Supplementary Information for

Attribution of storm track activity to instantaneous upper-level jets yields new insights into the North Pacific midwinter minimum

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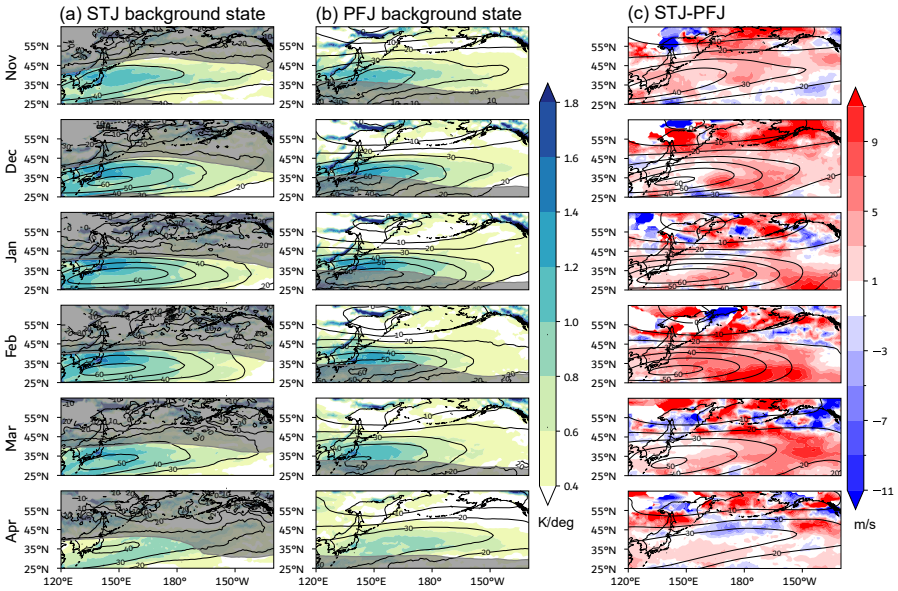

Fig. S1 (a) Composited background 300-hPa zonal wind speed ($\overline{U_{300}}^{M*}_{\mathrm{STJ}}$) (black contours) and 850-hPa meridional temperature gradient ($\frac{d\overline{T_{850}}^{M*}_{\mathrm{STJ}}}{dy}$) (color, K/100 km) for the STJ masking. (b) Same as in (a), but for PFJ masking ($\overline{U_{300}}^{M*}_{\mathrm{PFJ}}$ and $\frac{d\overline{T_{850}}^{M*}_{\mathrm{PFJ}}}{dy}$). (c) Difference in composited background 300-hPa zonal wind speed ($\overline{U_{300}}^{M*}_{\mathrm{STJ}} - \overline{U_{300}}^{M*}_{\mathrm{PFJ}}$) (colors, m/s). Black contours denote climatological-mean 300-hPa zonal wind speed (m/s).

