

the shape of the coast and the state of pack-ice. The circulation of the current is not perfect, but almost continuously round along the Antarctic continent.

According to the observation early in January to March in 1957, westerly current appears in the southern area over Lat. 60°S. The south end of the eastward flowing current has been curved clockwise and becomes recurvature current at Lat. 55°S. to 60°S.; and then streamed into the westward flowing current on the near Lat. 60°S. We measured the drift of the current 7-10 miles per 24 hours.

Dr. EKMAN reported that polar current streamed toward 30° left off the direction of the wind by earth rotation in Antarctica, but we found 20° left off the direction of the wind in this expedition. The direction of the current is

variable by the shape of shelf ice and pack-ice. The drift of the westward flowing current from Long. 20°E to 50°E is comparatively strong in January and indicated 5-10 miles per 24 hours (W/S). On February the drift is so much strong as to indicate 10-15 miles per 24 hours (W/S) in summer 1957.

The velocity of this current depends on the easterly wind. The accumulated wind velocity (NE-E/S) in January is 12346.7 miles; in February in 1957. The ratio of the accumulated wind velocity of both months was 1:3.

**Conclusion** The velocity of this current depend on the easterly wind. The accumulated wind velocity (NE-E/S) in January is 12346.7 miles, and 34100.5 miles in February in 1957. The ratio of the accumulated wind velocity of both in January to February was 1:3.

## THE EFFECT OF THE WIND ON VERY CLOSE PACK ICE\*

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## 氷野の漂流と圧縮疎化現象\*

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The m/s "Soya" of the 3rd Japanese Antarctic Research Expedition 1958-59 was caught in very close pack-ice between January 14 (at 67°33'S, 40°27'E) and February 1, 1959 (at 67°49'S, 37°18'E).

Wind observations were carried out every hour on the ship at a height of about 18 m above sea level. The east by north-east wind was most frequent in this period.

Wind factors of the pack ice were calculated

from data of the wind velocity, the wind direction and the positions of the ship. The effects of the ocean currents were not corrected, for the currents in the Lützow-Holm Bay were not observed. The velocity of the drift of the pack-ice was about 2% of that of the wind. This value was the same magnitude as was obtained in the Central Arctic Ocean free from the coasts. It seemed that the direction of the drift was influenced by the Antarctic coasts and the ocean currents, when the wind velocity was not large.

Several icebergs were seen in the very close pack ice around the ship. Relative positions of icebergs to the ship were observed by the use of the marine radar in every day.

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The polygonal area about 30 km across, centered at the ship's position, was taken as to the studies of ice field deformation. This area was represented by connecting the outer icebergs far from the ship. As it seemed that icebergs were also beset in the pack ice, deformations of this area showed the contraction and the relaxation of the ice field. The ice field was contracted by north-east or east by north-east wind, and was relaxed by south or west wind. In the period of Jan. 14-25 during which the east by north-east wind was most frequent, the ice area was contracted to about 64% of the initial area. When the ice field was relaxed by south or west wind between Jan. 25 and Feb. 1, the ice area increased about 34% of the area observed on Jan. 25. This fairly large value of ice area increment might be resulted from the motion of icebergs which drifted independent-

ly from surrounding pack ice, especially during the latter stage when the ice field became loose.

The ratios of contraction in all directions within the ice field were obtained from the contraction period of Jan. 18-22. The circle within the initial ice field deformed to the ellipse at the last stage during the considered period. The maximum contraction appeared in the direction of east by north-east to west by south-west. This contraction was observed from the ship as the formation of hummocks and pressure ridges. The ratios of expansion in all direction were obtained from the relaxation period of Jan. 26-Feb. 1. The maximum expansion appeared in the direction of north-west to south-east. This expansion was recognized from the airplane as the formation of cracks and leads in the direction of north-east to south-west which was perpendicular to the above-mentioned direction.

## PACK ICE IN THE LÜTZOW-HOLMBUKTA OF THE ANTARCTIC\*

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### 昭和基地沖の流水帯移動について\*

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**Introduction** Pack ice in the Antarctic late in summer (from January to February) begins to thaw out and disunite. The Antarctic pack is composed of sea ice frozen in the open sea, detached fragments of fast ice formed along the coastline, and disintegrated particles of land ice. This conglomeration drifts northward and north-westward under the influence of the wind,

the current and the anticlockwise component due to the earth's rotation. This drift to lower latitude impeded between 40°S. and 60°S. by the "Westerlies" prevailing in those latitudes, with the result that a belt of somewhat consolidated ice is produced through which vessels must pass in order to reach the shores of the continent. The north limit of the pack is variable and the location of the extreme edge varies also with the season. During the late winter and spring the edge extends to most northern limit, the edge lying in much the same position during July, August, September and

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