

Agenda Item 11

DIGITAL NAME DATA BASE ANTARCTICA
AS A COMPONENT OF A LANDSCAPE DATA BASE ANTARCTICA

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The map lettering can be regarded as a component of the map. Names and designations explain its linear or pictorial content. Whereas the graphical design of the lettering, the design and production of the lettering original for map reproduction are cartographic tasks, assigning of names and their orthography go beyond mere cartography. It is essential, however, that the various disciplines mentioned in the following work in conjunction with cartography.

1. Digital Landscape Data Base

In many cases the value of an information depends on its being up to date and readily available in a specific graphical form (e.g. as a map, table, etc.)

If, for instance, recent airphotos or satellite images are available in analog or digital form, it is important that the relevant information can rapidly be retrieved from the image recordings and be represented (and filed) in a form that allows rapid data processing and integration into an information system. At the Institute for Applied Geodesy in Frankfurt on Main the realization of this objective is being worked at with priority. The basis conception for such a geographical information system is shown in figure 1. The aim is to establish a digital landscape model:

a digital landscape data base which is linked with digital name data bases and digital "thematic" data bases (geology, etc.) and which allows rapid output of any data in various graphical forms. In its essential parts the information system (fig. 1) has been developed to an operational stage [1]. In the following, the part "Digital Name Data Base Antarctica" will be discussed and its terms of reference, structure and procedure will be described.

2. Terms of Reference

Topographic and chorographic map series constitute a necessary base material for a successful completion of most research projects in the other earth sciences. They further serve as a topographic base for thematic maps (after having been prepared accordingly) to display the results of geoscientific research in a clear and comprehensible form. The Digital Name Data Base Antarctica, by the Institute for Applied Geodesy (IFAG - DNAnt), is to constitute the basis for the lettering of future cartographic representations of Antarctica (satellite image maps, photomaps, line maps). Moreover, with the aid of this data base and the pertinent data processing programs, the required lettering films are to be produced directly by photoplotting as true-to-scale originals for print (vector or raster data). For the time being, name placing will require interactive operation. The creation and updating of such a name data base is therefore an important contribution towards the cartography of Antarctica. It is instrumental in achieving that Antarctica maps with lettering can be produced faster than had hitherto been possible so they can be more up-to-date. This increased topicality can be particularly useful with regard to ice kinematics, especially of the shelf ice areas (partly with flow speeds of 3m/day).

To date, the Institute for Applied Geodesy has participated in the following Antarctica expeditions: 1983/84, 1984/85, 1985/86 (1986/87, planned); so far it has prepared and issued several maps of Antarctica (photomaps and satellite image maps) [2].

A report on the contributions Germany has until now made to the cartography of Antarctica has been published in [3].

3. German Names Assigned in Antarctica until 1945

To begin with, the German names and designations assigned up to 1945 were traced at the Institute for Applied Geodesy (IfAG/Frankfurt on Main), with the assistance of the Deutsche Forschungsgemeinschaft (DFG/Bonn), the sources being the reports of the German Antarctic expeditions listed in Table 1. This stock of names remains to be reviewed though. For point features an unambiguous assignment of name to feature must be given or be established through satellite images/satellite image maps or else more recent line maps. As far as areal features are concerned, it is for the most part very difficult to determine exactly which area the bestower of a name intended to cover with the name (e.g. a landscape name). It is equally difficult and quite time-consuming to establish the limits of such an area as a regional division as yet hardly exists in Antarctica.

Of the names assigned by GERMANY to features and areas in Antarctica until 1945, 427 have been recorded so far. According to Table 1 they are subdivided as follows:

1873/74	Dallmann	14 names
1874	v. Reibnitz	3 names
1874-1876	v. Schleinitz	67 names
1882/83	Schrader	33 names
1893/94	Larsen	14 names
1898/99	Chun	3 names
1901-1903	v. Drygalski	138 names
1906	Szielasko	10 names
1911-1912	Filchner	29 names
1925-1927	Merz/Spiess	4 names
1928/29	Kohl-Larsen	15 names
1938/39	Ritscher	97 names

Map. No. 1 provides an overview of the expeditions listed in Table 1.

