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GEOMORPHOLOGICAL SKETCH MAP OF THE EVANS COVE AREA (VICTORIA LAND, ANTARCTICA)

ABSTRACT: SALVATORE M.C., BONDESAN A., MENEGHEL M., BARONI C. & OROMBELLI G., *Geomorphological sketch map of the Evans Cove area (Victoria Land, Antarctica)*. (IT ISSN 0391-9838, 1997).

The morphology of the coastal region between Inexpressible Island and Adélie Cove is here described and mapped.

The preliminary geomorphological sketch map in this paper enlarges the southern part of the Northern Foothills that have been previously covered by a published large-scale geomorphological map (Baroni, 1989). The main aim is to produce a geomorphological map at 1:50,000 scale of the whole of the Foothills, from Inexpressible Island to Campbell Glacier. It is part of a cartographic project of the Italian Programme for Antarctic Research to bring out a series of geomorphological sheets at 1:250,000 scale of Victoria Land.

The cartographic base is adopted from a Spot satellite image. The Gps geodetic measurements performed in 1993 (10 points) provided the geometric control for georeferencing. In this paper the map is reduced to approximately 1:70,000 scale, is reproduced in black and white, and the features mapped are simplified and generalized.

In the Terra Nova Bay area the morphology is moulded apparently by glaciers up to an altitude of about 1000 m above present sea level. The morphology shows rounded summits with deeply weathered rocks. Above that altitude an alpine type rugged morphology of horns and aretes is present. The glacial deposits were divided into Younger Drift (Denton & Hughes, 1981), here informally named Terra Nova Drift, and Older Drift (Orombelli & alii, 1991). Terra Nova Drift is of Late Wisconsin age and is correlated with the Ross Sea Ice Drift of the Dry Valleys. It was deposited by glaciers thicker than the present ones that formed an ice sheet which was probably linked with the advanced Ross Ice Shelf (Denton & alii,

1989). In the Northern Foothills the Terra Nova Drift can be found up to an altitude of 350-400 m (Baroni & Orombelli, 1987).

The legend includes areal and linear symbols: the former represent rock outcrops and lithological and glacial coverage, the latter epiglacial and geomorphological features.

Geomorphological symbols are grouped according to the main geomorphological processes: glacial, periglacial, aeolian, weathering, marine, structural, epiglacial and other (i.e. penguin rookeries, historical sites and so on).

KEY WORDS: Geomorphology, Geomorphological map, Victoria Land, Antarctica.

RIASSUNTO: SALVATORE M.C., BONDESAN A., MENEGHEL M., BARONI C. & OROMBELLI G., *Schizzo geomorfologico della zona di Evans Cove (Terra Vittoria, Antartide)*. (IT ISSN 0391-9838, 1997).

Viene descritta la morfologia della zona costiera tra Inexpressible Island e Adélie Cove. Lo schizzo geomorfologico qui presentato (scala 1:70.000) estende verso Sud quanto già cartografato in una carta geomorfologica a grande scala precedentemente pubblicata (Baroni, 1989). Lo scopo finale è quello di produrre una carta geomorfologica alla scala di 1:50.000 delle intere Foothills, dal Ghiacciaio Campbell a Inexpressible Island, che sarà parte del progetto cartografico condotto dal Programma Nazionale di Ricerche in Antartide, finalizzato alla produzione di una serie di carte geomorfologiche della Terra Vittoria alla scala 1:250.000.

La base di rappresentazione qui utilizzata si basa su un mosaico di immagini da satellite Spot, ridotto alla scala di 1:70.000. Le misure geodetiche ottenute con Gps nel 1993 (10 punti) hanno fornito i punti di controllo per georeferenziare le immagini.

Lo schizzo geomorfologico si basa su ricerche condotte direttamente sul terreno sin dal 1985 e sull'analisi di foto aeree (U.S. Navy Tma del 1956 e Usgs 1993).

