Measurements of Ice Flow around Skallen Rock, South of Syowa Station, Antarctica

Yutaka AGETA* and Renji NARUSE**

南極沿岸のスカーレン付近における氷の流速測定結果

上田　豊*・成瀬廉二**

要旨：昭和基地南方約 70 km の海岸にある露岩スカーレン(69°40′S, 39°25′E)の，東側と西側に流出する氷の流動速度を，1969年2月5日，10月12日および1970年2月4日の測量結果から算出した．測量は，スカーレンのふたつの基点から，氷の表面に立てた6本の標識ポールの位置を，ウィルドT2経緯儀で測角して求めた．これらの標識ポールは，海岸からの距離 1～1.5 km，高度 140～160 m，表面傾斜 5～15° のところに設置した．

えられた流速は，年間 2～7 m で，平均約 4 m となり，今までに報告された南極氷床沿岸部の氷床の流速に比べてかなり小さい．これは，測定地点がスカーレンの露岩に近いところであったため，岩盤によって氷の流動が妨げられているからと考えられる．また，それぞれの標識ポールについて，2月から10月にかけての流速と，10月から翌年2月にかけての流速との間には，ほとんど差がみられなかった．

Measurements of surface velocities of ice flow were made near the rock exposure area "Skallen" (69°40′S, 39°25′E) at a distance of 70 km south of Syowa Station, Antarctica. Surface velocities were calculated from the changes of positions of six stakes set on the surface. The positions of stakes were measured with a Wild T 2 theodolite, from two points on the rock of Skallen. The length of the base line is 1269.80 m. Six stakes were set at the points where the altitude ranges from 140 m to 160 m above the sea level, at a distance of 1～1.5 km from the coastline (Fig. 1). Inclination of ice surface was 5～10° at stakes S 1～S 5 and about 15° at S 6. Measurements of the positions of the stakes were made on 5 February, 12 October, 1969 and 4 February, 1970. But, stake S 6 could not be found on 12 October.

* 名古屋大学理学部水質科学研究施設. Water Research Laboratory, Faculty of Science, Nagoya University, Chikusa-ku, Nagoya.

** 北海道大学低温科学研究所. The Institute of Low Temperature Science, Hokkaido University, Sapporo, Hokkaido.

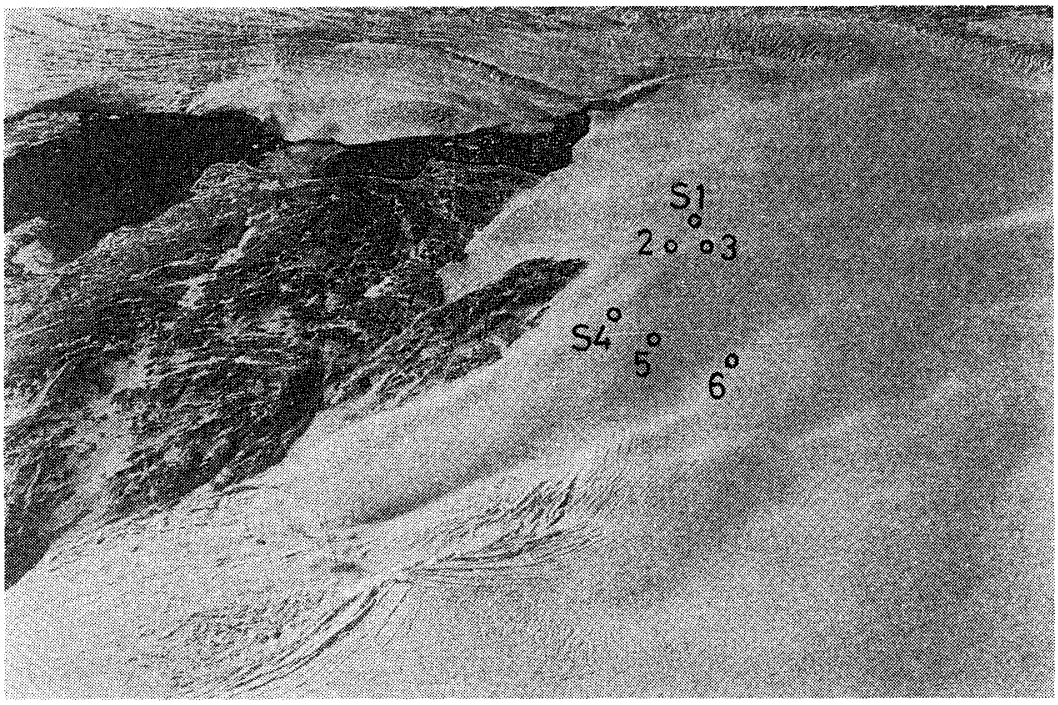

Fig. 1. Locations of stakes. (Taken from air on 15 March, 1971 by O. WATANABE.)

