

Some information on the glacier and geology in the vicinity of Ongul Island

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昭和基地周辺の氷河、地質に関する写真判読結果

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要 旨

第1次、ならびに第3次日本南極観測隊による航空写真測量結果から、昭和基地を中心とするリュッツォウホルム湾東海岸、プリンス・オラフ海岸に沿う氷山、氷河の分布と地質構造について写真判読を行なった。

1. 地質構造 夏季の露岩地帯について、走向、伏角を分布図として求めた(第1図)。全般的には細かいもめ方も少く、東経 40° から 42° まで、プリンス・オラフ海岸ではその走向は、ほぼ沿岸に直角であるのに対し、リュッツォウホルム湾東海岸ではほぼ平行である。

2. 氷河 東経 40° から 42°30' の間に8つの中級の氷河が存在しているが、リュッツォウホルム湾東海岸の氷河の規模は小さい。第1次(1957年)、と第3次(1959年)観測の際撮影された航空写真の内、プリンス・オラフ海岸に重複され撮影された地域から、氷河舌端の氷山の分裂流出状況が判読される。流出氷山の平均年間速度は約 500 m で、放射状に海中に入る。

この調査に当って、写真判読、図化に際し吉田前隊員、西村、金窪、木谷、羽田野各技官の協力を受けた。

At the time of the first and third Japanese Antarctic Research Expeditions, about one thousand aerial photographs, vertical and oblique were obtained between the east coast of Lützow-Holm Bay and 42°20'E in longitude along Prince Olav Coast, through Syowa Base (69°00'22"S in latitude and 39°35'24"E in longitude). From them, some informations on the distributions of glacier and geology in the vicinity of Ongul Island are found out.

1. On geology

As seen from aerial photographs, there are conspicuous alternately banded appearance, throughout the rocky area free from the ice along either the east coast of Lützow-Holm Bay or the western part of Prince Olav Coast.

Geological surveys of some parts of this area were already made by the first Expedition, 1956-57 including the first wintering team. From their surveys it was

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known that the rocks exposed within the area mainly consisted of different kinds of metamorphic rocks and alternately banded appearance reflected the geological structure.