La geomorfologia della zona è caratterizzata dall'erosione glaciale, con sommità arrotondate che si spingono fino a 1000 m di quota, dove si trovano i primi elementi caratteristici della morfologia alpina, cime piramidali e creste aguzze. I depositi glaciali appartengono a due distinti complessi, lo *Younger Drift* (qui denominato informalmente *Terra Nova Drift*) e l'*Older Drift* (Denton & Hughes, 1981; Orombelli & alii, 1991). Il *Terra Nova Drift* è attribuibile al Pleistocene sup. ed è correlabile al *Ross Sea Ice Drift* delle Dry Valleys. Venne deposto da ghiacciai più espansi di quelli attuali, saldati alla piattaforma di Ross che avanzò nel mare omonimo poggiando sulla piattaforma continentale (Denton & alii, 1989). Sulle Northern Foothills questi depositi si trovano fino a 350-400 m di quota.

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La legenda utilizzata per la realizzazione di questo schizzo include elementi areali e lineari: i primi si riferiscono alle rocce del substrato e ai depositi superficiali, i secondi agli elementi geomorfologici ed alle forme epiglaciali.

I simboli cartografici sono raggruppati con riferimento ai principali processi geomorfologici attivi nell'area, principalmente glaciali, periglaciali, eolici e marini, ma si riferiscono anche a forme di alterazione, strutturali e di altra natura (colonie di pinguini, siti storici, ecc.).

TERMINI CHIAVE: Geomorfologia, Carta geomorfologica, Terra Vittoria, Antartide.

INTRODUCTION

The geomorphological map described here covers the southern part of the Northern Foothills, an area partially mapped during the first expeditions (Baroni, 1989). The paper as presented here is preliminary, the aim being to issue a geomorphological map (scale 1:50,000) of the whole Northern Foothills, from Inexpressible Island to Campbell Glacier. It is produced as part of a cartographic project of the Italian Programme for Antarctic Research to bring out a series of geomorphological sheets at 1:250,000 scale of northern Victoria Land (Biasini & *alii*, 1992, 1994, 1995; Baroni & *alii*, 1995a; Salvatore, 1995).

The mapped area (fig. 1) is located in Terra Nova Bay, south of the Italian Station. Terra Nova Bay, situated in northern Victoria Land, is a 80 km long inlet, extending to the western coast of the Ross Sea between latitude 74° 40' and 75° 15' south (Orombelli, 1987; Frezzotti 1991). It is delimited to the North by Mt Melbourne (2732 m) and Cape Washington, and to the South by David Glacier and Drygalski Ice Tongue. The coastal belt between Campbell Glacier Tongue and Drygalski Ice Tongue is largely ice-free and formed by rounded mountains and hills. The area extends from Adélie Cove to the Nansen Ice Sheet, including Cape Confusion, Vegetation Island and Inexpressible Island.

In the Terra Nova Bay area the morphology was moulded apparently by glaciers up to an altitude of about 1000 m above present sea level. The morphology shows rounded summits with deeply weathered rocks. Above that altitude an alpine type rugged morphology of horns and aretes is present (Orombelli, 1991).

The glacial deposits were divided by Denton & Hughes (1981) into Younger Drift, here informally named Terra Nova Drift, and Older Drift (Orombelli & *alii*, 1991). Terra Nova Drift is of Late Wisconsin age and is correlated with the Ross Sea Ice Drift of the Dry Valleys. It was deposited by glaciers thicker than the present ones that formed an ice sheet which was probably linked with the advanced Ross Ice Shelf (Denton & *alii*, 1989). In the Northern Foothills the Terra Nova Drift can be found up to an altitude of 350-400 m (Baroni & Orombelli, 1987). At least two older glaciations left till and erratics at a higher elevation than the Terra Nova Drift. On the map it is shown as Older Drift.

The last deglaciation ended before about 7000 years ago. An uprise of the coastal area with a rate ranging from 2 to 5 mm per year in the last 5000 years is connected with the deglaciation.

THE GEOMORPHOLOGICAL MAP

The geomorphological map (fig. 2) is based on field researches carried out during the Italian Antarctic expeditions since 1985 (Orombelli, 1986; Baroni & Orombelli, 1987, 1989, 1991; Baroni, 1990; Baroni & *alii*, 1995b; Bondesan & *alii*, 1995c) and on the interpretation of both U.S. Navy Tma aerial photographs and above all those obtained in 1993 (Baroni & *alii*, 1991a; Frezzotti, 1992, 1993a, 1993b; Bondesan & Tison, 1994b). The only available topographical map of this region is the U. S. Geological Survey 1:250,000 scale sheet of Mount Melbourne which is not suitable for geomorphological mapping. The cartographic base is adopted from a Spot satellite image. The Gps geodetic measurements performed in 1993 (10 points) provided the geometric control for georeferencing. The scale of 1:50,000 was considered suitable for a detailed representation of the geomorphological features of this area. In this paper the map is reduced to approximately 1:70,000 scale, is reproduced in black and white, and the features mapped are simplified and generalized.

