period of 10:10-10:40 UT, Jan. 16, 2004, and it was found that the PMAFs and the FTEs observed by satellites had very good corresponding relationships. The result will be published on J. Geophys. Res.

Biology and Life

1. Ecological response of penguin population changes to Holocene climate and environment in Vestfold Hills, East Antarctica

We applied Ecology and Geology method and restored the changes of Adelaide penguin population in Vestfold Hills of East Antarctic in Holocene and its response to climate and environment changes: we found that during 4700-2400 years in such the area, the number of penguins was huge, and there was a "penguin appropriate period", and after conducting comprehensive analysis on research on "Antarctic Peninsula and the Gulf of Ross" we proposed the late Holocene "Ring Antarctic penguins appropriate period." The results were published in core journals in the field of polar science "Antarctic Science", and were quoted by a review article in "Science". And after comparing the change records of penguin population of late Holocene in east and west Antarctic regions, we found that the number of penguins in east and west Antarctic regions during the Little Ice Age 400-300 years was sharply reduced, showing important effects and role of climate change on biological populations, and such result were modified and would be published in international journals "Journal of Paleolimnology".

2. Molecular organic geochemistry study on the penguin dung layer in the East Antarctic

Organic geochemical analysis was conducted on a penguin dung mud core on Gardner Island, Vestfold Hills region of East Antarctica. The results showed that the cholesteric and cholesteryl alkyl alcohol can be regarded as a biomarker of penguins in this simple environment. We used the biological markers to effectively distinguished the number of penguins, aquatic moss, algae and vegetation changes for 8,500 years, rebuilt the ecological evolution process of the penguins gathering land. Through comparison, we found that the ecological evolution of Antarctic penguin colonies has the significant response relation with the climate change, which is of great significant response to the understanding of the ancient Antarctic environment and ancient ecology. The results have been published in "Polar Biology".

6. Study on the changes and causes of the Seal population on Fildes Peninsula in 20th century

After conducting geochemical elemental analysis on HN1 seals dirt sediment collected from first-level coastal terrace of King George Island, Antarctic Fildes Peninsula, we found that changes in Cu, Zn, Se, and TOC had a good consistency. Combined with ^{210}Pb - ^{137}Cs dating of HN1 sediment column, we speculated that Fa Erzi Peninsula region was in the period for killing seals by the human in the early of the last century to 1960s, resulting in that seal population in the region remained in the doldrums; from the beginning of 1960s, protection of the Antarctic by human made the number of seals rapid recovered; after 1960s, for the living environment of seals were relatively stable, the number of seals in the region was relatively stable and maintained at a high level. The results have been published in the "Chinese Science Bulletin"

Oceanography

1. Water Masses monitoring in the Southern Ocean

We used Argo float profile data of the Southern Ocean to monitor the sub-Antarctic mode water (SAMW) and Antarctic Intermediate Water (AAIW) distribution range month by month, by taking July 2010 as an example, the main conclusions are as follows:

SAMW was mainly in the sub-Antarctic front and north of the Antarctic Circumpolar Current, and SAMW was the thickest in the southeast Indian Ocean and the Pacific with the thickness of up to 1000 m, and SAMW was relatively shallow in the South Atlantic, usually in the 400 m or below; the main performance to the north of 50 ° S was the positive anomalies of SAMW thickness, especially in the middle of the Pacific and Indian Ocean sector, the positive anomalies exceeded 200 m, and negative anomalies mainly occurred near the 60 ° S frontal.

AAIW was mainly located in and its south of the sub-Antarctic front; AAIW was the thickest in Drake Passage, with thickness up to 900 m; the performance in a wide range of the Atlantic sector was the positive anomaly of AAIW thickness, which was nearly 300 m; the Indian Ocean sector showed a wide range of negative anomaly, and the largest value exceeded 300m; negative anomalies also occurred in the Pacific sector near 60 ° S, but was relatively weak.