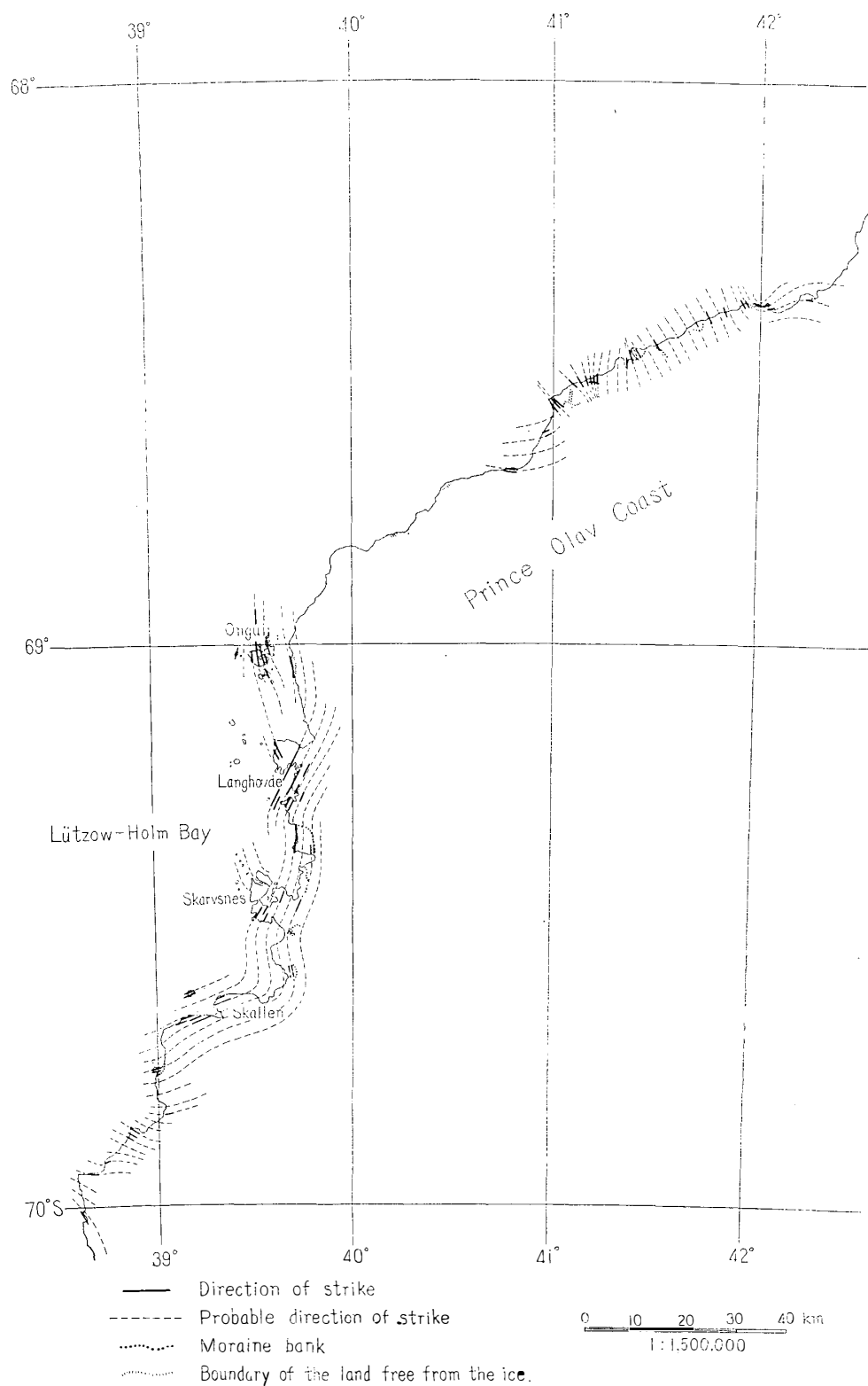


Fig. 1. General strikes of banded planes.

So, an attempt was made to plot, from vertical photographs, the directions of banding planes on a map of 1:1500,000, the results were obtained as follows (Fig. 1):

The strikes of the banding planes are generally N-S and invariably dip to the east side in the Ongul Islands, although with local fluctuations. But farther away from the islands, the strike changes gradually. It is N-S in the northern part of West Ongul Island and N35°W in the southern, and then, in the southern part of Langhovde district about 30 km south from the Ongul Islands, it changes in N20°E. About these values, there is no remarkable change for the Skarvsnes district, however, they come with various changes, from temporary N-S to finally N80°E at Skallen district. On the other side, at the main part of the Prince Olav Coast, the strikes are generally N30°W. However, along Prince Olav Coast, area of the land free from ice is so narrow that the structure often fades out, veiled by moraine banks.

It may be said that the directions of the planes are generally rectangular to the coast line between 40°E and 42°E in longitude. On the contrary, in the east coast of Lützow-Holm Bay, the directions are nearly parallel to the roughly drawn coast line except west from 39°E in longitude. However, it is thought that there may be an anomaly on the directions in some districts where the structure includes folding on the horizontal plane.

