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An update to Keller Peninsula place names data in the SCAR Composite Gazetteer of Antarctica

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ABSTRACT

Planialtimetric maps with good level of accuracy and at detailed scales may be used to improve geographic location information of the place names in the Composite Gazetteer of Antarctica (CGA), developed by the Scientific Committee on Antarctic Research (SCAR). In this study, a Geographical Information System (GIS) was used to obtain information on position and altitude of geographic features at the Keller Peninsula (KP), King George Island, Antarctica, as represented in a topographic map, a Digital Terrain Model (DTM) and an orthophoto. Using a GIS, points representing KP features were digitized, and their geographical coordinates and altitude were compared with the same features already recorded in the SCAR CGA. Among the 21 place names analyzed, only 3 showed correct location and altitude information. Nevertheless, we show that it is easy to update the SCAR CGA by using a GIS and planialtimetric data with good accuracy.

Key words: Keller Peninsula, King George Island, Composite Gazetteer of Antarctica.

INTRODUCTION

The Composite Gazetteer of Antarctica – CGA (GSSG 2003), developed by the Working Group on Geodesy and Geographic Information of the Scientific Committee on Antarctic Research (SCAR WG-GGI), presently reorganized as the SCAR Standing Committee on Antarctic Geographic Information (SC-AGI), has as main objective the standardization of the Antarctic place names. However, due to the lack of accurate maps for many regions of Antarctica, errors in the place name position and altitude can occur in this database. In order to improve the accuracy of the SCAR CGA, planialtimetric maps with good accuracy level and at detailed scales may be used to improve these place names positional information. This study uses topographic map data, a Digital Terrain Model (DTM) and an orthophotomap of the KP, produced by Mendes Jr. et al. (2012a, b, this volume), to update geographical coordinates and altitude of place names located in Keller Peninsula (KP), King George Island, Antarctica.

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METHODOLOGY

Place names used in the KP topographic map were obtained from the SCAR CGA. Only one place name per feature was chosen, giving priority to the oldest name, according to the rules proposed by Sievers and Thomson (1995). For example, the feature known as Punta La Plaza is also called Plaza Point (Table I), and the former was selected as it is the oldest, according to the CGA (GSSG 2003).

TABLE I
Names, countries, dates of origin and geographical coordinates of the feature "Punta La Plaza" in the SCAR CGA (2003).

Name	ID	Country	Date name	Latitude	Longitude
Plaza La, punta	11355	Argentina	–	–62.0833333	–58.3666667
Plaza Point		USA	1/1/1960	–62.100000	–58.4333333
La Plaza, Punta		Chile	1908	–62.0666667	–58.4166667
Plaza Point		UK	9/20/1955	–62.0909444	–58.40525

A brief description of these place names, the corresponding identification numbers (ID) in the CGA database, the country which named the feature and the date of the document that first records the feature name are presented in Table II.

Using the topographic map, the orthophotomap and the DTM of the KP, points in the vector format representing the mapped features (Fig. 1) were digitized using the Geographical Information System (GIS) software ArcGIS™ (ESRI Inc.). Geographical coordinates of these points (Table III), referenced to the ellipsoid World Geodetic System 1984 (WGS84), were obtained using GIS routines available in ArcGIS™. The feature point altitude (Table III) was derived from the DTM and, subsequently, its geographical coordinates and altitude were compared with the same information appearing in the SCAR CGA. In the case of one feature having different names and geographical coordinates, we selected the one which is the nearest to the point created in the GIS. In the case of "Punta La Plaza", we used the geographical coordinates reported by the Argentineans (GSSG 2003), despite being a name given by Chileans, as its coordinates were closer to the point created in the GIS (Fig. 1 and Table III).

On the KP orthophotomap (Fig. 1), we mapped the points as represented in the SCAR CGA and the GIS points. Each place name can be recognized by its respective ID (Fig. 1 and Table II) next to the symbol used for each point. The ID of a GIS point is the same of the CGA, followed by the letter N as the abbreviation of new (Table II). SCAR CGA points located close enough to the GIS points (e.g., Keller Peninsula, Barton Buttress and Flagstaff Glacier) were selected to identify the respective feature, in this case we used only the ID of the CGA.

CONCLUSIONS AND RECOMMENDATIONS

Except for CGA points located close to the GIS points, all other place names analyzed in this study must have their geographical coordinates changed, as they do not represent the actual location at the Keller Peninsula. For example, in the CGA database, the British Base G (now removed), located to the north and close to the Brazilian Comandante Ferraz station (EACF), is indicated by a point located to the west of the glacier Ferguson. At the same point, it was erroneously placed at the Harpoon point that is in fact about 300 m to the southwest. In the CGA, the EACF position is also incorrect, as it appears next to the real location of the old base G (Fig. 1 and Table III). Therefore, we recommend updating all planimetric coordinates of features analyzed in this study, to enable an accurate location on the terrain, maps or georeferenced images. The same is true for altitudinal data in the CGA, as the DTM and topographic map have better accuracy.