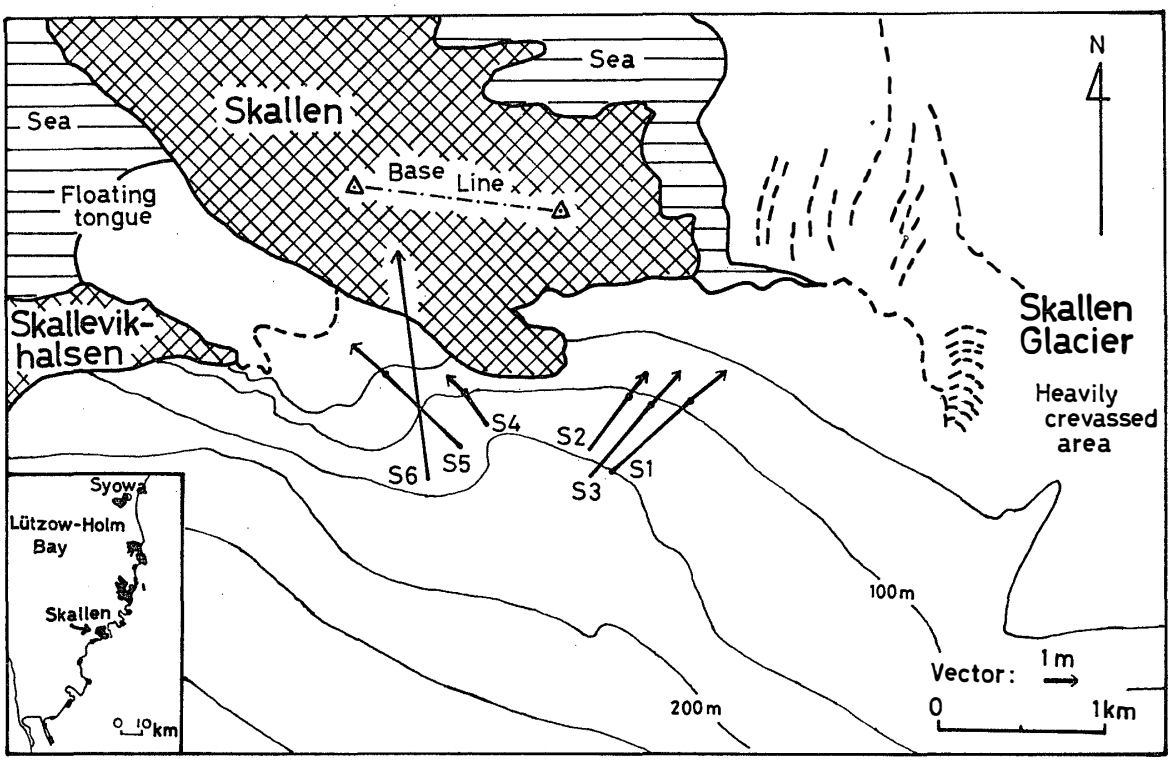

Fig. 2. Directions and distances of ice movements. (Each arrow starts from the original position on 5 February, 1969, and indicates the displacement in 250 days till 12 October, 1969, and that in 115 days from 12 October, 1969 to 4 February, 1970.)

Results of measurements are shown in Table 1, and the vectors of ice flow are indicated by the arrows in Fig. 2. Each arrow starts from the position on 5 February, 1969, and indicates the displacement in 250 days from 5 February to 12 October, 1969, and that in 115 days from 12 October, 1969 to 4 February, 1970. The errors of distances of ice movements derived from the law of the propagation of errors are in the range of ±(20~30) cm. Mean value of speed of ice flow observed at six points is about 4 m/year. This value is considerably small in comparison with the speed of ice flow summarized by MELLOR (1961), who classified ice movements in Antarctica into three types, namely, sheet flow, stream flow and ice shelf movement (MELLOR, 1959; 1961). The value of flow in the present case is smaller than that in the case of sheet flow, which is the slowest among the three types described above. This small speed may be attributed to the close locations of the stakes to the rock of Skallen which would retard the flow.

There are no significant differences between the velocities in the period from February to October and those in the period from October to February, as seen in Table 1.

Table 1. Results of measurements of ice flow movement (unit: cm).
(Each value is the horizontal component of flow.)

Stake No.	Feb. 5, '69—Oct. 12, '69		Oct. 12, '69—Feb. 4, '70		Feb. 5, '69—Feb. 4, '70
	Distance of ice movement	Speed (cm/month)	Distance of ice movement	Speed (cm/month)	Distance of ice movement (cm/year)
S 1	339	41	151	40	490
S 2	207	25	101	26	308
S 3	296	36	144	38	440
S 4	148	18	67	18	214
S 5	340	42	145	38	484
S 6					735

Note: The errors of distances of ice movements derived from the law of the propagation of errors are ± (20~30) cm.

Since stakes S 1, S 2 and S 3 were set at the vertexes of a triangle, the deformation of the triangle was calculated. The length of the side from S 1 to S 2 was 199 m, and its elongation was about 80 cm for one year. The length of the side from S 3 to S 1 was 137 m, and its elongation was about 80 cm. But, about 80 cm contraction was observed in the side from S 2 to S 3, the length of which was 153 m.

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