

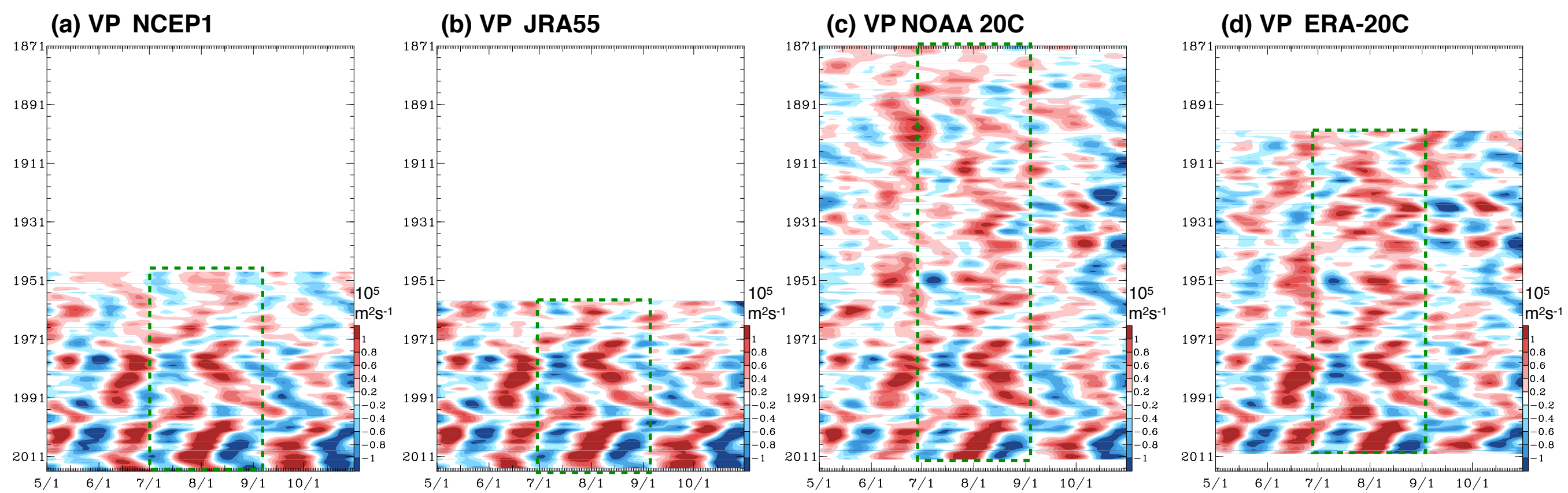


Figure S1. Yearly distributions of daily 850-hPa velocity potential (VP) with 30-90 days bandpass filter and 5 years moving averaged over convergent center in Western North Pacific for (a) NCEP1 reanalysis data with domain average over 125°E-165°E and 5°N-25°N, (b) JRA 55 reanalysis data with domain average over 120°E-150°E and 5°N-25°N, (c) NOAA 20th Century Reanalysis with domain average over 122°E-152°E and 8°N-24°N, and (d) ERA 20th Century Reanalysis with domain average over 115°E-155°E and 5°N -25°N.