The improved accuracy achieved in the assignment of names to features and the determination of the extent of the areas to which the German names in Antarctica apply, is, above all, the result of H.-P. KOSACK's efforts [4], [5]. Further improvement to this effect, particularly regarding the names given during the German Antarctic Expedition of 1938/39, was commenced at IfAG, with support by the Deutsche Forschungsgemeinschaft (Dipl.-Geograph K. BRUNK). By means of about 650 paper contact prints of aerial photography from the 1938/39 expedition, the Norwegian topographic maps 1 : 250,000 now published, and the satellite image maps of the Institute for Applied Geodesy as well as LANDSAT imagery of the area, the geodetic position of the 1938/39 flight paths in particular was verified and corrected. [6]. This allows better orientation across the areas covered by the individual oblique aerial photos of 1938/39 and, consequently, improvement of the name assignments described above, as well as elimination of double feature designation and other inconsistencies in name assignments.

4. German Names Assigned after 1945

The FEDERAL REPUBLIC OF GERMANY acceded to the Antarctic Treaty in 1979 and in 1981 became a member of the "Consultative Group" of the Antarctic Treaty. The activity of the German National Committee to the Scientific Committee on Antarctic Research (LASCAR), established at the Deutsche Forschungsgemeinschaft, eventually led to an "Antarctic Research Programme of the Federal Republic of Germany", now working on about 70 projects [7]. In the scope of these post-1945 activities, names for features and areas have been suggested by various institutions, particularly the "Bundesanstalt für Geowissenschaften und Rohstoffe (BGR/Hannover). In connection with its German North Victorialand Expeditions GANOVEX I (1979/80) and GANOVEX III (1982/83, the latter has proposed 55, respectively 73, names.

The GERMAN DEMOCRATIC REPUBLIC acceded to the Antarctic Treaty in 1974. The activity of the National Committee for Antarctic Research established at the Zentralinstitut für Physik der Erde at Potsdam led to a series of Antarctic expeditions which were conducted in conjunction with the USSR. The names assigned by Antarctic researchers of the GDR were also included in the Digital Name Data Base Antarctica.

AUSTRIA and SWITZERLAND are as yet not members of the Antarctic Treaty. It is planned to record the German-language names assigned by these countries in Antarctica.

The German names assigned by other countries (USA, USSR, a.o.) will, in the course of time, also be recorded and integrated into the data base.

5. The Orthography of the Topographic/Geographic Names in Antarctica

The German Antarctica Names available at present need revision, not only as to their assignment to features and the extent of the area to which they apply, but also as to their spelling. Should writing in one word be preferred to hyphenated writing, e.g. Ritscher-Hochland or Ritscherhochland, Wohlthatmassiv or Wohlthat-Massiv, Gaussberg or Gauss-Berg, etc.?

The Standing Committee on Geographical Names (StAGN), which is composed of representatives of the Federal Republic of Germany, Austria, and Switzerland, is concerned with this problem. Its members come from various disciplines and institutions, such as the Austrian Academy of Sciences, the Society for the German Language, from surveying and mapping, the university departments, private cartography, etc. The office of the StAGN is managed by the Institute for Applied Geodesy.

A first part of the German names in Antarctica recorded so far has already been checked in a great effort on the part of the StAGN, and subsequently the spelling of the more than 600 Antarctica names was laid down.

In the production and editing process, not only German, but also foreign names and designations will have to be entered in the Antarctica maps. The considerations of the problem of "translation" have not been concluded yet. Specific rules are to be set up for this purpose, taking into account international procedures such as are employed in the USA, the USSR, and other countries. A method of indicating translated names will be discussed in detail in section 6.