2. On glacier and icebergs

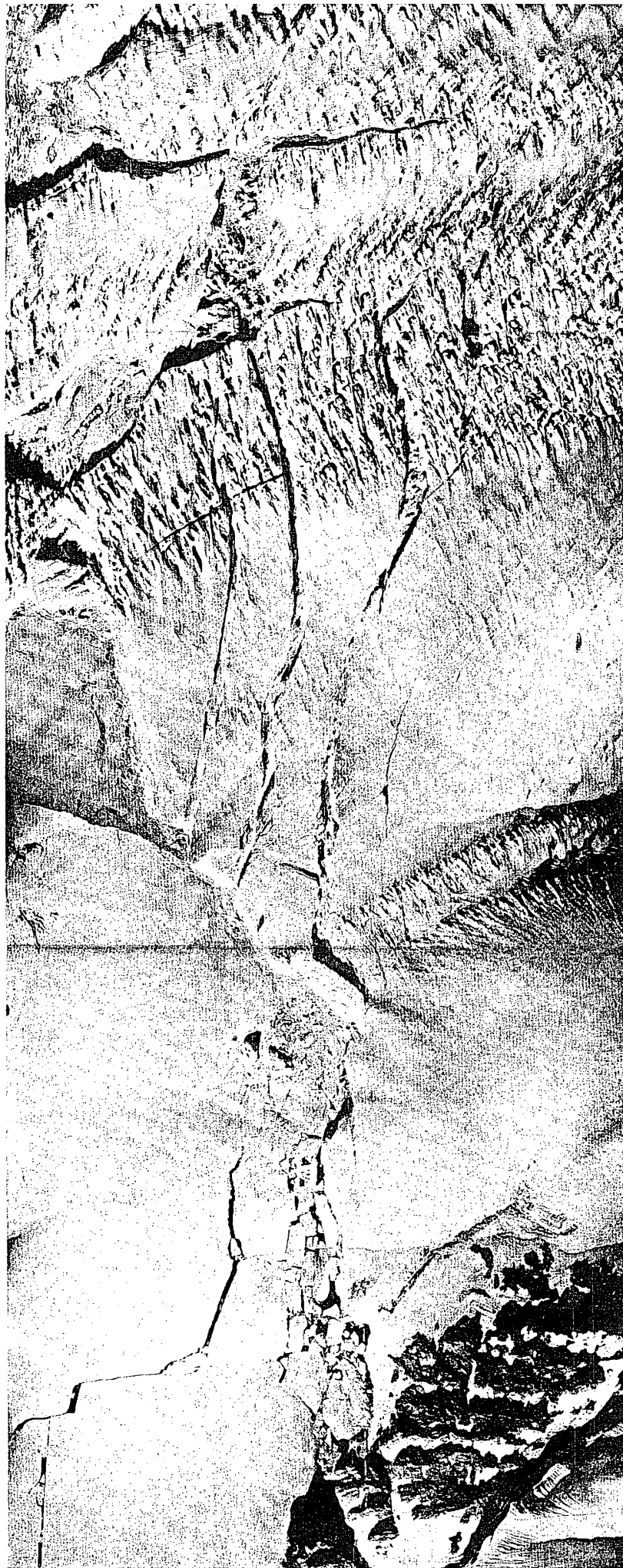
Concerning the glaciers of Prince Olav Coast, eight medium scale glaciers with 6 km of mean width are recognized from the aerial photographs between 40°E and 42°20'E in longitude. On the other side, the glaciers in the east coast of Lützow-Holm Bay are of smaller scale. As regards the photographed area we have two single courses of vertical photographs, taken on 31st January, 1957 (The first expedition), and on 5th February, 1959 (The third expedition), covering about the same area between 40°E and 41°30'E in longitude along the Prince Olav Coast. From these photographs of two times, we know the displacements of glacier, icebergs and ice coast line as follows:

1) As to icebergs, large or small, which are near the coast and seemed to break out from glaciers, fast to the sea ice, most of them are not supposed to move during two years, except the areas near to glacier tongues.

