Interannual variability of sea ice production in the Barrow Coastal Polynya off Barrow, Alaska

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Recently, it has been proposed that the Barrow Coastal Polynya (BCP), previously considered to be a latent heat polynya, is a “wind-driven” hybrid latent/sensible heat polynya, with both features caused by the same northeasterly wind (*Hirano et al*., 2016). In this study, we examine the interannual variability of sea ice production in the BCP from 2002/03 to 2010/11 during AMSR-E operation period, with focus on the northeasterly wind that characterizes the BCP as a hybrid coastal polynya. Throughout the ice-growth season (November–May), sea ice production was the highest in 2003/04 and the lowest in 2010/11. In 2003/04, amount of the suppressed sea ice production was also highest, when ~30% of the BCP ice production was suppressed by the ocean heat transport associated with warm water upwelling. Wind pattern around the BCP region varies from year to year, and frequency and magnitude of the northeasterly wind correlate well with sea level pressure difference between the Beaufort High and Aleutian Low. Compared with climatology, the northeasterly wind in the BCP was more frequent and stronger in 2003/04 due to strengthening of the Beaufort High. In contrast, it was less frequent and weaker in 2010/11 due to weakening of both the Beaufort High and Aleutian Low. Frequency and magnitude of the northeasterly wind, mainly regulated by variabilities of the Beaufort High and Aleutian Low, are considered to be major factors of the interannual variability of sea ice production in the BCP.

Keywords: hybrid latent/sensible heat polynya, sea ice production, interannual variability

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