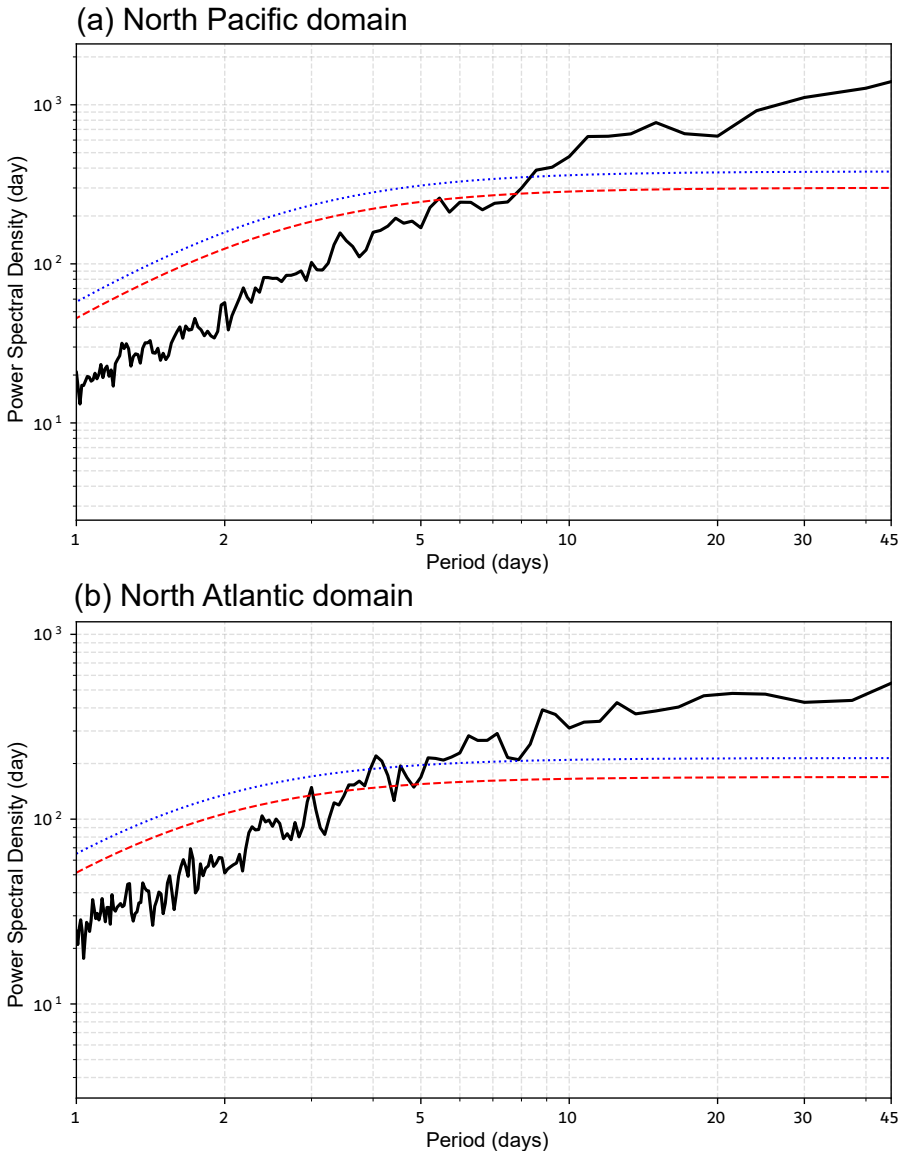

Fig. S2 (a–b) Power spectral density (day) of 6-hourly relative dominance of PFJs over STJs, as measured by area-averaged $[M_{\mathrm{PFJ}}] - [M_{\mathrm{STJ}}]$ within (a) the North Pacific and (b) the North Atlantic domains. Red and blue dashed curves denote the theoretical red noise background and 95% confidence level, respectively. Both panels are based on extended winter seasons (i.e., November−April).