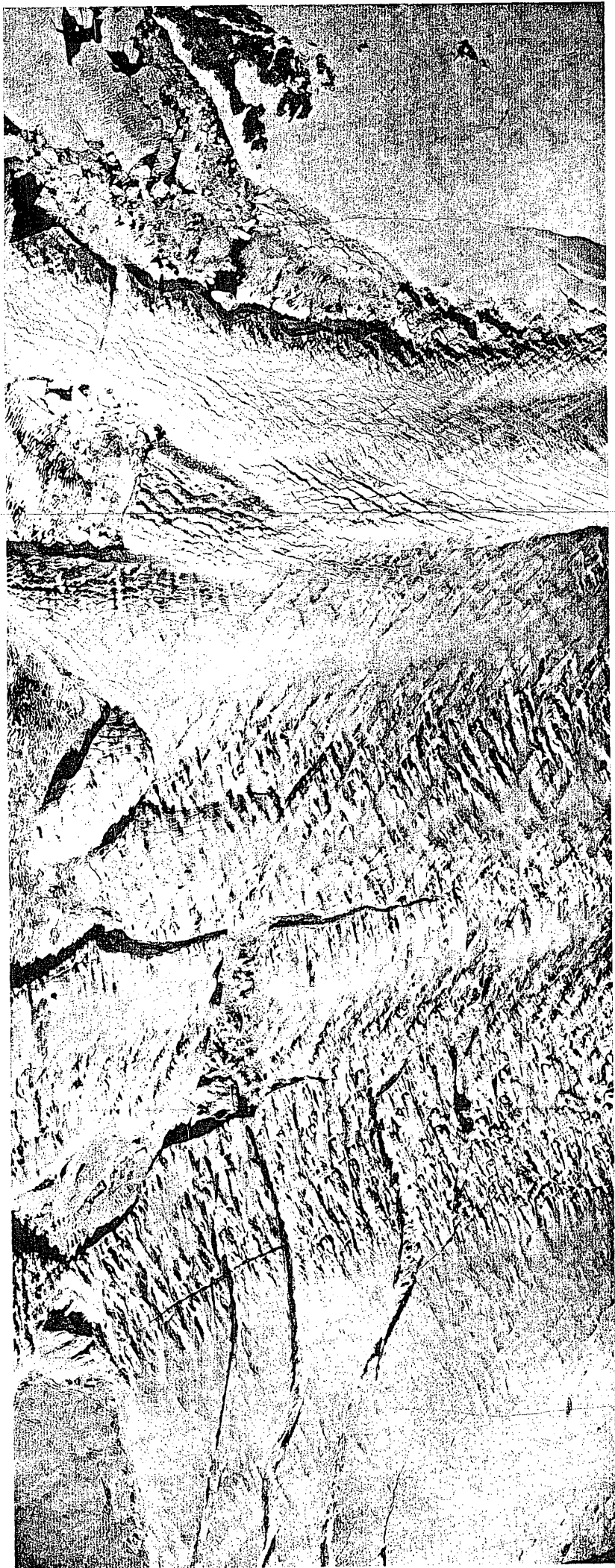
2) Along the ice coast line continuing monotonously and having a gentle ice sheet slope behind it, there is no change.

3) In a part of the front margin of glaciers, moving speed during two years is estimated as considerably higher.

For examining how each of the calved icebergs floating on the sea or of the icebergs to be calving from an ice tongue of a glacier has moved during two years, the plotting by radial line method was carried out to be compiled in a map of scale 1:50,000, along a glacier tongue of which width is 4 km and its length is 6 km



