

N O R T H W E S T   G E O L O G Y

A journal devoted to regional aspects of the geology  
of the Northern Rocky Mountain Region

Edited By

D. W. Hyndman

&

D. Alt

Vo1. 6-2

1977

Published at the  
University of Montana  
Missoula

AN ACTIVE ALPINE GLACIER  
LOST RIVER RANGE, IDAHO

By

Bruce R. Otto\*  
Boise State University  
Boise, Idaho 83725

Introduction

Although there are numerous permanent snowfields in the high country of Idaho, no reports have been published on active glaciers. An active glacier was found on the flank of Idaho's highest peak, Mount Borah, in October of 1974 at 3250 meters on a shaded northern-accumulation slope.

Discussion

The glacier occupies the southwest corner of a complex cirque. The headwall has a maximum height of 600 meters. The cirque is separated into two parts by a large bedrock ridge which extends from its threshold nearly to the peak. The portion containing the glacier is 600 meters wide and 800 meters long.

The overall length of the glacier and terminal moraine is 550 meters; length of the ice is approximately 400 meters. Width varies along the length with the widest portion being across the headwall. Maximum height of the terminal moraine is 80 meters, decreasing to a few meters at the upper end of the lateral moraine. The lower third of the glacier is mantled with rock debris derived from the cirque headwall.












The glacier and related surficial material was mapped by plane table and alidade during August of 1975. Major morphologic features of the glacier such as crevasse patterns and firn limit were also mapped (see Fig. 1). Ice thickness at sixteen points was determined with a Nimbus-brand engineering seismograph using a single-point reflection technique. Greatest ice thickness was 64 meters directly below the average firn line, diminishing to a minimum of 18 meters near the toe of the glacier.

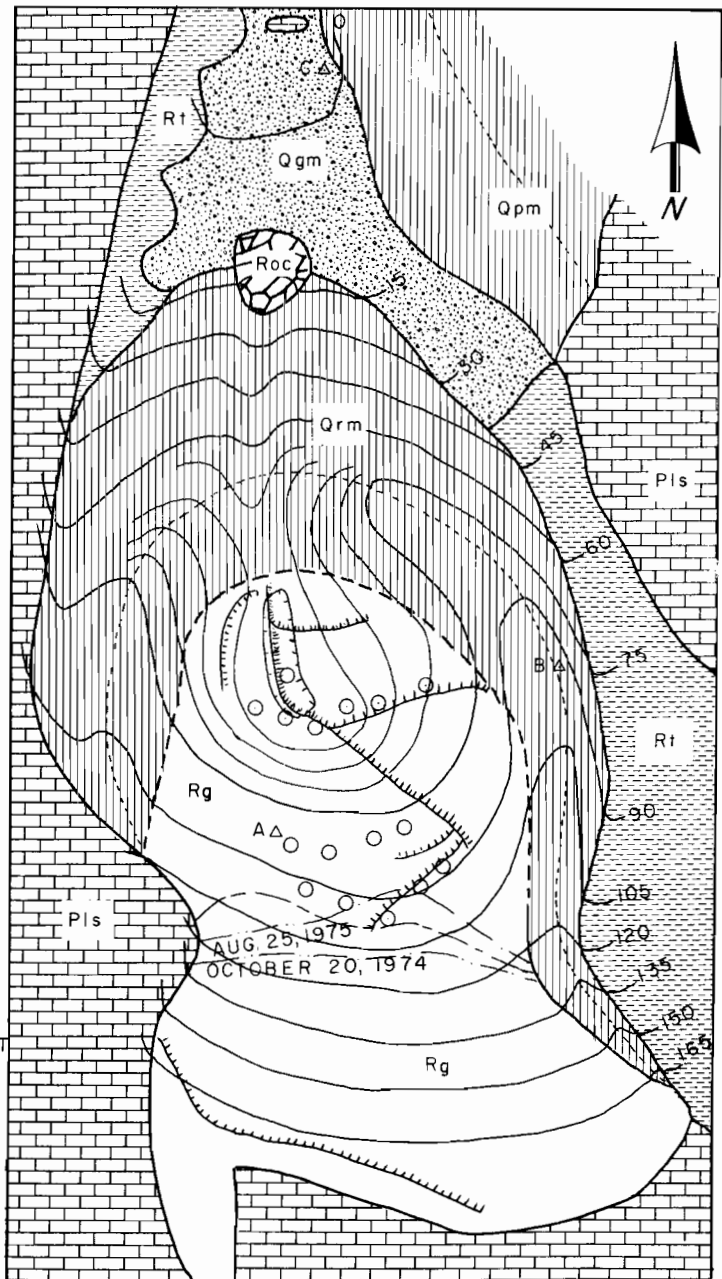
Crevassees are exposed over much of the glacier's surface but are concentrated immediately downslope from the area of maximum ice thickness. Geophysical data indicates that the cirque floor below the area of maximum ice thickness is a depression. It is likely that the crevassees are caused by tensional forces created as the ice flows out of the subglacial depression.

A reconnaissance climatic survey of the immediate area indicates that annual precipitation has less influence on firn accumulation than does wind drifting or avalanche loading. The steep ridge to the south and west shades the snow accumulation zone. During the ablation seasons of 1974, 1975 and 1976, the area upstream from the glacier's

\*Now at University of Montana

EXPLANATION

-  Rt  
TALUS
-  Roc  
OUTWASH  
CONE
-  Qrm  
RECENT  
MORAINE
-  Qpm  
PLEISTOCENE  
MORAINE
-  Rg  
GLACIER
-  Qgm  
GROUND  
MORAINE
-  Pls  
LIMESTONE  
BEDROCK
-  CREVASSE
-  MORaine CREST
-  ANNUAL FIRN  
LIMIT
-  ROCK MANTLE  
LIMIT



CONTOUR INTERVAL = 15 METERS  
intermediate contours = 3 meters

Figure 1, GEOLOGIC MAP  
SHOWING GLACIER and  
RELATED SURFICIAL DEPOSITS

0 30 60 90 meters



rock mantle accumulated firn. No data were recorded on the rates of ablation of the lower sector.

### Conclusion

The glacier accumulated firn during the 1974, 1975 and 1976 ablation seasons in an area covering approximately one third the surface of the glacier. It appears from the surface morphology of the lower sector that accumulation in the upper portion may not exceed ablation of the entire glacier. Changes in crevasse patterns between August of 1974 and August of 1976 indicate that the glacier is now active.

A copy of the complete 27 page report, all pertinent field data, the August 1975 plane-table map (Fig. 1) and photographs taken in October of 1974 and August of 1975, have been filed with World Data Center A: Glaciology-U.S. Geological Survey, 1305 Tacoma Avenue South, Tacoma, Washington 98402.

### Acknowledgments

I wish to thank Mr. Jack Bills of Challis National Forest for furnishing a helicopter to transport equipment and Dr. Monte Wilson of Boise State University for his help throughout the project. I would also like to thank Dana Hutchison, Jerry Willis, Dave Hinkley, Dave Otto, and Bert Otto for help with field work.