

アデリーペンギンの個体数観測

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Population census of Adélie penguins

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Penguins are considered as an excellent bio-indicator of Antarctic coastal marine ecosystems, because they consume large amount of krill and fish, and therefore their breeding performance and population changes should integrate any possible changes in biological communities at the lower trophic levels. Adélie penguins are especially suited as bio-indicators, as they distribute widely along the coast of Antarctic continent and have relatively easy access from nearby research stations in summer breeding seasons. JARE started to count the number of breeding Adélie penguins as early as in 1961 (JARE 5), and established the annual population census of 5-10 penguin colonies near Syowa station since 1982 (JARE 23). These population census data are among the longest time series of any biological parameters in Antarctica, and are valuable source of information to examine long-term changes in the Antarctic ecosystems. The population census data from JARE are now submitted every year to CCAMLR, as a part of CCAMLR's Ecosystem Monitoring Program (CEMP). The population census results showed that the breeding population of Adélie penguins increased overall across the past 30-50 years in Lützow-Holm Bay area. The overall increasing population trends were observed widely in East Antarctica, from Lützow-Holm Bay area (40° E) to Terre Adélie (140° E). This shows a striking contrast to the decreasing trends of Adélie penguins observed widely across Antarctic Peninsula and Scotia Sea, but the environmental drivers of overall population increase are yet to be determined. In Lützow-Holm Bay area, there were shorter-term (7-10 years) fluctuations in the increasing and decreasing trends of penguin populations. Over the recent decades, the number of breeding penguins was highest in 2004, and decreased gradually until 2015. Such shorter-term fluctuations appeared to be related to the changing conditions of fast-ice breakup in the Lützow-Holm Bay. Large-scale fast-ice breakup observed in early 2016 are expected to affect the population size of penguins in the forthcoming summer breeding season. Continued effort on penguin population census by JARE would be invaluable to document the effect of environmental changes on Antarctic coastal marine ecosystems.