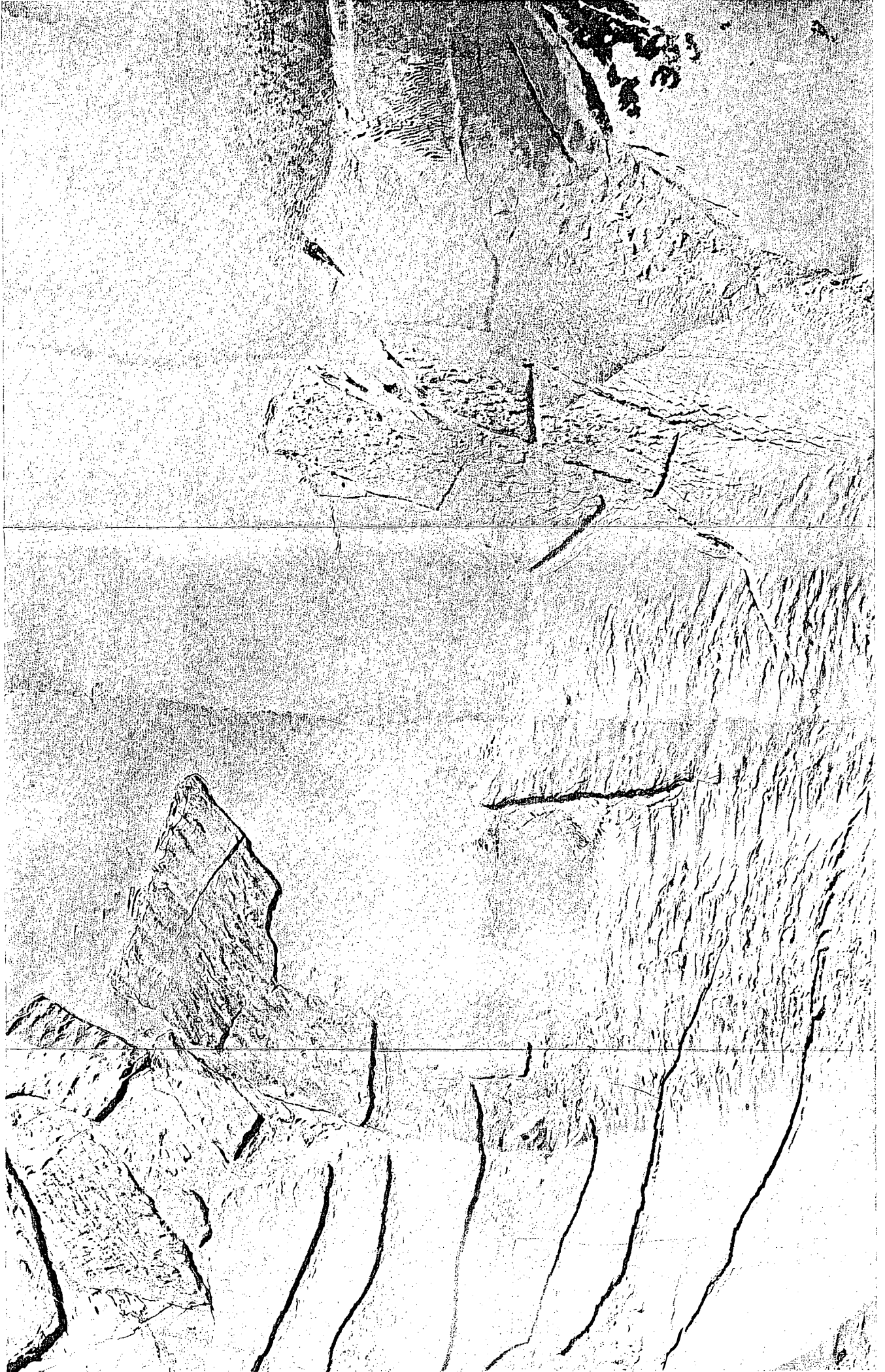
A glacier tongue on Prince Olav Coast, in February, 1957.



A glacier tongue on Prince Olav Coast, in February, 1957.



The same glacier tongue as on the preceding page on Prince Olav Coast, in February 1959.



