Supplementary information

Anticyclonic suppression of the North Pacific transient eddy activity in midwinter

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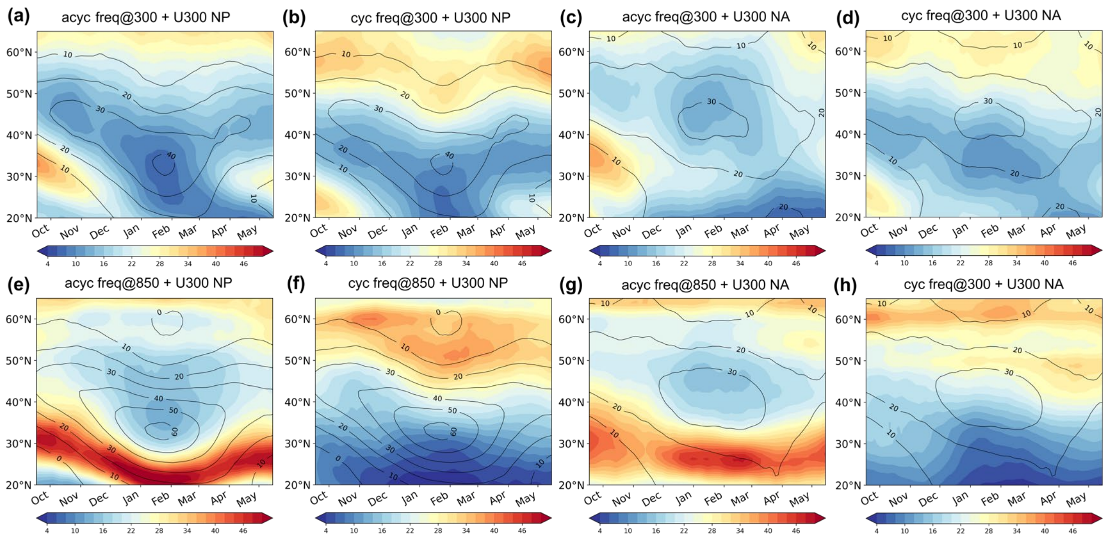
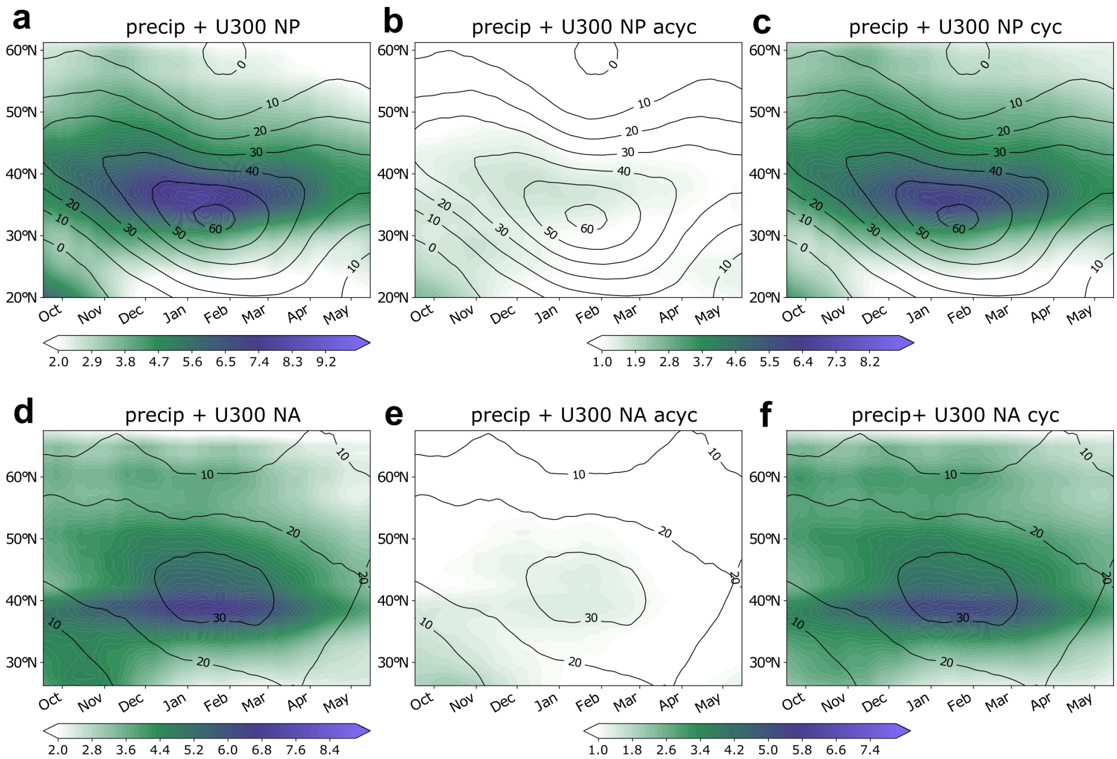


