

1930年代以降における南極リュツォ・ホルム湾の沿岸定着氷の変動特性

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Land-fast ice variation in Lützow-Holm Bay, Antarctica, since 1930s

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Satellite images shot Lützow-Holm Bay (around 69°S, 38°E in the Antarctic) have revealed frequent occurrences of ice-breakup events in the bay. Such unstable ice conditions have continued, with more than 20 events annually since the 1980s. The variability of these events coincides with the characteristics of snow accumulation patterns on sea ice within the bay. Breakups are often observed during periods of thinner snow cover, leading to a weakening fast-ice as the melt season progresses in spring - summer. In contrast, land-fast ice was extremely stable during the 1950s–70s, judging from the appearance of a long glacier tongue originating from the Shirase Glacier flowing into the land-fast ice field of the bay. Expansion or contraction of the floating ice tongue depends on the surrounding sea ice conditions within the bay; revealing that unstable sea-ice conditions for the last three decades have shortened the ice tongue. Ice floes from the broken fast-ice field are then transported offshore by prevailing southerly winds. Furthermore, the feature of peculiar pack-ice extent off the bay should be considered in order to understand land-fast ice condition. The offshore pack-ice extent influences the land-fast ice stability by causing ocean swell intrusion into the bay through the regional retreat of the pack ice edge ‘embayment’. The present study focuses on revealing the variation processes of the Antarctic coastal ice and its relation to surface meteorological conditions, based on satellite and field data since 1930s.

南極海氷域のうち、沖合流氷の変動については、衛星データやモデルによる研究が盛んである。しかし、大陸沿岸に形成される定着氷の研究例は未だ少ない。本研究では昭和基地周辺を含むリュツォ・ホルム湾を対象に、衛星画像と現地観測報告を用いて海氷変動の実態を監視している。特に海氷の崩壊・流出現象の発生有無に注目して、沿岸定着氷の変動機構を解明することが主な研究目的である。2011年9月以前の過去80年間にわたって解析した結果を報告する。海氷状態の変動要因として、氷上積雪深や地上風系、沖合流氷域の消長を調べた。また、湾奥における定着氷の流出有無を白瀬氷河浮氷舌末端の状態から推測した。近年、沿岸定着氷の実態とその変動把握の重要性が注目され、国際極年2007-2008を契機にオーストラリア主導で定着氷観測ネットワークが構築されつつある。昭和基地もその一翼を担うべく、国際共同観測として準備を進めている。