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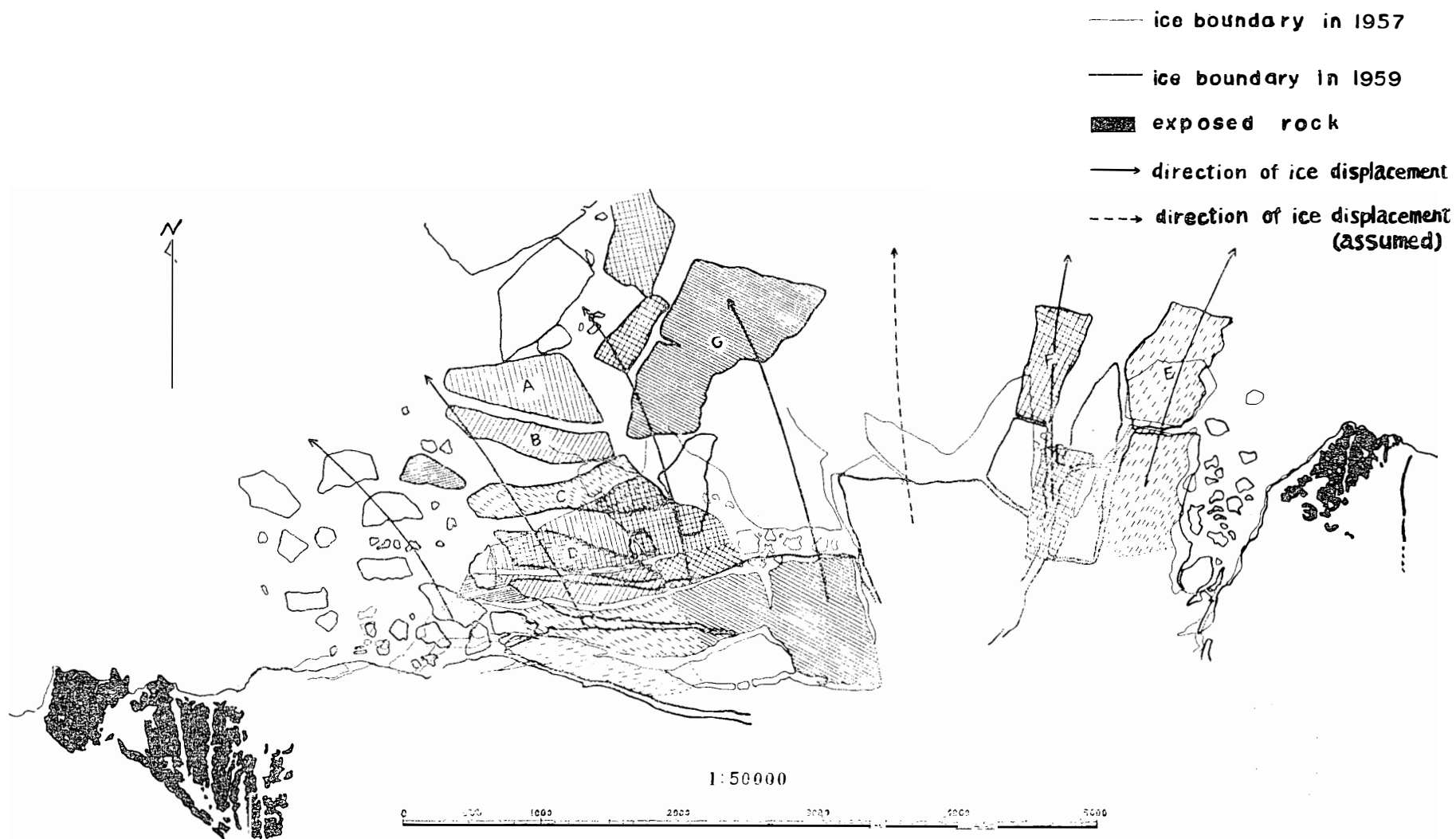


Fig. 2. Showing the ice displacement on glacier front
(from aerial photo. dated 31 Jan. 1957 & 5 Feb. 1959).

from $41^{\circ}10'E$ to $41^{\circ}20'E$ in longitude (Fig. 2).

Table I. Displacements of icebergs (in meters).

Iceberg	A	B	C	D	E
Distance of movement	1,320m	1,260m	900m	825m	960m
	1,095	1,050	1,065	840	855
Mean distance of movement	1,208	1,155	982	832	908

Table I shows the displacements of calved icebergs, A, B, C, or icebergs, D, E, calving from a glacier tongue during two years. Their elevations above sea level were calculated at from 25 meters to 30 meters.

Although the figure shows a general tendency of a radial expansion with a north principal direction as if to be the crevasses on the central part of the glacier as a centre, the drifting direction in the western part of the area has a small west component, (the left side on the map), while the eastern part has a east component (right side). It is supposed that the drifting iceberg are not too much affected by either long-shore current or wind, though limited in such a narrow area.

Concerning the relative velocity of the stream flow of the icebergs, the central part of the glacier tongue is faster, while, the both sides are slower. The difference of the velocity between them might be caused by the ground feature beneath the glacier and irregularity of the sizes of ice masses, and the larger the mass, especially about thickness, the faster it might moves.

In conclusion, we wish express our hearty thanks to Mr. A. Yoshida, Mr. K. Nishimura, Mr. T. Kanakubo, Mr. Y. Kitani and Mr. S. Hatano in our institute for their collaborates.