6. The Structure of the Digital Name Data Base Antarctica of the Institute for Applied Geodesy (IfAG - DNAnt)

In coordination with the German National Committee of SCAR (Federal Republic of Germany) and the Alfred Wegener Institute for Polar Research (AWI/Bremerhaven) the Institute for Applied Geodesy has begun to set up the Digital Name Data Base Antarctica IfAG-DNAnt. Proceeding on the experiences won with the compilation of the "Gazetteer of the Federal Republic of Germany" (which is available in digital form), IfAG-DNAnt was structured such as to allow outputting its current state at any time as alphabetic name lists and in a few other formats. The structure of IfAG-DNAnt can be seen in figure 2.

The name data as it is collected from the respective expedition report or the like are considered "source version". It is identified by the figures .00 (preceded by the name number). Any subsequent modifications of the source or .00-version are identified as .01, .02, .03, etc., version. A printout of all versions will document the historical development of all name data. Figure 3 shows such a complete printout for one name. It is also possible to output the latest version only.

In order to readily identify the "designation country", the official letter symbol for the country precedes the four-digit source number.

The statement of reasons for the name assignment are also entered in a fixed order, namely:

- o in case of German Antarctic expeditions before 1945 the entry starts with "DAE (and the date) ..." (e.g. DAE 1873/74..)
- o in case of German Antarctic expeditions after 1945 and non-German Antarctic Expeditions it starts with "AE (and the letter symbol for the country)..." (e.g. AE (D) ..., or AE (DDR) ..., or AE (USA) ...)

Names translated into German are followed by <0> and the name in the source language in [], together with a reference to their origin, for instance [source language (french)].

7. The Procedure of Assigning Names, as Employed in the Federal Republic of Germany

For the assignment of names and designations to topographic/cartographic features and areas in Antarctica a procedure has been worked out in the Federal Republic of Germany which breaks down into the following steps:

- (1) Assignment of "working names" (provisional assignment) by the expedition on location, by the competent map editing agency, and others. Preparation of a reference document in the form of lists and maps (preliminary drawing/sketch).
- (2) These name data are passed on to the Institute for Applied Geodesy (IfAG) in Frankfurt on Main.
- (3) The data are edited at IfAG and then submitted to the Standing Committee for Geographical Names (StAGN) which reviews the orthography of the names and lays down the results by resolution (StAGN resolution). After that, the data are returned to IfAG.

(4) After coordination with the agencies concerned and the Alfred Wegener Institute for Polar Research (AWI) at Bremerhaven, IfAG submits the reviewed name data to the German National Committee to SCAR (LA-SCAR). The latter decides by resolution whether the provisional name assignment shall become final (LA-SCAR resolution). If so, IfAG enters the then "final data" into the Digital Name Data Base Antarctica, IfAG-DNAnt.

(5) The (newly) assigned names and designations will be published from time to time in conjunction with the current National Antarctic Report to SCAR by the Federal Republic of Germany.

Note: The names assigned during the German Antarctic Expedition of 1938/39 were published in 1952 in the Federal Gazette No. 149 (4th year) of the Federal Republic of Germany.

8. Present State of the Project

As indicated in section 5, more than 600 recorded Antarctica names in the German language have so far been checked through by StAGN as to their spelling and have been laid down by the StAGN resolution of 5 March 1985. The German National Committee has by LA-SCAR resolution of 19 April 1985 declared these names as definite assignments. Publication of the set of names so processed is planned.

In the meantime, further German Antarctica names have been recorded and translations have been made, as the publication of certain Antarctica maps had required it (for purposes of documenting research results). They have been filed as "preliminary assignments" in the name data base. They will be processed as described in section 7.

