Topographic map of the SSSI No. 8, King George Island, West Antarctica

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ABSTRACT: A topographic map 1:12,500 scale of the SSSI No. 8 and the Arctowski Station region was prepared during the XXV Polish Polar Expedition (2000/2001) organized by the Department of Antarctic Biology, Polish Academy of Sciences. The map documents geomorphological changes which took place during the last 20 years. Several new place names have been introduced for the SSSI No. 8 area.

Key words: Antarctica, King George Island, SSSI No. 8, Arctowski Station, topographic map.

Introduction

A new large-scale (1:12,500) topographic map of Arctowski Station and its surroundings was prepared during the XXV Antarctic Expedition (2000/2001) organized by the Department of Antarctic Biology of the Polish Academy of Sciences. The topographic map is the basic material for drafts, thematic maps, and GIS data base.

The Site of Special Scientific Interest No. 8 (SSSI No. 8) was created by the Antarctic Treaty Consultative Parties in 1979, based on a Polish proposal. Diverse avian and mammalian species and locally rich vegetation provide a representative sample of maritime Antarctic ecosystem. The management of the SSSI No. 8 aims at the protection of bird colonies and seal breeding grounds against unnecessary and potentially damaging human activities.

Survey and methods of preparing the new topographic map

The field surveys were carried out using double frequency GPS receivers Ashtech Z-12. The first one, with a fixed location, served as a base receiver. The
second reciever, after an introductory 10-minute initialization (this is required for resolving the carrier phase ambiguity), was carried into the field, gathering information at 15-second interval. Co-ordinates of points (X, Y, Z) obtained during field survey were subsequently calculated by using PNAV application. Precision of the measurements has been estimated as better than 10 cm (see Czarnecki 1994). Essential conditions of correct measurements were: observations of at least 4 satellites by two receivers, and PDOP index below 4.0.

About sixteen thousand points were measured. The measurements were carried out in such a way as to allow the determination of the range of objects (including creeks, lake borders, ice ranges, ridges, shorelines, etc.) and to achieve density of point cover sufficient to interpolate contour lines. For a few objects, the GPS measurement was impossible to obtain because of the loss of contact with 4 satellites (under cliffs and rocky walls), or because of difficult terrain (glacial crevasses, ridges). In these cases, the measurement gaps were filled by analyses of aerial photos (made by Furmańczyk in 1979) and theodolite measurements.

The collected GPS data were processed using ArcView. Aerial photos were rectified by Erdas Imagine (both are Geographic Information System applications – GIS). Materials for printing were prepared in CorelDraw graphic environment.

Description of the 1:12,500 scale map

The 1:12,500 scale map presents the area of SSSI No. 8 (with the exception of a small glacier area in the western upper part of the SSSI No. 8) and ice-free terrain at northern margin of SSSI No. 8 where the Arctowski Station is located (Fig. 1).

SSSI No. 8 was defined according to Management Plan for Site of Special Scientific Interest No. 8 (see XII SATCM/ WP9 2000) as: “the area consisting of land on the western shore of Admiralty Bay. The westerly boundary extends from Patelnia (Telefon) Point, NNW to The Tower (a distinctive peak above Tower Glacier), then continuing along a straight line to encompass the base of Jardine Peak. This line then runs NE to the sea (Admiralty Bay) where it bisects the coast immediately north of Rakusa Point. Thereafter, the Area is all the land which is bounded by the coastline south towards Demay Point, then SW along the coast to Patelnia (Telefon) Point.”

Fig. 2. Symbols used in the map (Fig. 4, Pudelko 2002).
The legend of the map 1: 12,500 scale is shown in Fig. 2. Contours interval is 10 m. Projection properties are shown in Table 1.

### Table 1: Projection properties.

<table>
<thead>
<tr>
<th>Projection</th>
<th>Transverse Mercator (TM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spheroid</td>
<td>WGS 84</td>
</tr>
<tr>
<td>Central meridian</td>
<td>57° W</td>
</tr>
<tr>
<td>Reference latitude</td>
<td>0’</td>
</tr>
<tr>
<td>Scale factor</td>
<td>1</td>
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<tr>
<td>False westing</td>
<td>500,000 m</td>
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<td>False northing</td>
<td>0 m</td>
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New place names introduced in 2001 for SSSI No. 8

Location of the place names is shown in Fig. 3. Their co-ordinates refer to averaged center of a defined object, except for creeks, which are given co-ordinates defining their beginning and end.