The legend includes areal and linear symbols: the former represent rock outcrops and lithological and glacial coverage, the latter epiglacial and geomorphological features. The glacial coverage was distinguished as snow-firn and several kinds of ice. The till is differentiated according to its age, into Terra Nova Drift and Older Drift. Geomorphological symbols are grouped according to the main geomorphological processes: glacial, periglacial, aeolian, weathering, marine. Structural, epiglacial features and other data (i.e. penguin rookeries, historical sites and so on) are also mapped.

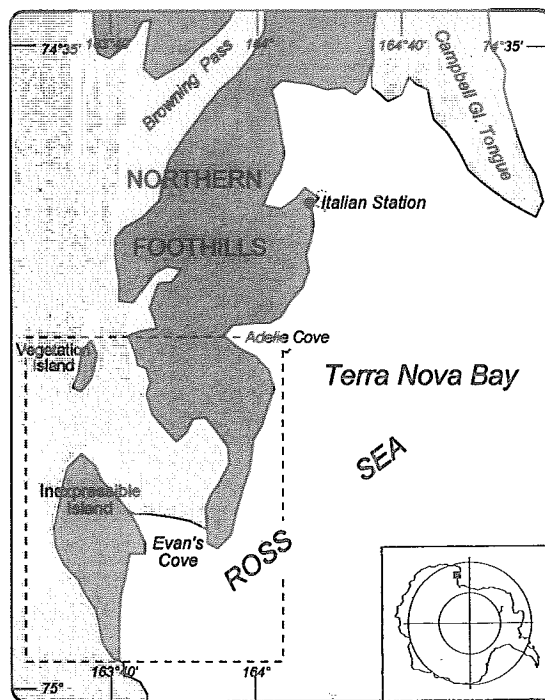


FIG. 1 - Located map of the area represented in fig. 2.

Inexpressible Island

The island is about 13 km long in NNW-SSE direction and has a triangular shape. The longest side is the western side, where the island borders on the Nansen Ice Sheet. The northern part of the slope is formed by vertical walls, scoured by avalanche tracks and weathered by tafoni. At the foot of the slope long wind scoops hold elongated lakes. Here, talus and avalanche cones are present. The southern segment of this slope is lower and is covered by snowfields. The second side of the triangle faces NE, towards the Hell's Gate Ice Shelf. The fact that it is straight is probably related to a geological fault. The third side faces eastward and is formed by the Ross Sea coast. It is more sinuous than the other two, with coves and headlands.

The island can be divided by a meridian line into two parts with different physiography. The western part has a higher altitude and bedrock is largely outcropping in rounded summits. On this surface structural lineaments are found and arranged in two main directions: NNW-SSE and NE-SW. Some rocks are striated by a glacier that had a W-E flowing direction. Where a debris cover is present consisting of Terra Nova Drift or weathered rocks, polygons develop. A small valley with till at its bottom opens out in the southern part; another at right angle extends from the west. They were mapped as Dellen because of periglacial processes now acting there, but they were probably carved by glaciers along structural lines.

The eastern and lower part of the island is divided from the western part by a scarp along a structural line. A small glacier formed by wind blown snow, covers a section of the scarp. On the eastern part of Inexpressible Island there are large covers of Terra Nova Drift, on which many periglacial features have developed (terraces, sorted and non-sorted polygons, ice cored dirt cones). A peculiar feature is the straight scarp, a few meters high, with a NW-SE direction that limits the glacial deposit. Its formation is probably due to the action of the sea on the ice-cored till just above the raised beaches in the southern part. South of the till deposit a flat surface has been interpreted as the bottom of a previous cove or lagoon, now raised above sea level. Some small raised abrasion platforms were also mapped. The southern part of the island and the part between Seaview Bay and Evans Cove consist of outcropping bedrock rounded by weathering. Along the present coast, the raised sea floor and Hell's Gate raised beaches have been recognized by many researchers (see for instance Baroni & Orombelli, 1989, 1991). All are gravelly and the highest have an altitude of 30 m.