9. Literature

- (1) W. Göpfert: Integration von Fernerkundungsdaten und kartographischen Datenbanken zu einem Landinformationssystem. - Allgemeine Vermessungs-Nachrichten, Karlsruhe 1985, fasc. 1.
- (2) Kartenverzeichnis des Instituts für Angewandte Geodäsie, Frankfurt a.M. and Berlin.
- (3) H. Schmidt-Falkenberg: Deutsche Beiträge zur Kartographie der Antarktis mittels Photogrammetrie und Fernerkundung. - Zeitschrift f. Vermess. Wes., nr. 4, pp. 141-154 (1984).
- (4) H-P. Kosack: Zur Vierblattkarte der Antarktis in 1:4 Millionen. - Petermanns Geographische Mitteilungen, Gotha 1954, fasc. 2.
- (5) H-P. Kosack: Forschungen in der Antarktis im Internationalen Geophysikalischen Jahr 1957/58. - Petermanns Geographische Mitteilungen, Gotha 1957, fasc. 3.
- (6) K. Brunk: Kartographische Arbeiten und deutsche Namengebung in Neuschwabenland, Antarktis - Neubearbeitung des deutschen Namengutes in Neuschwabenland. - Veröffentlichung der Deutschen Geodätischen Kommission, series E, fascicle 24, Frankfurt a.M.
- (7) Antarktischforschungsprogramm der Bundesrepublik Deutschland. - Edited by vom Bundesminister für Forschung und Technologie, 3. edition, Bonn 1983.

Abstract Digital Name Data Base Antarctica,
as a Component of a Landscape Data Base Antarctica.

The author provides an overview of the "Digital Name Data Base Antarctica" of the Institut für Angewandte Geodäsie (IfAG-DNAnt) as a component of a Landscape Data Base Antarctica. In particular he discusses the terms of reference of the task, the German-language stock of names assigned in Antarctica, both before 1945 and after, as well as the orthography of the topographic/geographic Antarctica names. He describes the structure of the IfAG-DNAnt, the procedure of assigning names as employed in the Federal Republic of Germany, and the present state of the project. The paper will be published in English as well, in the IfAG publication "Mitteilungen aus dem Karten- und Vermessungswesen", series II; Institut für Angewandte Geodäsie, D-6000 Frankfurt a.M. 70.

Résumé Banque de Données Numérique Toponymique
de l'Antarctique comme Élément Constitutif d'une
Banque de Données de Paysage Antarctique.

L'auteur donne un aperçu de la "Banque de données numérique toponymique de l'Antarctique" de l'Institut für Angewandte Geodäsie (IfAG-DNAnt), qui fait partie intégrante d'une banque de données de paysage Antarctique. Sont abordés en particulier les données du problème la toponymie allemande pour l'Antarctique telle qu'elle a été établie avant et après 1945, de même que l'orthographe des noms topographiques/géographiques antarctiques. Ensuite sont présentés la structure de la banque de données "IfAG-DNAnt", le procédé de la détermination des noms comme il est appliqué en République fédérale d'Allemagne ainsi que l'état actuel du projet. L'article paraîtra aussi en anglais dans la publication de l'IfAG "Mitteilungen aus dem Karten- und Vermessungswesen des Instituts für Angewandte Geodäsie, D-6000 Frankfurt a. M. 70", série II.

Resumen Base de Datos Digital de Nombres en
las Tierras Antárticas como componente
de una Base de Datos del Paisaje Antártico.

El autor da una vista general de la "Base de Datos Digital de Nombres en Las Tierras Antárticas" del Institut für Angewandte Geodäsie (IfAG-DNAnt) como componente de una Base de Datos del Paisaje Antártico. Expone en particular el objetivo general del proyecto, los nombres de lengua alemana asignados en las Tierras Antárticas tanto antes como después de 1945, así como la ortografía de los nombres topográficos/geográficos antárticos. Detalla la estructura de la IfAG-DNAnt, el procedimiento de asignar nombres empleado en la Republica Federal de Alemania, así como el estado actual de la obra. Este artículo será publicado también en Ingles en la serie II de los "Mitteilungen aus dem Karten- und Vermessungswesen" del Institut für Angewandte Geodäsie, D-6000 Frankfurt a.M. 70.