1. **Baszta**. — 62° 13' 27'' S – 58° 27' 44'' W, 156 m a.s.l. A peak between Bastion and Blue Dyke.


3. **Fosa Creek**. — 62° 12’ 36” S – 58° 28’ 14” W, 200 m a.s.l., 62° 12’ 09” S – 58° 26’ 29” W, 0 m a.s.l. A creek carrying meltwater from Tower Glacier and Baranowski Glacier to Staszek Cove. This is a new geomorphological form that had formed as a result of glacier’s thawing during the past twenty years. Polish name: Potok Fosa.

4. **Ginger Lake**. — 62° 12’ 37” S – 58° 27’ 25” W, 85 m a.s.l. A lake with ginger-colored water, between Brama and Demay Point. This is a new lake that had formed as a result of glacier’s thawing during the past twenty years. Polish name: Jeziorko Imbirowe.


6. **Mud Lake**. — 62° 13’ 11” S – 58° 27’ 18” W, 85 m a.s.l. A muddy lake on Creeping Slope, east of Bastion. This is a new lake that had formed as a result of glacier’s thawing during the past twenty years. Polish name: Jeziorko Blotniste.
New names:
1. Baszta
2. Dead Glacier
3. Fosa Creek
4. Ginger Lake
5. Krzemień
6. Mud Lake
7. Petrel Creek
8. Rondel
9. Seal Creek
10. Sugarloaf Hill
11. Tarnica

Changed or customary names:
1C. Czech Creek
2C. Vanishing Creek
3C. Wróbel Valley

- ice-free area
- ice area
- cliffs
- SSSI No. 8 border

Fig. 3. Locations of geographical names, SSSI No. 8 (see Pudelko 2002).
7. **Petrel Creek.** — 62° 10' 35'' S 58° 27' 25'' W, 35 m a.s.l. 62° 10' 25'' S 58° 27' 00'' W, 0 m a.s.l. Petrel Creek runs from dead ice zone and northern moraines of Rescuers Hills to Suszczewski Cove. There are three Giant Petrel colonies next to Petrel Creek. Polish name: Potok Petrela.


9. **Seal Creek.** — 62° 11' 43'' S – 58° 27' 14'' W, 60 m a.s.l. 62° 11' 36'' S – 58° 26' 21'' W, 0 m a.s.l. Seal Creek runs parallel to Blaszyk Moraine, carrying melt–water from southern part of Sphinx Glacier to Admiralty Bay. Next to Seal Creek, there are breeding grounds of sea elephants and fur seals. Polish name: Potok Foczy.

10. **Sugarloaf Hill.** — 62° 13' 43'' S – 58° 27' 39'' W, 104 m a.s.l. The shape of the top of this hill looks like a sugar loaf. It is located between Blue Dyke and Windy Glacier. Customary name: Sugar Mound. Polish name: Głowa Cukru.


The area presented in the map (Fig. 3, Pudełko 2002) is subject to rapid glacier range changes. This becomes apparent when comparing this study with earlier maps (Furmańczyk and Marsz 1980, Battke 1990) and measurements (Kejna et al. 1998, Battke et al. 2001, Birkenmajer 2002). The greatest changes were recorded in the vicinity of Bastion and close to Ecology Glacier forehead. Bastion and The Tower used to be nunataks some years ago (Battke 1990).

**Changed place names**

Two changes (Fig. 4) were introduced for named objects which were defined earlier (Birkenmajer 1980):

1. **Wróbel Glacier** was named by Birkenmajer (1979) as: “glacier, outlet of Warszawa Icefield, in the upper part of Italia Valley”. The glacier has disappeared since then, leaving a small valley covered with dead ice drained by a creek. The name was thus changed to **Wróbel Valley**.

2. **Ornithologists Creek** (Birkenmajer 1979, 1980) has changed its course. Its upper part has an outflow under the moraine of Ecology Glacier. As a result three new creeks were formed, informally renamed the Ornithologists-, the Czech-, and the Vanishing creeks).

   Czech Creek – 62° 10' 00'' S – 58° 29' 28'' W – 165 m a.s.l. 62° 10' 06'' S – 58° 28' 35'' W – 80 m a.s.l.
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