Tarns, usually frozen, and ponds occur scattered over the island. Some ponds and a small lagoon have been described by Fanzutti & alii (1989).

An Adélie penguin rookery of 9000 pairs is present near the Snow Cave Site (Wilson & Taylor, 1984). Nearby abandoned sites have been recognized. Ornithogenic soils and radiocarbon dates are described by Baroni (1990, 1994a, 1994c), Baroni & Orombelli (1989, 1991), Orombelli & alii (1991), Stuiver & alii (1981).

Two historical sites are present on the island, both related to the expedition of Capt. Scott in 1910-1913. The first, located at 74° 54' S, 163° 43' E, is the site where the Northern Party of the expedition was left behind, in 1912, as the ship Terra Nova could not pick them up at the beginning of the winter. Here the men dug a «snow cave», 3,6x2,7 m, as a shelter for the cold season; the second is a deposit, not far from the first site (74° 53' S, 163° 44' E), where a sledge was present; it was left in January 1913 (Baroni, 1994b).

Hell's Gate Ice Shelf

The Hell's Gate Ice Shelf extends in the central part of the map, flowing from north-west to south-east into the Ross Sea. It can be considered as part of the Nansen Ice Sheet, to which it is connected through the gap between Inexpressible and Vegetation Island. From north to south it measures 17 km with a maximum width in the middle part of 10 km; the total area is more than 70 km².

The ice shelf surface is longitudinally crossed by a double morainic ridge in the eastern part and by two alignments of ice-cored dirt cones in the western part. Other complex moraines are present near Cape Confusion and east of Vegetation Island.

Owing to its peculiarities Hell's Gate Ice Shelf has been widely studied by scientists during the last decades, but the processes occurring in it and its forms are still a matter of debate. It was first explored and described by Priestley (1923) in his study of Terra Nova Bay and reproduced in a 1:250,000 scale map. A large amount of research was later performed: geophysical surveys as radio echo sounding profiles, seismic, electric, electromagnetic and gravimetric prospections (Caneva & alii, 1994a, 1994b; 1994c; De Dosso & alii, 1995; Lozej & alii, 1994), ice drillings (Bondesan & Tison, 1994a), photo-interpretation, grounding zone investigations with the use of Gps (Bondesan & alii, 1994, 1995a, 1995b), stable isotope analysis (Baroni & alii, 1991b; Souchez & alii, 1991), strain net monitoring (Bondesan & alii, 1995d), water column profiles at the front (Tison & alii, 1995) and geomorphological surveys (Campbell & Claridge, 1975; Baroni, 1990).

The ice shelf is characterized by upward movement as a result of intense surficial ablation due to katabatic winds descending from the Antarctic Plateau (and blowing with great intensity and frequency across the ice shelf). Paleoglaciological reconstruction made by Baroni & Orombelli (1991) shows an advance of the Hell's Gate Ice Shelf after the glacio-eustatic uprise of the coast.

The glaciological data referring to Hell's Gate are from the field research carried out during the IX and X Italian Antarctic Expedition (Bondesan & Tison, 1994a, 1994b; Bondesan & alii, 1994, 1995c) and from former studies (Baroni, 1990; Baroni & alii, 1991b; Caneva & alii, 1994a, 1994b; Ronveaux, 1992; Souchez & alii, 1991; Tison & alii, 1993).

To acquire a better understanding of the features present on the ice shelf surface, a description of its dynamics is necessary. The Hell's Gate Ice Shelf is fed by an ice flow