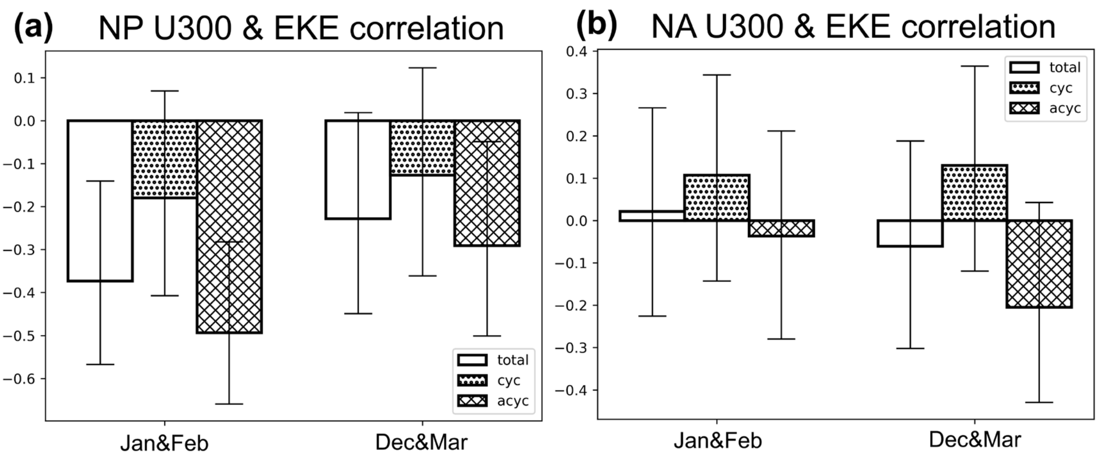
Supplementary Figure S1. Seasonality in probability based on a non-zero curvature threshold.

a-b Same as in Figs. 3c-d, but for anticyclonic and cyclonic domains, respectively, over the NP with the absolute value of curvature > 1.0×10^{-6} m^{-1}. **c-d** Same as in **a-b**, respectively, but for the NA. These thresholds are equivalent to the radius of 1,000km. **e-h** Same as in **a-d**, respectively, but for 850-hPa cyclonic and anticyclonic domains.



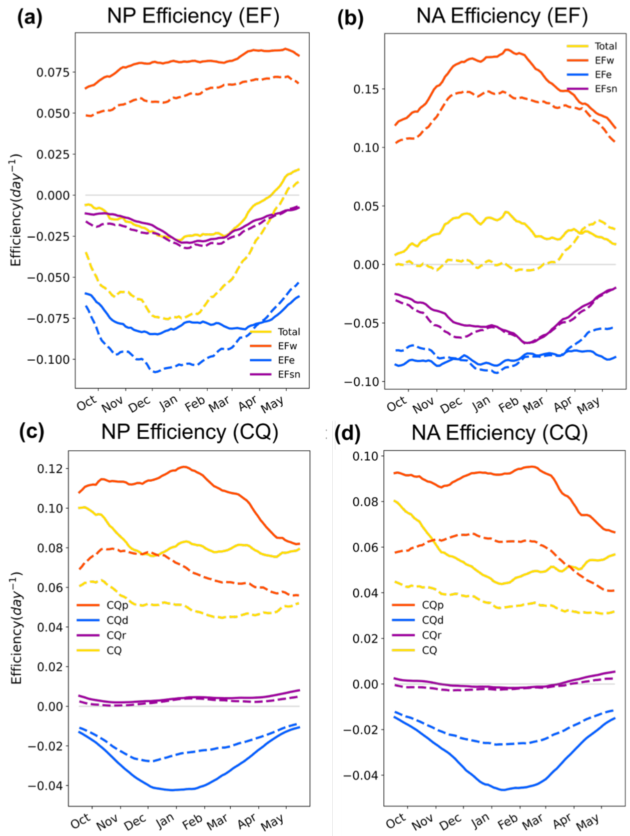
Supplementary Figure S2. Climatological seasonality of anticyclonic and cyclonic contributions to precipitation.