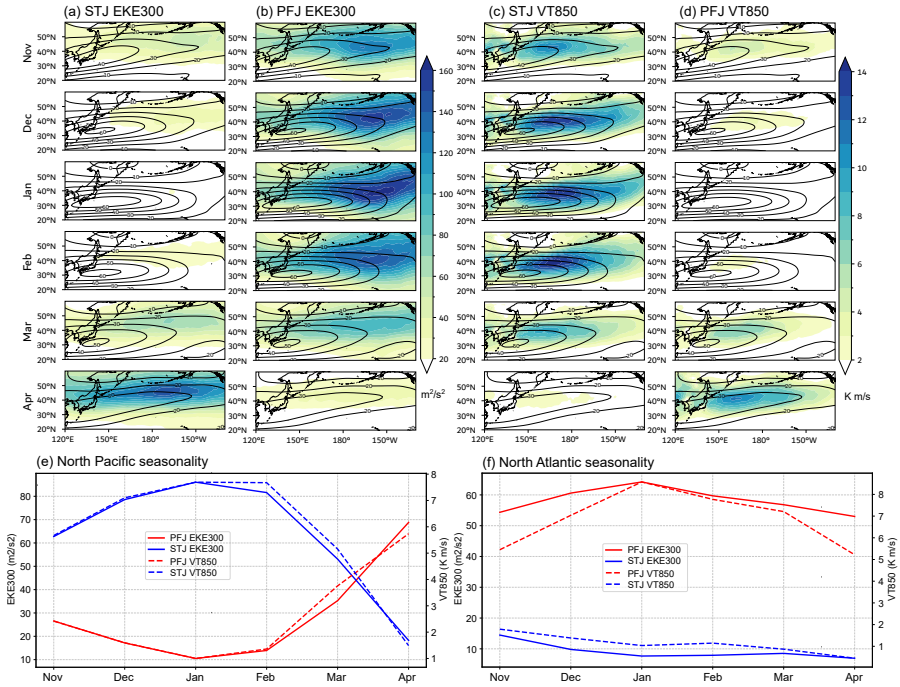

Fig. S3 (a) Accumulated climatology of EKE_{300} ($\mathrm{m}^2/\mathrm{s}^2$) under STJ-dominant conditions ($\overline{\mathrm{EKE}_{300\mathrm{STJ}}}$). Note that EKE is not normalized by the probability of STJ-dominant conditions, unlike in Fig. 3. Black contours denote climatological-mean 300-hPa zonal wind speed (m/s). (b) Same as in (a), but for PFJs ($\overline{\mathrm{EKE}_{300\mathrm{PFJ}}}$). (c-d) Same as in (a-b), respectively, but for $V'T'_{850}$ ($\overline{V'T'_{850\mathrm{STJ}}}$ and $\overline{V'T'_{850\mathrm{PFJ}}}$). (e) Seasonality of climatological-mean typical $\overline{\mathrm{EKE}_{300}}$ and $\overline{V'T'_{850}}$ in the North Pacific domain as indicated. (f) Same as in (e), but for the North Atlantic domain.

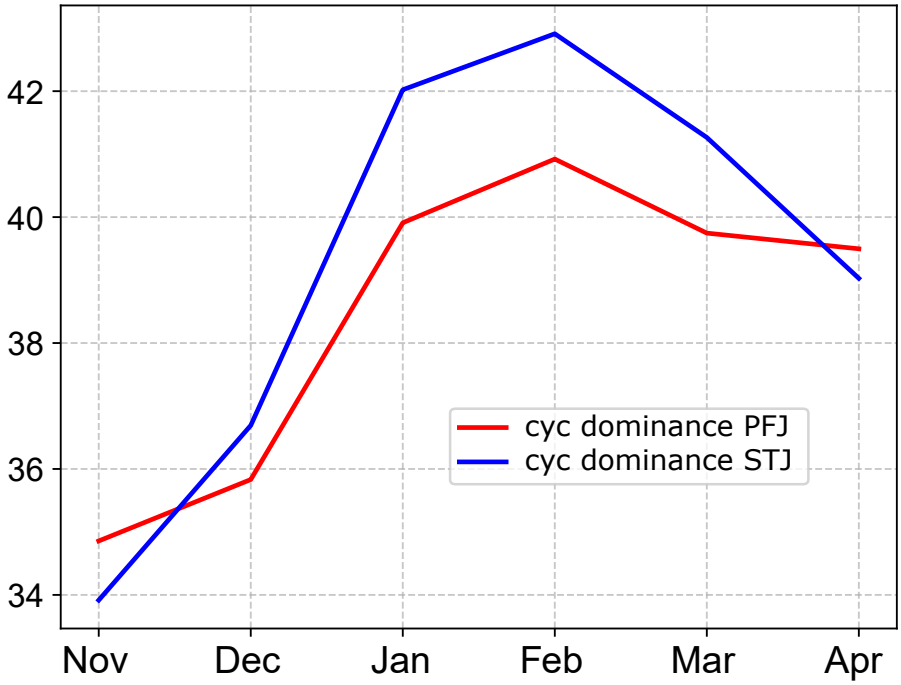

Fig. S4 Seasonality of dominance of cyclonic curvature defined as a ratio of cyclonic curvature probability to the sum of cyclonic and anticyclonic curvature probabilities in the North Pacific domain [130°E–130°W, 20°–65°N], under STJ- and PFJ-dominant conditions as indicated. Cyclonic and anticyclonic regions are required to have a curvature radius less than 2,500 km.