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TABLE II

General description of Keller Peninsula geographic features examined in this study. Source: CGA (2003).

Name	ID	Country Date name	Description
Barton Buttress	963	Poland 1/1/1984	Buttress of Tyrrel Ridge in the southern part of Keller Peninsula. Named in honor of Dr. C.M. Barton, author of geological monograph of KGI.
Base G	87	UK 25/1/1947	A FIDS station established on Keller Peninsula on January 25th, 1947, occupied temporarily until March 23rd, 1947, re-occupied on January 18th, 1948, and maintained continuously until January 19th, 1961.
British Point	1870	Poland 1/1/1980	Small cape immediately east of British Base "G" (dismantled), Keller Peninsula, Admiralty Bay.
Comandante Ferraz Station	18349	Brazil 2/6/1984	Brazilian Antarctic station Comandante Ferraz, sited near the old British station Base G, was inaugurated on February 6th, 1984 for summer occupation; named after Commander Luiz Ferraz (1982) of the Brazilian Navy; occupied continuously since December 13th, 1985.
Ferguson Glacier	4527	Poland 1/1/1980	Small corrie glacier and related snowfields in the southern part of Keller Peninsula. Named in honor of Dr. D. Ferguson who prepared the first geological map and description of KGI in 1913 and 1914.
Flagstaff Hill	4672	USA 1/1/1960	Hill 265 m high, lying 0.5 mi N of Plaza Point on Keller Peninsula. The name, which has been used at the FIDS station at Admiralty Bay since about 1952 arose because there was an iron flagstaff on the summit of the hill.
Flagstaff Glacier	4671	USA 1/1/1960	Very small glacier lying immediately N of Flagstaff Hill on Keller Peninsula. The name, which arose locally about 1958, following glaciological studies by FIDS, derives from association with Flagstaff Hill.
Harpoon Point	6028	Poland 1/1/1980	Small cape on the southwest coast of Keller Peninsula, Mackellar Inlet, Admiralty Bay area. Named after an old whaling harpoon found there.
Keller Peninsula	7420	UK 20/9/1955	High peninsula separating Mackellar and Martel Inlets in Admiralty Bay, on King George Island. The name Keller was applied by the FrAE under Charcot, who charted Admiralty Bay in December, 1909.
Moraine Point	9819	Poland 1/1/1980	Small morainic promontory (hence the name) at the east coast of Keller Peninsula, Martel Inlet, Admiralty Bay area.
Mount Birkenmajer	1359	Poland 1/1/1980	Mountain range with peaks 300 m (southern) and 360 m (northern) high, between Piasecki Pass and Rolnicki Pass. Named in honor of Professor Dr. Krzysztof Birkenmajer, leader of Earth Sciences group of the 1978/79 Polish expedition to Arktowski Station.

TABLE II (continuation)

Name	ID	Country Date name	Description
Noble Glacier	10319	USA 1/1/1960	Small glacier lying just North of Flagstaff Glacier on the East side of Keller Peninsula. Named by the UK-APC in 1960 for Hugh M. Noble of FIDS, glaciologist at Admiralty Bay in 1957, who made detailed studies of the regimes of Flagstaff and Stenhouse Glaciers.
Ore Point	10661	Poland 1/1/1980	Small promontory built on ore vein (hence the name), on the west coast of Keller Peninsula, Mackellar Inlet, Admiralty Bay area.
Piasecki Pass	11233	Poland 1/1/1980	Pass (200-210 m high) between Mount Birkenmajer and Tyrrell Ridge, above Noble Glacier. Named in honor of Dr. Jacek Piasecki, glaciologist of the 1978/79 Polish expedition to Arctowski Station.
Punta La Plaza	11355	Chile 1908	Point forming the Southern tip of Keller Peninsula, separating Mackellar and Martel Inlets in the Northern part of Admiralty Bay. Charted and named by the FrAE under Charcot (1908-1910), in honor of the Argentinean minister of external affairs Victorino de la Plaza. The name suggests the central position of the feature which references the head of Admiralty Bay.
Rolnicki Pass	12314	Poland 1/1/1984	Pass about 210 m high between Mount Birkenmajer and Tokarski Peak, Keller Peninsula, leading from Stenhouse Glacier to Domeyko Glacier, Admiralty Bay area. Named in honor of Polish Eng. Krzyszstof Rolnicki.
Speil Point	13793	Poland 1/1/1980	Cape west of Flagstaff Mount, west coast of Keller Peninsula, Mackellar Inlet, Admiralty Bay. Named in honor of Jerzy Speil, geophysicist, radio-link of geological field party at Admiralty Bay during the 1978/79 Polish expedition to Arctowski Station.
Tokarski Peak	14777	Poland 1/1/1980	Peak (320 m high) north of KP, between Stenhouse Glacier and Domeyko Glacier, north of Rolnicki Pass, Admiralty Bay area. Named in honor of Prof. Dr. Antoni K. Tokarski, geologist, member of the 1978/79 Polish expedition to Arctowski Station, and several other Antarctic expeditions.
Tyrrel Ridge	15147	Poland 1/1/1980	Mountain ridge (220 m high) between Flagstaff Mount and Piasecki Pass, Keller Peninsula, Admiralty Bay area. Named in honor of Dr. G.W. Tyrrell, who petrographically described many rocks of King George Island.
Weiss Point	15861	Poland 1/1/1980	Promontory on the west coast of Keller Peninsula, west of Flagstaff Mount, Mackellar Inlet, Admiralty Bay. Named in honor of Józef Weiss, seismologist, radio-link of the geological party during the 1979/80 Polish Antarctic Expedition.
Yellow Point	16366	Poland 1/1/1980	Cape on the east coast of Keller Peninsula, Visca Anchorage, Martel Inlet, Admiralty Bay area, made of yellow-weathered ore vein.