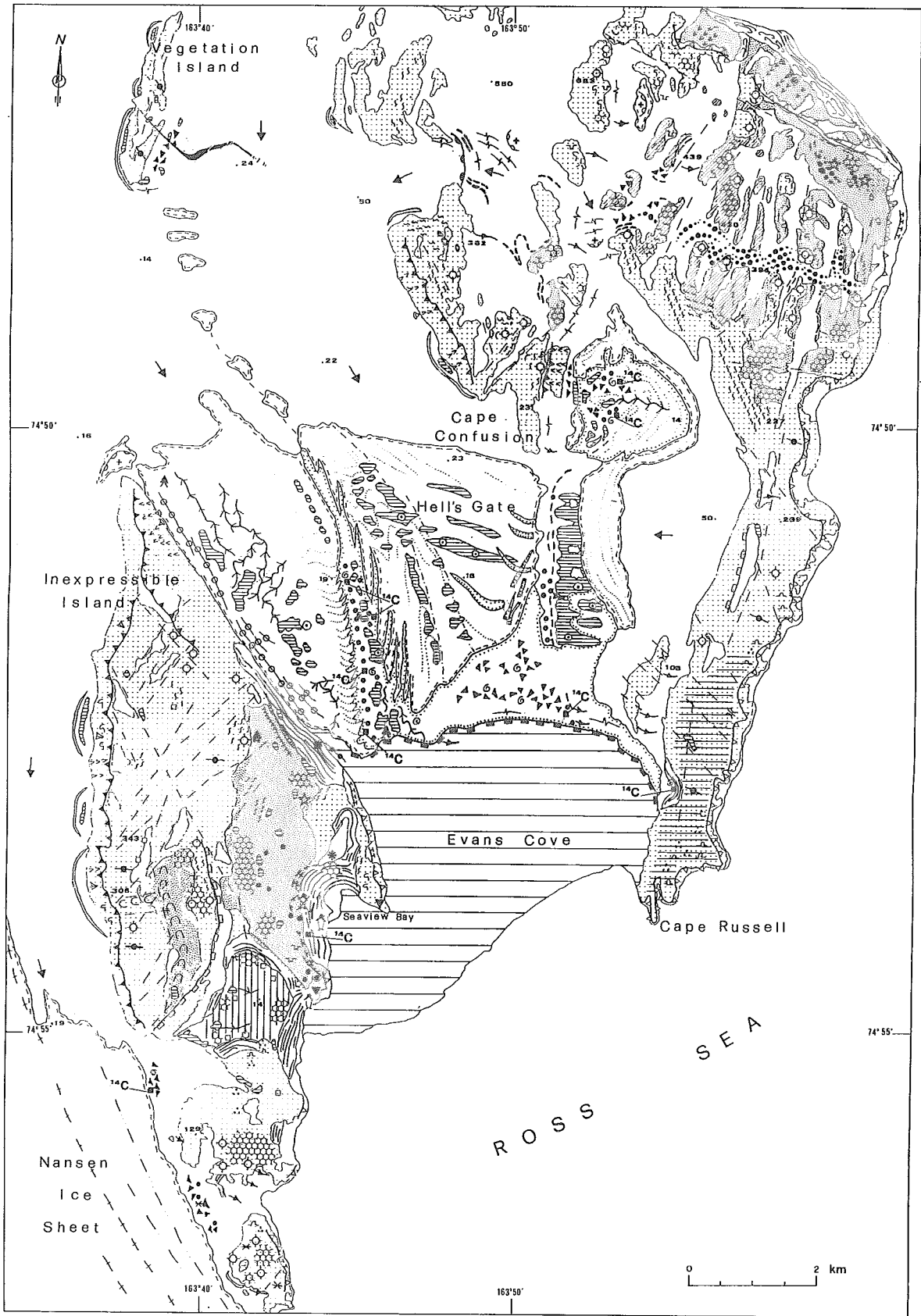








FIG. 2 - Geomorphological sketch map of the Evans Cove area, Victoria Land, Antarctica.









LEGEND

GLACIAL LANDFORMS AND DEPOSITS








Erosional landforms

-  Erosional scarp
-  Rounded summit in solid rock
-  Closed bedrock basin
-  Flat erosion surface
-  Striations
-  Scarp on glacial drift



Constructional landforms and deposits

-  Supraglacial debris
-  Dirt cones
-  Medial moraine
-  Shear moraine
-  Deformed ice core moraine and drift
-  Continuous and scattered drift:
a) Terra Nova (TN); b) Older Drift
-  Perched block
-  Big erratic boulder (> 20 m³)



PERIGLACIAL LANDFORMS AND DEPOSITS

-  Delle
-  Avalanche track
-  Avalanche cone
-  Gelifluction terraces
-  Polygons
-  Sorted polygons, stones circles
-  Rock glacier

