

**SCAR XXVII
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Report of Current Activities of China for 2000-2002

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Chinese Antarctic Center of Surveying and Mapping have developed working programmes to conduct research or operational work in the Antarctic in the field of Geodesy, Bathymetry, Geographic Information and Cartography.

1. FIELD ACTIVITIES AND DATA PROCESSING

1.1 Geodetic Surveys

(a) GPS observation campaigns in the international framework of the SCAR 2000 and SCAR 2001 Epoch GPS Campaigns

To carry out the international cooperative research project GIANT (Geodetic Infrastructure in Antarctica) hosted by SCAR, both Great Wall Station and Zhongshan Station have successfully participated in SCAR Epoch GPS Campaigns in 2000/2001 and 2001/2002 summer expeditions in accordance with SCAR Epoch GPS Campaign's instructions. The GPS receivers employed in campaigns were Trimble 4000SSI at Great Wall Station and Geotracer 3220 at Zhongshan Station respectively. We have sent both observation data and meteorological parameters to the data processing center in Germany.

Chinese Antarctic Center of Surveying and Mapping have processed the GPS data of 7 stations in Antarctic Peninsula, Western Antarctica using the software GAMIT, and have done the network adjustment using the software GLOBK and GPSNAS. The relative precision of baseline we have obtained is 10^{-8} ~ 10^{-9} , the repetition of the horizontal weight of the baseline and the length of the baseline are superior to 5mm, and the repetition of the vertical weight is superior to 1cm.

(b) We carried out the "ITASE China Plan" to study the ice sheet motion in eastern Antarctic. 25 GPS monitoring points were set with the interval of 50km along the inland ice sheet traverse route from Zhongshan Station to the Dome-A, And part of these points have periodical repetitious observation, ice sheet movement and the elevation section plot along this 1100km expedition route were obtained.

1.2 Remote Sensing

(a) Blue ice distribution map was produced to look for meteorolites in the inland ice sheet of eastern Antarctica. Using 3 bands data of LandSat-4 TM special mapping instrument and utilizing satellite parameter, we produce satellite colour image map at 1:100 000 scale of the Grove Mountains Area without ground control points.

(b) Utilizing the satellite image data of three different periods 1973, 1990 and 1997, we monitored ice velocities and fluxes of the Polar Record Glacier and the Dark Glacier. The average velocity of the Polar Record Glacier is 808m per year, and the average ejected ice area into the sea is 11.4km³ per year; meanwhile the average velocity of the Dark Glacier is 191m per year, and the average ejected ice area into the sea is 11.4km³ per year.

1.3 Tide Gauge Data

Automatic tide gauge was installed at Zhongshan station with the cooperation of Australia and China at the end of the year 1999. Tide gauge data of year 2000 were collected.

2. MAPPING ACTIVITIES

After having measured 14,000 topographic points using DGPS method, we compiled and printed the topographic maps at 1:250 000 scale of the Grove Mountains, and named more than 20 place names in Chinese.

The anchorage ground maps at the Great Wall Station and the Zhongshan Station are printed for Chinese Antarctic scientific expedition vessel -- XueLong Ship.

3. GEOGRAPHIC INFORMATION ACTIVITIES

GIS of Antarctica, based on the software GeoStar developed by Wuhan University, is the integrations of virtual environments and network. It's virtual

environment for studying geo-phenomena and geo-process. GIS of Antarctica based on Internet is an interactive, distributed and Virtual Geographical Environment that is a N-tiers complicated system running with multiple interfaces. In addition to the share and management of the Antarctica data and the service for the Antarctic scientific expedition, Internet GIS of Antarctica can be used by everyone who knows about Internet in any way or any time.

4. SCIENTIFIC PAPERS PUBLISHED / PRESENTED

An analysis on the results for the GPS points along the Chinese Antarctic inland traverse route, Polar Research, 2001(2)

Characteristics of snow relief and weather for China's third expedition profile of the Antarctic inland ice sheet, Journal of Wuhan Technical University of Surveying and Mapping, 2000(3)

The results analysis for the deformation monitoring by using GPS technology in Antarctic Peninsula, Polar Research, 2001(1)

Design and implementation of Internet based GIS of Antarctica, Journal of Wuhan Technical University of Surveying and Mapping, 2000(2)

The study of remote sensing on monitoring ice velocities and the Polar Record Glacier and the Dark Glacier, Polar Research, 2001(2)

The digital mapping of satellite images under no ground control and the distribution of landform, blue ice and meteorites in the Grove Mountains, Antarctica, Chinese Journal of Polar Science, 2001(2)

Application of GPS Technology to Meteorology in Antarctica, to be published in Polar Research.

5. PLACE NAMES

More than 20 placenames in Chinese of the Grove Mountains Area have been approved by National Committee for Naming Antarctic Features and submitted to the Composite Gazetteer of Antarctica in the past two years.

6. GROUND CONTROL POINT LIBRARY

During the field surveying, we changed two mark cores at the Hardin Hill and the Sacharow Hill to cupreous prefab mark cores.

The Location of the mark at the Hardin Hill:

72° 53' 33.33910" S 75° 03'32.39896" E

The Location of the mark at the Sacharow Hill:

72° 54' 04.90919" S 75° 11'03.50954" E

7. PLANNED ACTIVITIES FOR THE NEXT TWO YEARS

- (a) Continue to participate in SCAR Epoch GPS Campaigns in the future and process the data obtained from SCAR Epoch GPS Campaigns and the permanent GPS tracking station at the Zhongshan Station;
- (b) Continue the tide gauging at Zhongshan Station, and cooperate with Australia to research sea level change in Eastern Antarctica;
- (c) Survey and ground truth measurements for investigations for the Dark Glacier movement will be undertaken. Utilizing the GPS and Remote Sensing technology to monitor its velocity and fluxes and forecast the icefall;
- (d) Study on INSAR technology and apply to topographic mapping in Antarctica;
- (d) Complement and perfect the GIS of Antarctica and the Antarctic geographic information database;
- (f) Update the topographic maps of the Great wall Station and the Zhongshan Station.