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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 GEOMORPHOMOGICAL 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.

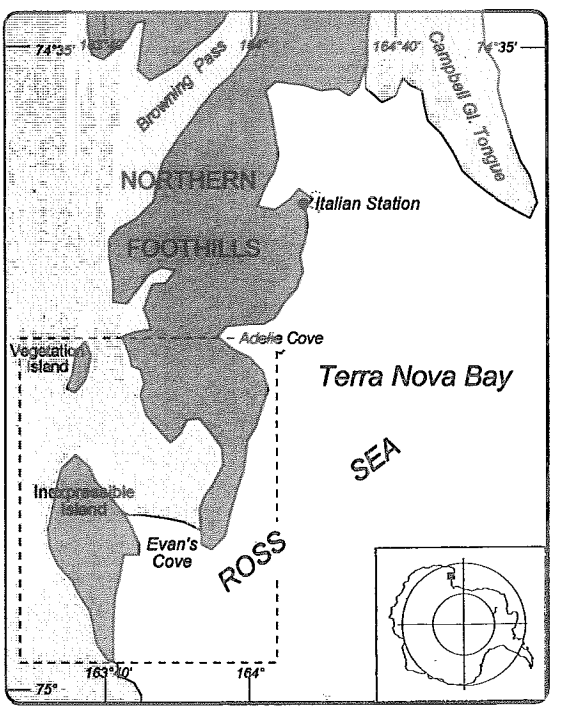

FIG. 1 - Located map of the area represented in fig. 2.