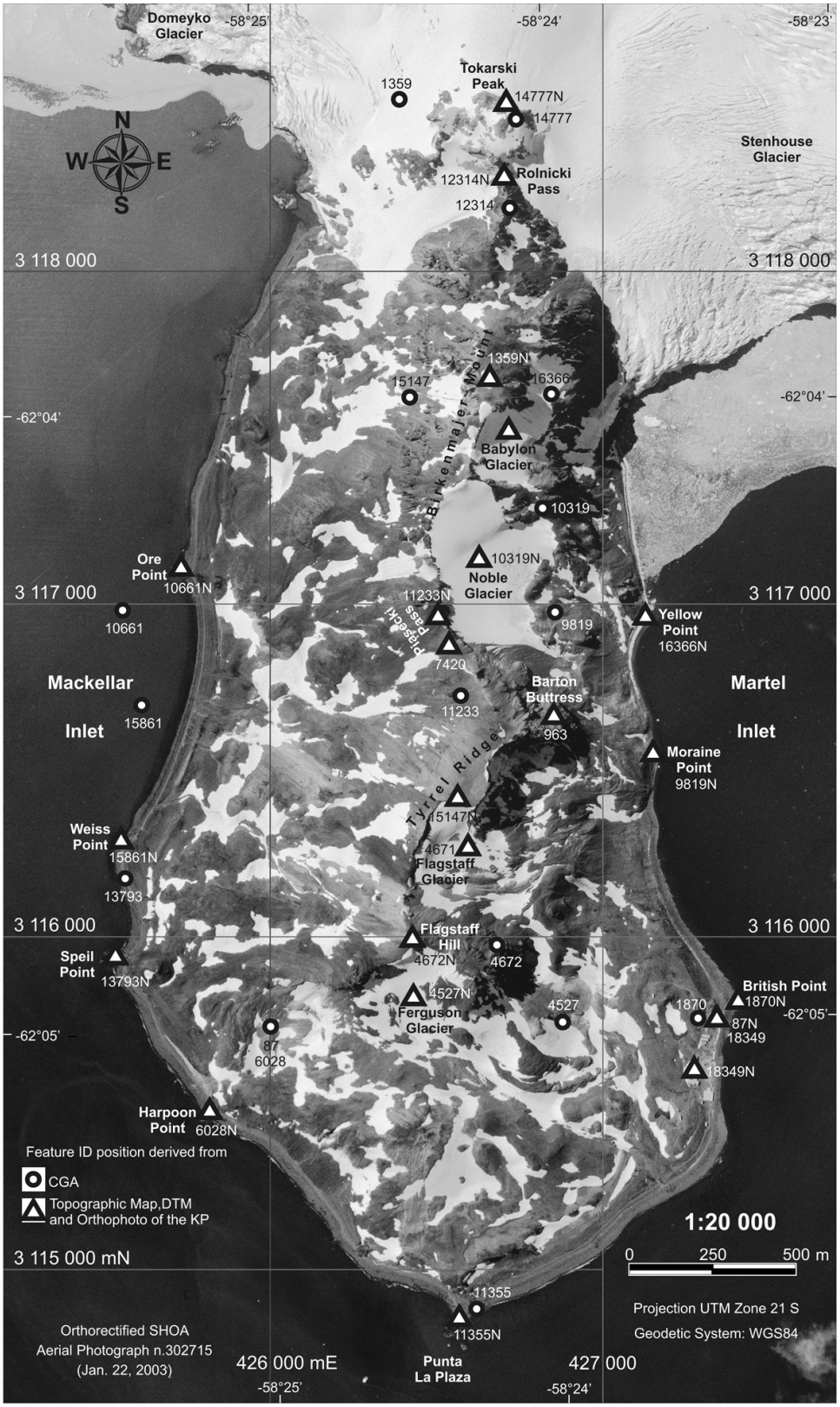

Fig. 1 – Location of the features derived from the SCAR CGA and the points created in the GIS and on the KP orthophoto.

TABLE III

Planialtimetric coordinates in the SCAR CGA (2003) and derived from the Topographic Map, the DTM and the orthophoto of the KP.

SCAR Composite Gazetteer of Antarctica				Derived from the Topographic Map, the DTM and the Orthophoto of the KP			
Name	Latitude	Longitude	H (m)	ID	Latitude	Longitude	H (m)
Babylon Glacier	NA	NA	NA	NA	–62.067731	–58.402634	251.746
Barton Buttress	–62.0750000	–58.4000000	NA	963N	–62.075000	–58.400000	137.120
Base G	–62.0833333	–58,4166667	NA	87N	–62.083375	–58.391319	8.754
British Point	–62.0833333	–58.3916667	NA	1870N	–62.083975	–58.389695	0.163
Cmte Ferraz Station	–62.0833333	–58,3911111	8	18349N	–62.084796	–58.392487	4.880
Ferguson Glacier	–62.0833333	–58.4000000	NA	4527N	–62.083133	–58.408400	155.442
Flagstaff Hill	–62.0813333	–58.4038889	265	4672N	–62.081055	–58.408531	267.200
Flagstaff Glacier	–62.0789444	–58.4048333	NA	4671N	–62.0789440	–58.404833	139.022
Harpoon Point	–62.0833333	–58.4166667	NA	6028N	–62.085588	–58.420517	0.646
Keller Peninsula	–62.0729722	–58.4060556	NA	7420N	–62.0729722	–58.406056	171.187
Moraine Point	–62.0722222	–58.4000000	NA	9819N	–62.076159	–58.394265	0.412
Mount Birkenmajer	–62.0583333	–58.4083333	360	1359N	–62.066016	–58.40400	332.805
Noble Glacier	–62.0666667	–58.4333333	NA	10319N	–62.071210	–58.404652	175.417
Ore Point	–62.0722222	–58.4250000	NA	10661N	–62.070939	–58.421740	0.840
Piasecki Pass	–62.0750000	–58.4083333	200	11233N	–62.072226	–58.406457	192.979
Punta La Plaza	–62.0833330	–58.366667	NA	11355N	–62.091354	–58.406431	1.136
