

Breakup of land-fast sea ice in Lutzow-Holm Bay, East Antarctica and its teleconnection to tropical Pacific

*Shigeru Aoki¹

1. Hokkaido University

A large land-fast sea ice breakup occurred in 2016 in Lutzow-Holm Bay, East Antarctica. The breakup caused calving from the Shirase Glacier Tongue (SGT), which is otherwise held back by the ice. Although similar breakups and calving have been observed in the past, the timing and magnitudes are not well-constrained. We analyzed the ice's breakup latitude during 1997-2016 to investigate the variables controlling breakup and examine correlation with local calving for a longer period. The breakup latitude had a persistently high correlation with sea-surface temperature (SST) in the tropical Pacific, which exceeds correlations with local atmospheric variables. The multi-decadal variability of the tropical SST can explain the multi-decadal variation of the calving front of SGT from the 1950s through the breakup of fast ice. The SST-regressed breakup latitude can potentially explain 5 out of 6 SGT calving events from the mid-20th century, including its frontal retreat in the 1980s. Our proposed teleconnection between tropical SST and Antarctic sea ice could lead to better predictions of breakup and might impact the glacier flux for a wider region.