

Moulins and marginal contact caves in the Gornergletscher, Switzerland

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1. A view of the central part of the Gornergletscher. Note the surface streams and lakes. (photo: L. Piccini)

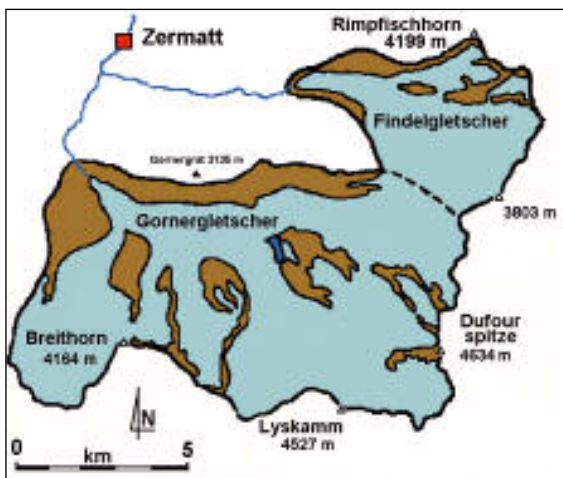
2. Sketch map of the Gornergletscher.

3. Present longitudinal profile and cross section of the glacier.

Abstract

The Gornergletscher, in the Mt. Rosa group, is one of the widest glaciers in the Alps. In the ablation zone, between 2600 and 2400 m of altitude, the surface is relatively planar and a few fractured; this morphological condition allows the development of the surface drainage of meltwater. Supraglacial streams feed glacier lakes, most of which have not a surficial outflow, or plunge down into moulins that feed directly the englacial drainage network.

The investigations performed since 1985, have allowed to survey more than 40 englacial caves and some marginal tunnels. Two main different types of moulins have been recognised: the first type is characterised by a vertical pattern, the second type has a gently dipping development



with a small shaft in the entrance. Some of the first type shafts have been explored to the water table (depth range: -30 to -140 m). The life of the major moulins ranges from 3 to 5 years and it depends on the local glacier movement rate: the faster the movement, the shorter the life period. Our surveys suggest that an important role in controlling the development rate and the shape of moulins is played by the level of the water table. Our observations seem also to indicate that in the last 15 years the number of moulins and their period of life are increasing. Further studies are now in progress to understand their cyclic life, whose increasing could be referred either to a lower movement rate

of the glacier or to different climatic conditions.

Key Words: glaciology, englacial hydrology, glacier caves, Gornergletscher.

Riassunto

Negli ultimi 15 anni sono state compiute molte ricerche da parte di speleologi italiani nei sistemi di cavità endoglaciali presenti sui ghiacciai delle Alpi. I risultati più interessanti sono stati ottenuti sul ghiacciaio del Gorner, nelle Alpi svizzere Occidentali (gruppo del Monte Rosa), che è caratterizzato da una topografia di superficie per molti versi simile a quella di un paesaggio carsico. Il Gorner è uno dei ghiacciai maggiori delle Alpi. La lingua principale discen-