Rolnicki Pass	–62.0555556	–58.4083333	210	12314N	–62.060564	–58.402274	215.402
Speil Point	–62.0791667	–58.4250000	NA	13793N	–62.081394	–58.425625	0.122
Tokarski Peak	–62.0590278	–58.4020000	320	14777N	–62.058607	–58.402273	304.402
Tyrrel Ridge	–62.0666667	–58.4083333	220	15147N	–62.077274	–58.405765	204.875
Weiss Point	–62.0750000	–58.4250000	NA	15861N	–62.078164	–58.425189	0.173
Yellow Point	–62.0666667	–58.4000000	NA	16366N	–62.073000	–58.395000	0.589

*NA = data not available.

RESUMO

Mapas planialtimétricos com um bom grau de precisão e em escalas de detalhe podem ser utilizados para aprimorar informações da localização geográfica de topônimos no *Composite Gazetteer of Antarctica* (CGA), desenvolvido pelo Comitê Científico de Pesquisas Antárticas (SCAR). Neste estudo, um Sistema de Informações Geográficas (SIG) foi utilizado para a obtenção de dados da posição geográfica e altitude de feições da Península Keller (PK), ilha Rei George, Antártica, a partir de um mapa topográfico, de um Modelo Digital do Terreno (MDT) e de uma ortofoto. Nesse SIG, foram digitalizados pontos representando as feições da PK e, posteriormente, suas coordenadas geográficas e altitude foram comparadas com informações correspondentes contidas no CGA. Dentre os 21 topônimos analisados, somente 3 apresentaram dados de localização e altitude corretos. Por outro lado, foi demonstrada a facilidade de atualização do CGA pelo uso de um SIG e de dados planialtimétricos com precisão adequada.

Palavras-chave: Península Keller, ilha Rei George, *Composite Gazetteer of Antarctica*.

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