Rock glaciers, Central Andes, Argentina, Version 1

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Trombotto, D. and E. Buk 1998. *Rock glaciers, Central Andes, Argentina, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.7265/hnfj-eb25. [Date Accessed].

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National Snow and Ice Data Center

TABLE OF CONTENTS

Notice: This data set was first published on the 1998 CAPS CD.
The text for this document was taken unchanged from that CD.

1 DETAILED DATA DESCRIPTION

1.1 Spatial Coverage

1.1.1 Study location:

Morenas Coloradas and El Salto Basin Central Andes - Argentina.

1.1.2 Geographic extent:

Morenas Coloradas:
32° 54' and 33° 01' S
69° 27' and 69° 15' W

El Salto Basin:
32° 55' and 32° 59' S
69° 21' and 69° 25' W

1.2 Temporal Coverage

1.2.1 Period of investigation - years covered:

Inventory of rock glaciers:
Morenas Coloradas Basin: 1980, 1993.
El Salto Basin: 1981, 1986.

1.3 Summary Description

1.3.1 El Salto

Primary rock glaciers are fed by avalanche chutes. At the rock glacier El Salto surveys have been undertaken in order to determine the creep rate. Between 1981 and 1986 temperatures at elevations between 3500 and 3600 m were measured in the active layer to a depth of 1 m with a multipoint temperature recorder (Grant). On the basis of these measurement Buk (1983) determined that permafrost table was at a depth of about 3 m and the base of the permafrost at 68 m. Similar conclusions were reached by Barsch and King (1989). As an ilustration of the

importance of avalanches to these forms, the base camp there was destroyed by an avalanche in November 1983.

1.3.2 Morenas Coloradas

The surface of the basin of Morenas Coloradas is 54 km2, of which 10.4 km2 is seasonally frozen ground. The remaining 60% of the surface is typically periglacial with rock glaciers as the most important forms. In the glacigenic rock glacier, the clean glacier ice ends in detritus-covered or morainic tongues which result in glacigenic ice being incorporated within the substrate. In this way, ice persists at lower altitudes and under very arid conditions (Lliboutry, 1986; Garleff and Stingl, 1986; Schrott, 1992). Interconnected rock glaciers are generated which undergo different phases of activity not always in agreement with those expected as a result of their elevations. That is, they continue to show signs of activity not only at the height of the present 0 degree C air isotherm, but at lower elevations. In the last step downwards towards the valleys these rock glaciers become inactive, and finally morphologically relict or fossil rock glaciers are found. Meteorological, hydrological and geophysical measurements as well as 5 drillings to a depth of 5 m have been carried out in Morenas Coloradas. At an elevation of 3560 m the temperature oscillates around 0 degree C (with a maximum variation of 0.5 degree C) at depths between 4 and 5 m. The annual precipitation (1991-93) is 630 mm and the mean annual temperature is 1.6 degrees C. Using a calculated lapse rate of 0.52 degree C per 100 m, the 0 degree C isotherm occurs at approximately 3860 m, which represents a considerable rise in comparison with earlier years. It is assumed that this value is strongly influenced by climate warming in the 1980s and 1990s.

Temperatures measured at different depths in Morenas Coloradas at 3560 m are positively correlated with the discharge of Rio Vallecitos (correlation coefficients of 0.8-0.9; significance p=0.01). There is no correlation with snowfall data, however, because of the influence of the "zonda", a very dry and warm wind (up to 100 km/h) which impedes the accumulation of snow. Between 1978 and 1979, the zonda was active for more than 1000 hours. Discharge from the basin is of good quality and averages 505 l/s with a range from 230 l/s (early spring) to >1000 l/s (summer). In comparison, Schrott (1994) calculated the discharge of a rock glacier in the arid region of San Juan, Argentina to be only 5-8 l/s.

1.4 Current storage of data

Paper

Are your data at risk of being lost? Yes

2 REFERENCES AND RELATED PUBLICATIONS

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Buk, E. (1983). Glaciares de escombros y su significacion hidrologica. Acta Geocriog‰nica, no. 1: 22-38, Mendoza.

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3 CONTACTS AND ACKNOWLEDGMENTS

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4 DOCUMENT INFORMATION

4.1 Publication Date

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4.2 Date Last Updated

2021