Supplemental Material

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Supplementary information for

Dynamic origin of the interannual variability of West China autumn rainfall

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Supplementary figures S1-S6
Figure S1. The correlation coefficient map between WCAR index and autumn mean (September and October) precipitation in each grid over China. The black dots mark those correlation coefficients passing the 95% significance level, and the red box denotes the WCAR domain.
**Figure S2.** The vertical integrated (from 1000hPa to 700hPa) vapor flux (vectors; $10^{-3}$ kg m$^{-1}$s$^{-1}$, only vectors passing the 95% significant level are shown) and its divergence (shading; $10^{-7}$ kg m$^{-2}$s$^{-1}$hPa$^{-1}$) regressed onto the interannual variability of WCAR. The black dots mark those regression coefficients passing the 95% significance level, and the red box denotes the WCAR domain.
**Figure S3.** (a) Vertical–longitude profile of geopotential height (shading; gpm), vertical motion (vectors; m s$^{-1}$, only vectors passing the 95% significant level are shown) and divergence (contours; 10$^{-7}$s$^{-1}$) regressed onto the interannual variability of WCAR averaged over 27°N–40°N. (b) Vertical–latitude profile of geopotential height (shading; gpm), vertical motion (vectors; m s$^{-1}$, only vectors passing the 95% significant level are shown) and divergence (contours; 10$^{-7}$s$^{-1}$) regressed onto the interannual variability of WCAR averaged over 110°E–135°E. The black dots mark those regression coefficients passing the 95% significance level. The yellow bar denotes the WCAR domain.
**Figure S4.** The areal mean regression coefficients of latent heat net flux (lhtfl; W m\(^{-2}\)), sensible heat net flux (shtfl; W m\(^{-2}\)), upward longwave radiation flux (ulwrf; W m\(^{-2}\)) and upward shortwave radiation flux at surface (uswrf; W m\(^{-2}\)) over SAT (32°N–42°N, 60°W–30°W) onto the interannual variability of WCAR.
Figure S5. Time series of normalized year-to-year CEP_SST index (areal mean SST over 5°S-5°N and 175°E-120°W, red line) and its trend (red dashed line), SAT_SST index (areal mean SST over 32°N-42°N and 60°W-30°W, blue line) and its trend (blue dashed line).
**Figure S6.** The vertically integrated (from 1000hPa to 300hPa) Q1 (shading; K day\(^{-1}\)) regressed onto the interannual variability of WCAR. The black dots mark those regression coefficients passing the 95% significance level, and the red box denotes the WCAR domain. The black solid lines represent the Tibetan Plateau.