LANDFORMS AND DEPOSITS DUE TO GRAVITY




-  Degradational scarp
-  Debris cone

AEOLIAN LANDFORMS



-  Snow drift
-  Wind scoop

LANDFORMS AND DEPOSITS OF MARINE ORIGIN












Erosional landforms








-  Cliff
-  Raised abrasion platform
-  Raised sea floor

Constructional landforms







-  Flowed ice cored drift along the ancient coast
-  Raised beach ridge

GLACIERS AND SEA ICE FEATURES, HYDROGRAPHY




-  Snow covered glacier and snowfield
-  Glacier ice
-  Marine ice
-  Fast ice (in 1988)
-  Ice wall
-  Ice front (in 1988)
-  Ice cliff
-  Ice bulge
-  Pressure ridge and ice blister
-  Elongated ice bulge
-  Glacier table

-  Crevasses
-  Foliation
-  Glacier flow direction
-  Flow line
-  Border of glacial flow
-  Lake and supraglacial lake
-  Stream channel and meltwater channel (bédrière)








WEATHERING LANDFORMS AND DEPOSITS

-  Tafoni
-  Rounded boulders
-  Weather pit (Gnamma, Opferkessler)
-  Grûs
-  Salt cone
-  Rock varnish

STRUCTURAL FEATURES

-  Lineament and /or fault
-  Saddle
-  Structural scarp

OTHER DATA

-  Granitic and metamorphic rocks (Precambrian - Ordovician)
-  Radiocarbon dates (C-14 yr B.P.)
-  Adelie penguin rookery
-  Abandoned penguin rookery
-  Photogrammetric elevation
-  Subfossil marine specimens
-  Hystorical site

from the Nansen Ice Sheet through the passage between Inexpressible and Vegetation Island, from an ice flow between Vegetation Island and the Northern Foothills, from a minor local glacier in the Northern Foothills, and, possibly, partially from the Priestley Glacier. The different flows remain distinct, «squeezing» between the northern tip of Inexpressible Island and widening in the median part of the ice shelf. Several studies were performed to evaluate the surficial velocity giving values from 3.3 m/yr in the eastern part to some 30 m/yr in the central sector (Baroni, 1990; Baroni & *alii*, 1991a; Bondesan & *alii*, 1995d; Frezzotti, 1993b). Where different flows meet they form something similar to «inverted channels» on the bottom of the ice shelf where the frazil ice accumulates. When the composite flows from Browning Pass and Nansen Ice Sheet hit the predicted bedrock shoulder in proximity to the eastern moraine, probably close to Cape Confusion, they ground, forming the eastern double shear moraine and the sub-parallel thin lined marine ice outcrops.

The overall movement is towards the sea, so that the marine ice formed along the «inverted channels» in between the flows is deformed with the convexity towards the cliff. The two distinct bands of debris visible in the frontal marine ice outcrop, abounding in marine specimens, are probably the result of large scale folding.

The western line of dirt cones, which are the most elevated and peculiar forms on the ice shelf, is probably due to active discrete shear planes cutting a continuous debris layer inside the marine ice, originating in the area of Vegetation Island.

The data on the map can be divided into the following groups.

- a) Snow and firn. This kind of coverage is strongly conservative. Snow cover due to occasional precipitations was not mapped. Snow and firn are present in the northern part of the map and above the «aeolian» glacier to the east, beyond the eastern moraine;
- b) Glacier ice. It is strongly ablated (35 cm/yr) by katabatic wind, showing a smooth surface, often with very clear foliation patterns, wide topographical undulations and a whitish colour (easily recognizable from aerial photographs and in the field). It outcrops in the central part of the shelf;
- c) Marine ice. It forms at the ice/ocean interface at the base of the ice shelf. It is characterized by a greyish colour, rough surface, a higher susceptibility to degradation during the warm season, the presence of abundant marine debris and marine specimen remnants. Five marine ice «systems» were identified: massive outcrops at Ice Shelf front scattered with sediments, filled crevasses along the eastern flank of the debris cones, two series of discordant outcrops along the western side of the east moraine flank; a closely spaced network of outcrops parallel to the eastern flank of Vegetation Island, at the southern edge of the morainic complex (Tison & *alii*, 1994);
- d) Sea ice, fast ice, multiyear fast ice. The fast ice extends seaward of the ice shelf cliff, breaking down annually and partially or totally freeing the bay. In some places it turns

into multiyear fast ice (Tison & *alii*, 1993). Being the most variable feature of the map, refers to established dates.