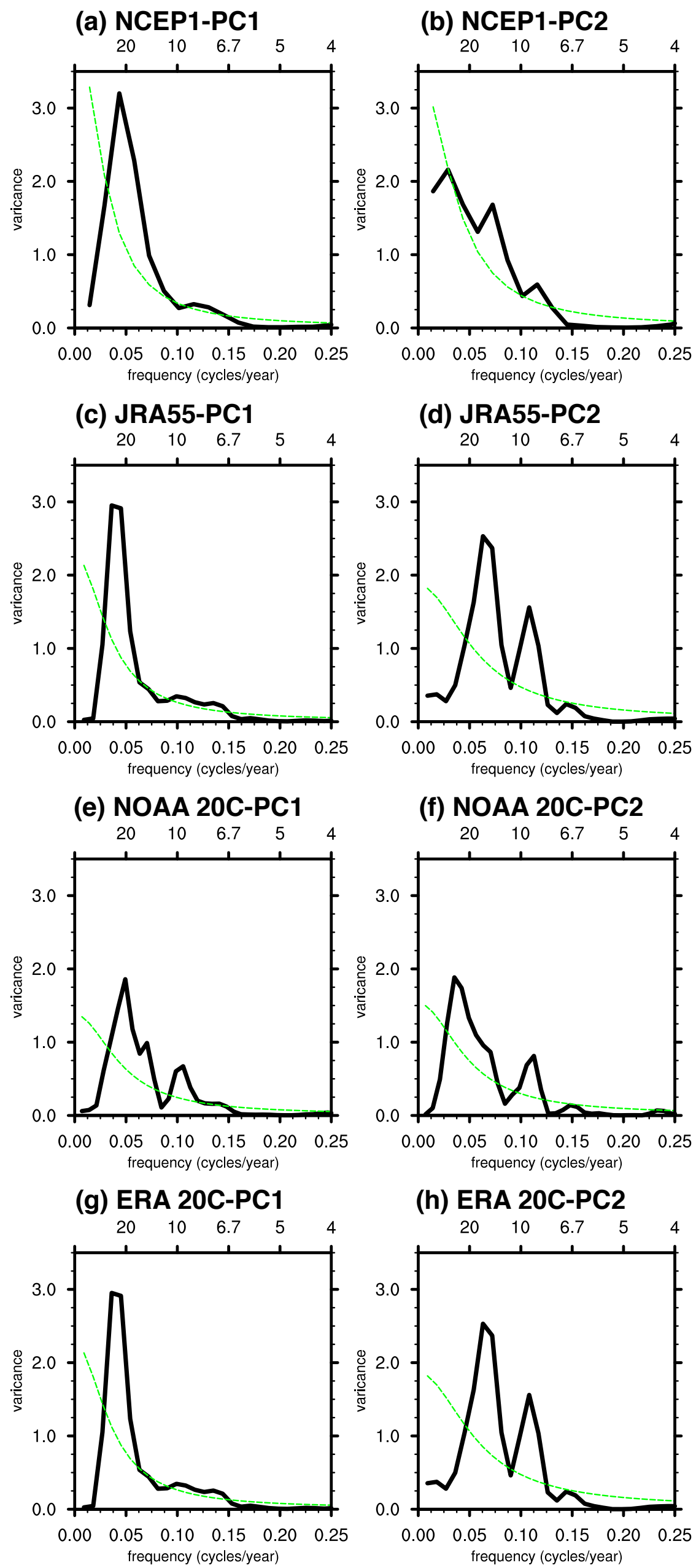


Figure S2 . Power spectrum analysis of (a) NCEP1-PC1, (b) NCEP1-PC2, (c) NOAA 20C-PC1, (d) NOAA 20C-PC2, (e) ERA 20C-PC1, and (f) ERA 20C-PC2. Green line shows the 99% significance level.

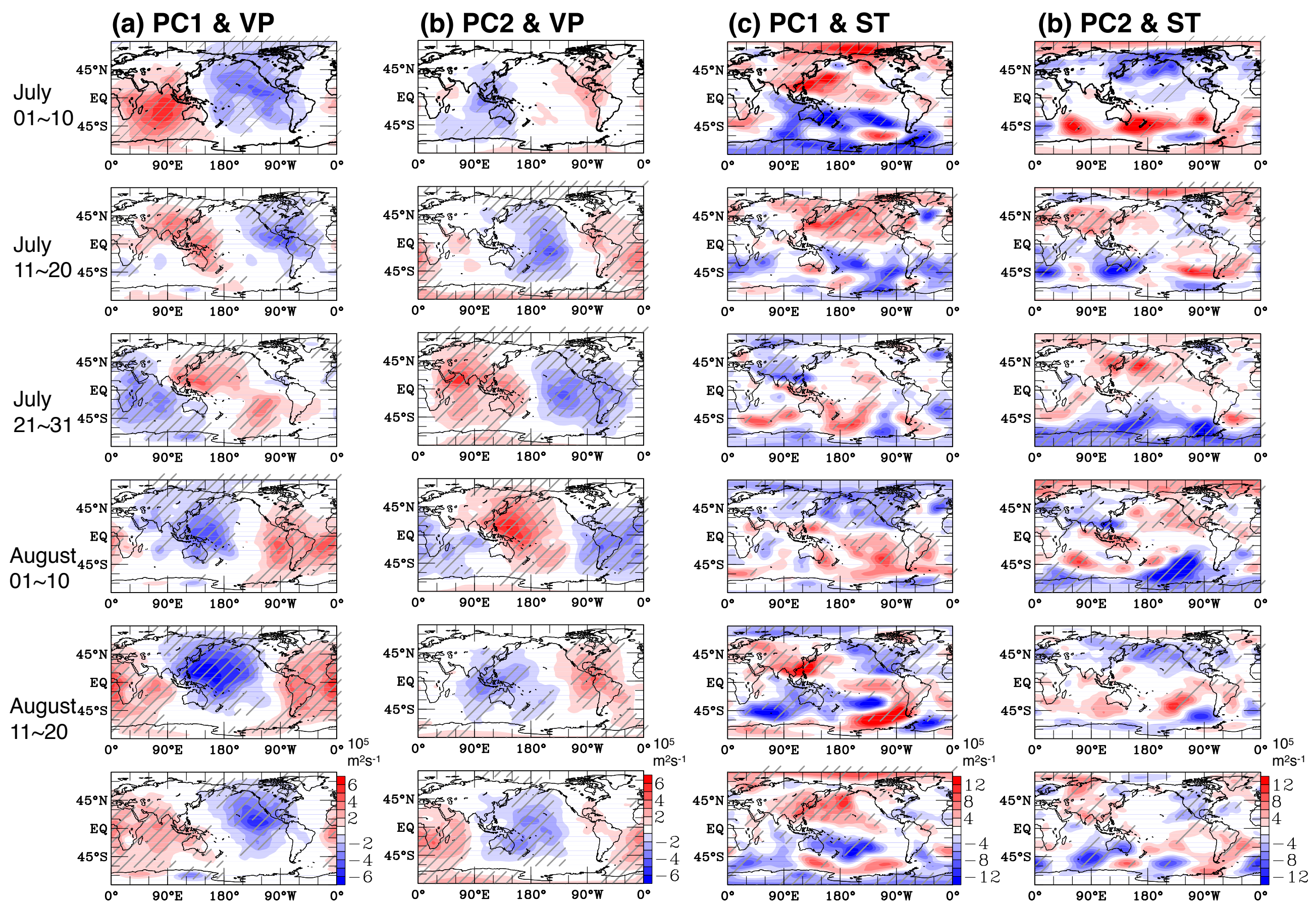


Figure S3. NCEP1 10-days average 850-hPa velocity potential (VP) regresses onto the (a) PC1 and (b) PC2, and 850-hPa stream function (ST) regressed on (c) PC1 and (d) PC2 from 1948 to 2016 .