



Supplement of

The Arctic sea ice extent change connected to Pacific decadal variability

Xiao-Yi Yang et al.

Correspondence to: Xiao-Yi Yang (xyyang@xmu.edu.cn)

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Figure S1. 241-month running partial correlation between the HadEN4 subsurface Bering sea temperature anomalies and (a) the PDO index, with the effect of NPGO removed; (b) the NPGO index, with the effect of PDO removed. All the data are preprocessed by 13 months low-pass filter.



Figure S2. Winter (December-February mean) ChukBerSIE anomalies for the period of 1979-2018.



Figure S3. (a) Regression of December-February mean sea surface temperature anomalies (color shading) and sea level pressure anomalies (contour) on the PDO index during the period of 1979-2006. The solid and dashed contours indicate the positive and negative anomalies of SLP. The contour interval is 0.2hPa. (b) Same as (a), but regression on the NPGO index. (c) & (d), same as (a) & (b), but during the period of 2007-2018.



Figure S4. (a) & (b) Regression of December-February mean surface wind stress (vector) and Ekman pumping rate (color shading) anomalies onto the PDO (left panels) and NPGO (right panels) indices during the period of 1979-2006. (c) & (d) Same as (a) & (b), but for the period of 2007-2018. Solid (dashed) lines enclose the positive (negative) regression coefficients of Ekman pumping that are significant at the 95% confidence level. The black (gray) vectors indicate the wind stress regression coefficients are statistically significant (non-significant) at the 95% confidence level.



Figure S5. Climatology of spring (March-May mean) sea level pressure during the periods of (a) 1979-2006; (b) 2007-2018. (c) Decadal change of spring sea level pressure by (b) minus (a).



Figure S6. 121-month running correlations between the NPGO index and northeast Pacific (180 W-110 W, 25 N-62 N) SSHa EOF PC1 (blue) and PC2 (red). Grey dashed lines denote the correlation coefficients of ± 0.5 .



Figure S7. Regression of Northeast Pacific $(180^{\circ} \text{ W-110 W}, 25 \text{ N-62 N})$ sea surface height anomalies on the NPGO index for the periods of 1979-1998 (a) and 1999-2017 (b). (c) & (d) The second EOF of Northeast Pacific sea surface height anomalies for the two separate periods.