Among the deposits present on the ice shelf surface, apart from moraines and dirt cones, the supraglacial debris is scattered on the frontal outcrop of marine ice; where they outcrop among the marine debris, the marine specimens are mapped; erratic boulders and perched blocks are also mapped.

The ice cliff at the front of the ice shelf has changed in recent years: it therefore refers to a specific date on this map.

Regarding hydrography, the main melt water streams (*bédières*) and the melt water lakes are mapped. During the summer warming, melt water lakes form over a large part of the ice shelf surface. When water freezes inside the basins and the lakes, they are still easily recognizable even during colder seasons. They develop both on glacier ice and on marine ice. Their position is very stable over the years.

Surficial forms related to glacial movements, such as pressure ridges, ice bulges and sausage-like ridges, formed by the ice shelf movement against the bedrock boundary of Inexpressible Island, are mapped. Glacial flows and flow directions were traced when distinguishable by helicopter reconnaissance. The main foliations were identified by photo-interpretation, and later checked in the field. The main crevasses (or belts of fissures and cracks, often closed) were drawn. As far as the aeolian forms and processes are concerned, the main snowdrifts and wind scoops were mapped.

Vegetation Island

Vegetation Island is a rock bluff, 4.5 km long, extending in NNE-SSW direction, and emerging between the ice flows of the Priestley and local glaciers. Its western slope is vertical, at its foot there are wind scoops and lakes. The eastern side slopes gently. Supraglacial debris is present on the lee side of the glacial flow. On the ridge striated rocks mark the NW-SE direction of the glacier that overran the island.

Promontory of Cape Russel

The promontory of Cape Russell is a long narrow strip of ice-free rock bounded on the western side by snowfields and a local glacier flowing to Hell's Gate and on the eastern side by the Ross Sea. It is 7.5 km long and 2 km wide in its larger section. The bedrock is almost free of a debris cover. The northern part forms a smooth surface, with some rounded summits. Some elongated snowfields are aligned parallel to the coast. The southern sub-horizontal surface can be interpreted as a terrace (probably a raised abrasion platform). Here rocks are weathered in rounded boulders and *Grûs* is widespread. A number of lineations have a NW-SE direction, parallel to the NE side of Inexpressible Island; some other lineations run N-S to NNE-SSW, which is also the direction of a scarp of clear structural origin.

On the east side a 25 m cliff faces the sea. On the western side, close to the boundary of Hell's Gate Ice Shelf, raised beaches are present up to an altitude of about 20 m (Baroni & Orombelli, 1989). The beach ridges are made by rounded pebbles and sand. These beaches show, together with those along the SW side of Hell's Gate on Inexpressible Island, that some time before their rise the ice shelf was not as extended as it is now.

Northern Foothills

The higher part of the Northern Foothills is largely covered by local glaciers and snowfields. Where rock outcrops, it forms a smooth surface with rounded knobs. The surface is strongly weathered, with varnish and tafoni. Where a debris cover is present, both of Older Drift or of local origin, polygons and gelifluction terraces have developed. A scarp faces Hell's Gate, interrupted by a local glacier hanging with a snow cliff on the surface of the shelf. The morphology under the ice is probably cwm-like and comparable to that of Adélie Cove. On the scarp avalanche tracks and small cones can be seen. At its foot windscoops with lakes are present.

The part towards the sea shows less ice coverage while the debris cover, both of Terra Nova Drift and Older Drift, is more abundant. As a whole, the surface can be considered a plane gently sloping toward the sea. In particular, because of tectonic lines with a NNE-SSW orientation, the surface is divided into a sequence of ice free rounded ridges and snow covered broad valleys, all parallel to the direction shown. All these features are crossed in the central part by sinuous WNW-ESE running moraine ridges. On top of the Terra Nova drift of the NE corner of the area other ice cored moraines are present, together with polygons and small tarns. The northern scarp bounding this area is scoured by avalanche tracks in its upper part, whilst the foot is covered by rock glaciers flowing onto the raised beaches of Adélie Cove. Towards the open sea, facing E, a high cliff has been cut by marine action. To the south the plateau is limited by a gentler scarp, on which gelifluction terraces are well developed. The NW-SE direction of this scarp is the same as lineations and other features described in this area.

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