a Climatological seasonality in total precipitation (mm/day) averaged for 150°E−180° based on the JRA-55 6-hourly precipitation data. Contours denote the corresponding seasonality of U_{300} averaged for 150°E−180°. A tick mark on the abscissa represents the first day of a given calendar month .**b-c** Same as in a, but for the climatological seasonality in precipitation reconstructed only with anticyclonic (b) and cyclonic (c) domains averaged for 150°E−180°. **d-f** Same as in a-c, respectively, but for precipitation averaged for 70°−30°W. Contours denote the corresponding seasonality of climatological-mean U_{300} averaged for 70°−40°W.



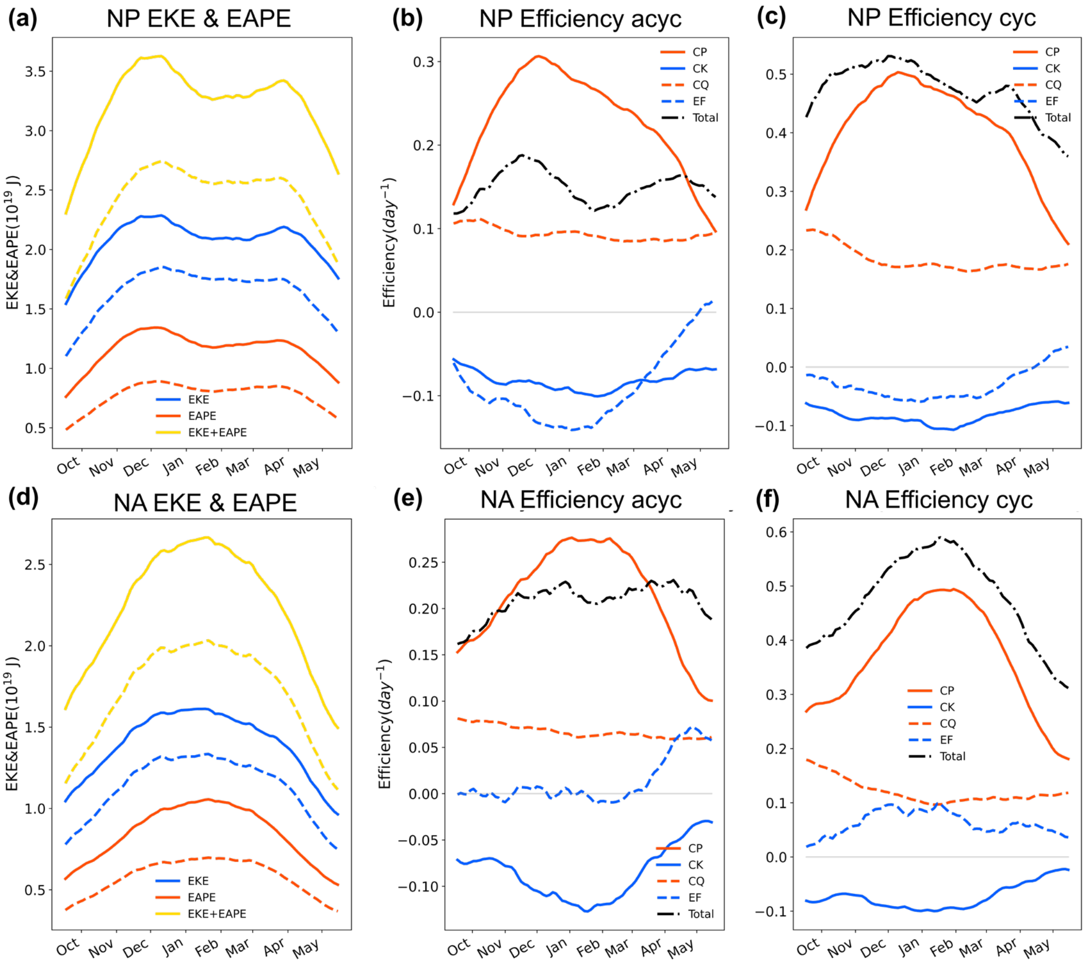
Supplementary Figure S3. Interannual relationship between transient eddy activity and westerly jet speed.

