

Figure S1. Individual CMIP5 models' first two leading V EOFs, based on Historical DJF data - 300hPa monthly subseasonal anomalies for the entire NH. The λ value for each EOF is denoted in parentheses in the titles. Positive (negative) values are displayed in red (blue), with an interval of 1 ms^{-1} .



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Figure S2. The first two leading Historical MMM V EOFs, calculated for the entire NH (shading) and for the NA and AS sectors (contours).

S1 Lagged linear regression of tropical proxies

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We used lagged linear regression in an attempt to establish a causal relationship between tropical convective forcing (expressed by OLR and upper tropospheric divergence) and the excitation of CTP events. After choosing a base daily time series as an independent variable (X_i) , we regress onto it the 7-day lagged time series of a chosen dependent field (Y_i) . Multiple regression equations are then derived, one for every gridpoint of Y. We map the resulting Y pattern by plugging an identical arbitrary x value in every equation. Statistical significance is assessed through the p-value of the correlation coefficient.

Following Livezey and Chen (1983), we assume that the coefficient's distribution is normal with a standard deviation of $1/\sqrt{n-3}$. *n* is the number of degrees of freedom, estimated by:

$$n = N/[1 + 2\sum_{i=1}^{N} C_{XX}(i\Delta t)C_{YY}(i\Delta t)]$$

Where N is the number of samples, Δt is the sampling time (1 day) and $C_{ZZ}(i\Delta t)$ is the autocorrelation of Z for lag $i\Delta t$.

Table S1. CMIP5 models used in this study. All data was taken from monthly-resolution Historical and RCP8.5 runs. Models denoted by (*) were studied as test cases using daily data.

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