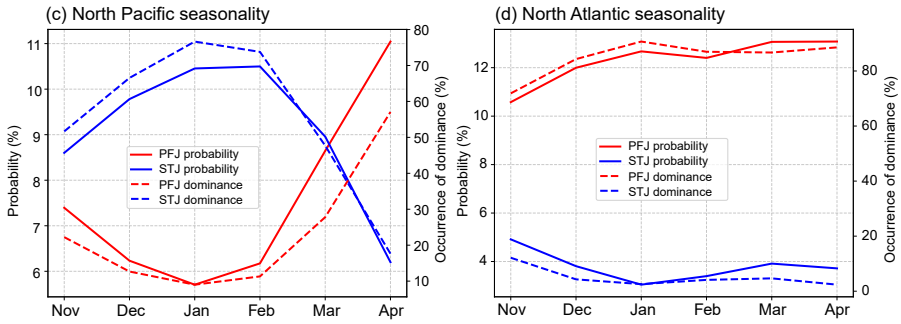

Fig. S5 (a–b) Same as in Figs. 1c–d, respectively, but for the probability [M] and occurrence of dominance D with a distance threshold of 200 km.

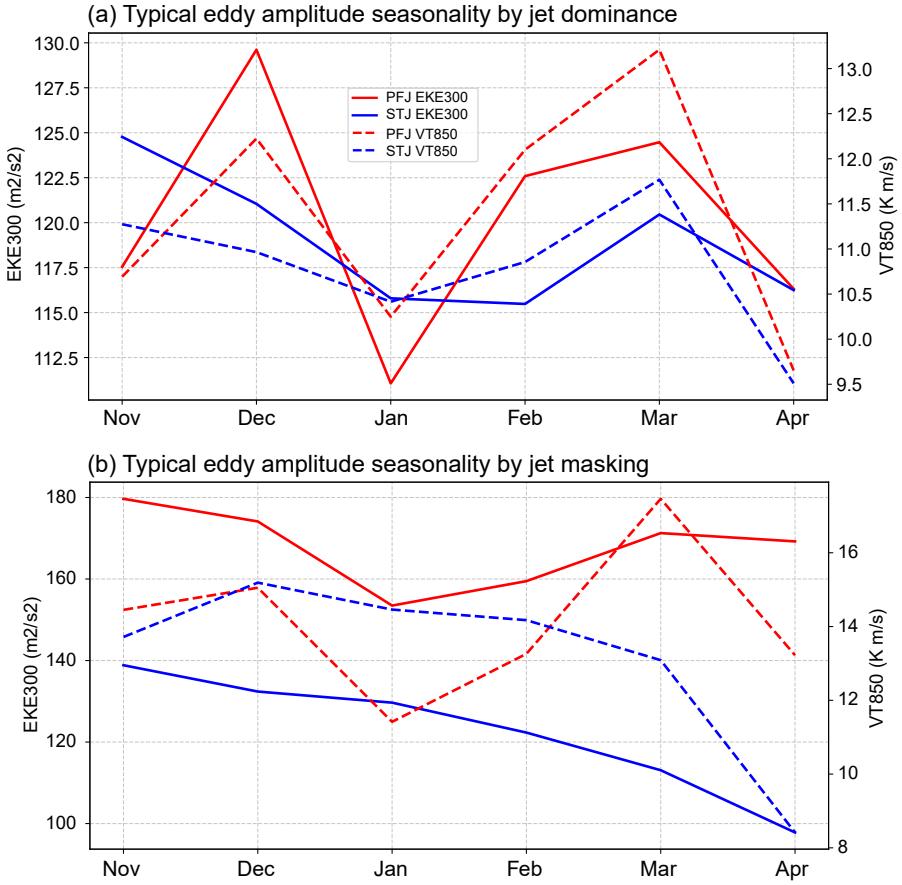

Fig. S6 (a–b) Same as in Figs. 3e and 4e, respectively, but for statistics based on a distance threshold of 200 km.