Same as in upper panels in Figs. 7a-b, respectively, but for interannual correlation coefficients between EKE_{3D} (10^{19}J) over the NP [130°E−130°W, 20°−65°N] (a) and NA [80°−10°W, 25°−65°N] (b), and maximum speed of monthly U_{300} (m/s) averaged zonally for 150°E−180° (a) and 70°E−40°W (b). The correlation is evaluated separately for their midwinter (Jan and Feb) means and shoulder-season (Dec and Mar) means.



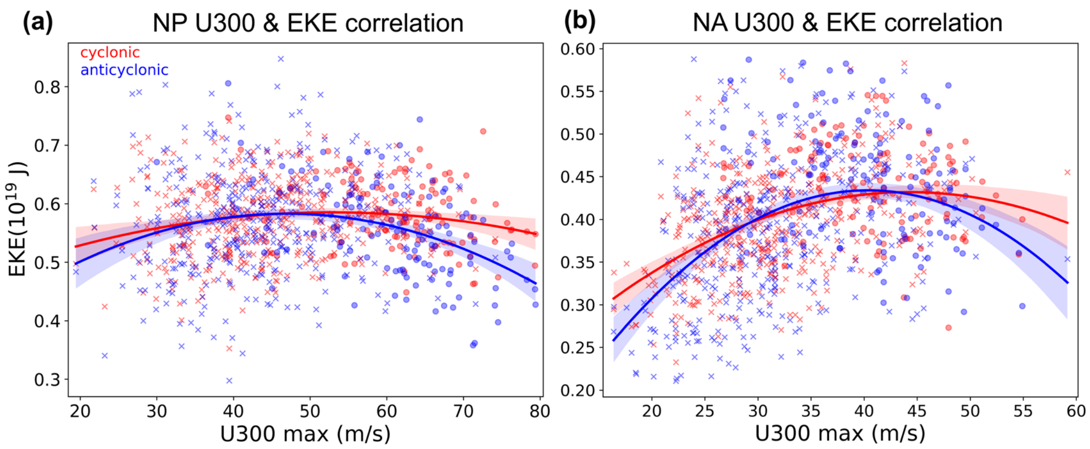
Supplementary Figure S4. Seasonality in energetics of transient eddies associated with energy flux terms and diabatic heating rates.

a Same as in Fig. 8a, but for the efficiencies (day^{-1}) of energy fluxes through the western (red), eastern (blue), southern and northern (purple) boundaries of the NP domain. Yellow lines denote the net efficiency of the total energy flux. Positive (negative) values signify inward (outward) fluxes. **b** Same as in **a**, but for the NA. **c-d** Same as in **a-b**, respectively, but for efficiencies of energy generation through diabatic processes. Red, purple, and blue lines signify efficiencies associated solely with precipitation, vertical diffusion, and radiative processes, respectively. Yellow lines indicate the efficiency of the total diabatic energy generation.



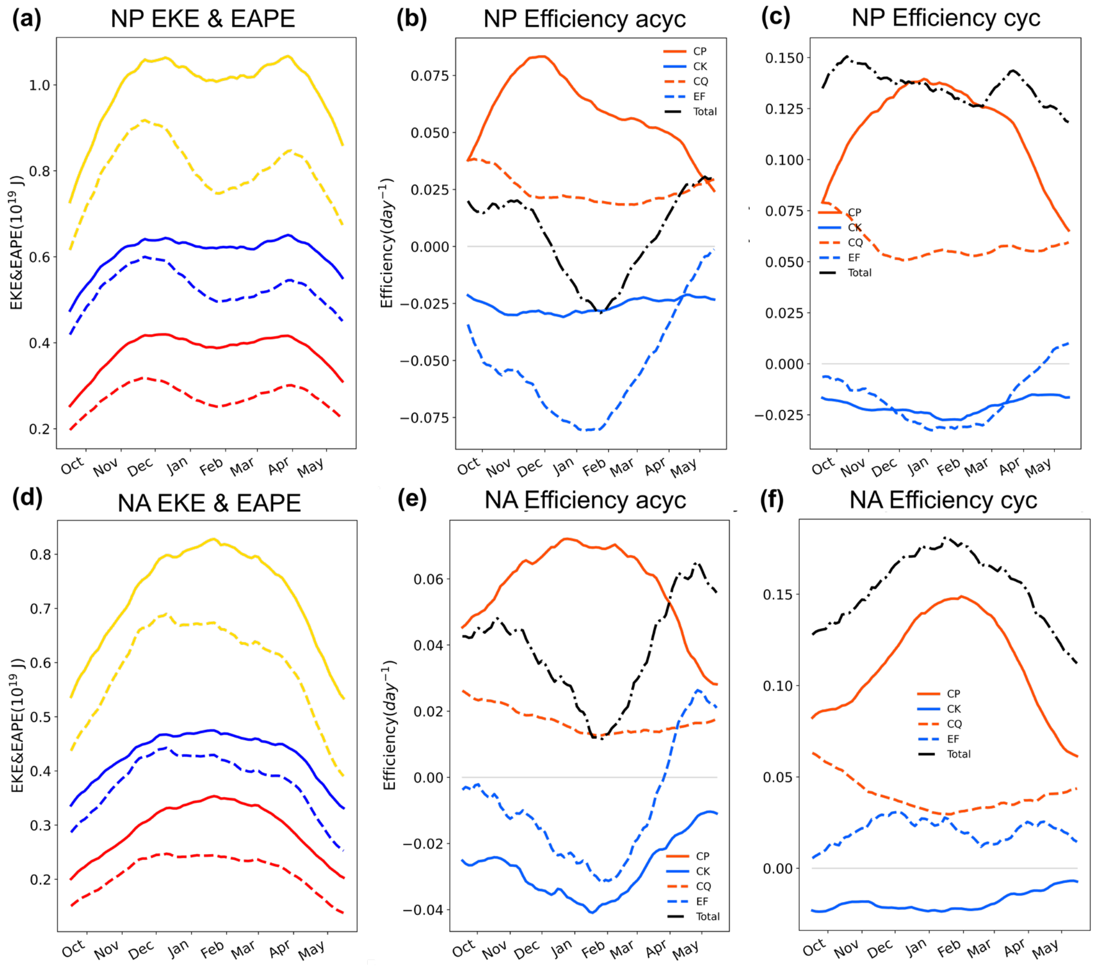
Supplementary Figure S5. Seasonality in the energetics associated with transient eddies separated into the cyclonic and anticyclonic contributions, normalized by probability of cyclonic or anticyclonic domains..

Same as in Fig. 8, but for energy and efficiency normalized by probability of cyclonic or anticyclonic domains.



Supplementary Figure S6. Relationship between transient eddy activity and westerly jet speed based on a non-zero curvature threshold.

Same as in Figs. 6a-b, respectively, but for monthly EKE_{3D} reconstructed only with cyclonic and anticyclonic domains based on curvature thresholds equivalent to the radius of curvature of 2,500km.



Supplementary Figure S7. Seasonality in energetics of transient eddies separated into cyclonic and anticyclonic contributions based on a non-zero curvature threshold. Same as in Figs. 8a-f, respectively, but for energetics based on curvature thresholds equivalent to the radius of curvature of 2,500km.