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Supplement of

Mean state and day-to-day variability of tropospheric circulation in planetary-scale barotropic Rossby waves during Eurasian heat extremes in CMIP5 models

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Supplementary Material

September 2, 2025

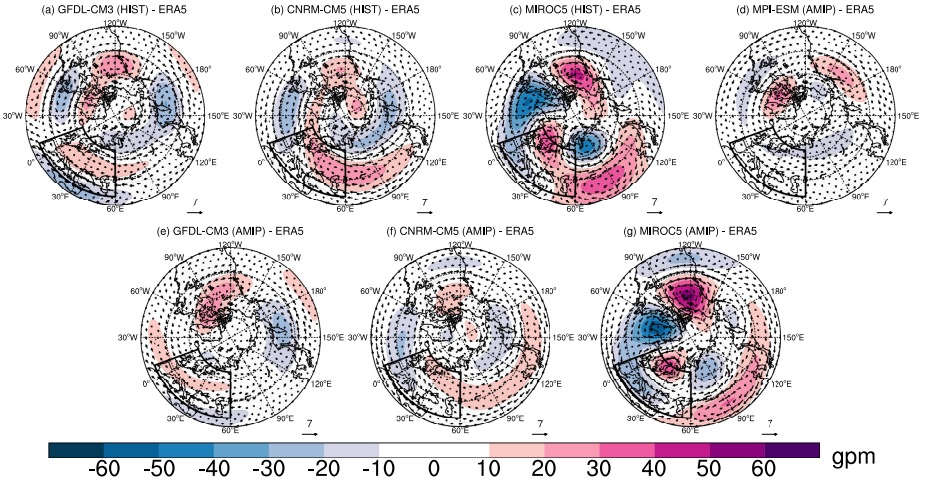

Figure S1: Differences between CMIP5 simulations and ERA5 for climatologies of MJJAS mid-troposphere (500 hPa) planetary Rossby-wave circulation (geopotential height anomalies and winds) for the HIST simulation of GFDL-CM3 (a), CNRM-CM5 (b) and MIROC5 (c), and the AMIP simulation of MPI-ESM (d), GFDL-CM3 (e), CNRM-CM5 (f) and MIROC5 (g). The climatologies are computed for the period 1980 to 2005 for the simulations and 1980 to 2019 for ERA5. Geopotential height anomalies are shaded, wind speed in m/s is indicated by the arrow length.

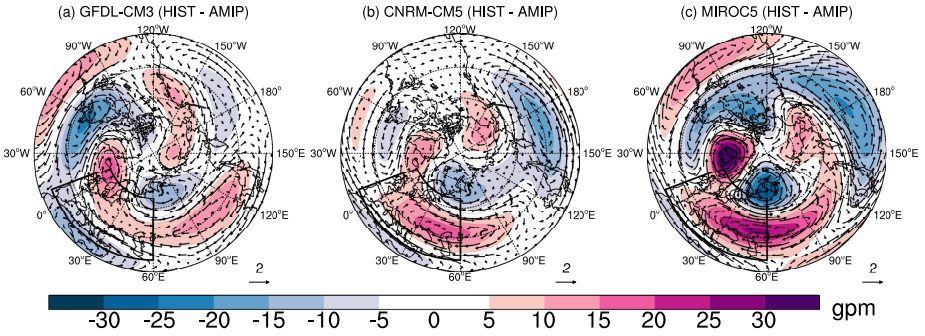

Figure S2: Differences between HIST and AMIP simulations for climatologies of MJJAS mid-troposphere (500 hPa) planetary Rossby-wave circulation (geopotential height anomalies and winds) for the HIST simulation of GFDL-CM3 (a), CNRM-CM5 (b) and MIROC5 (c). The climatologies are computed for the period 1980 to 2005. Geopotential height anomalies are shaded, wind speed in m/s is indicated by the arrow length.

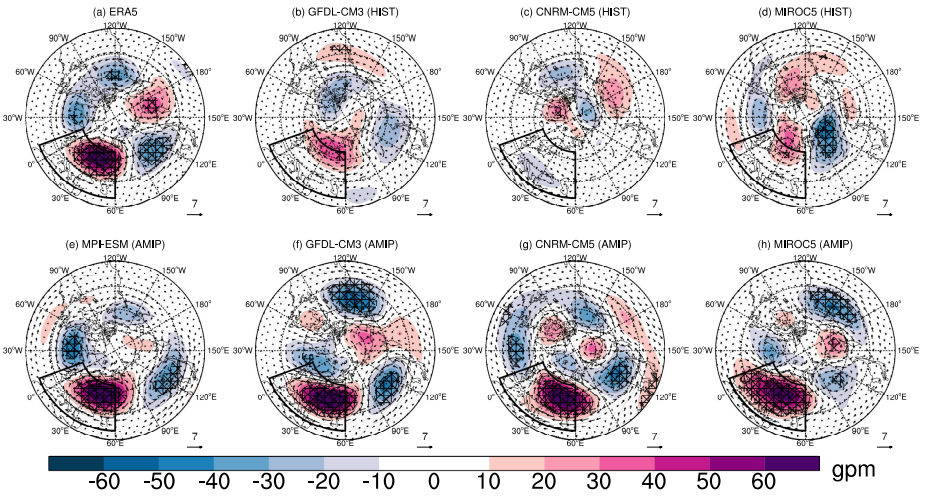

Figure S3: Differences between EHW composites and climatologies for MJJAS mid-troposphere (500 hPa) planetary Rossby-wave circulation (geopotential height anomalies and winds) for ERA5 (a), the HIST simulation of GFDL-CM3 (b), CNRM-CM5 (c) and MIROC5 (d), and the AMIP simulation of MPI-ESM (e), GFDL-CM3 (f), CNRM-CM5 (g) and MIROC5 (h). Geopotential height anomalies are shaded. Wind speed in m/s is indicated by the arrow length. Stippling indicates grid cells that are significant with 95%-confidence.

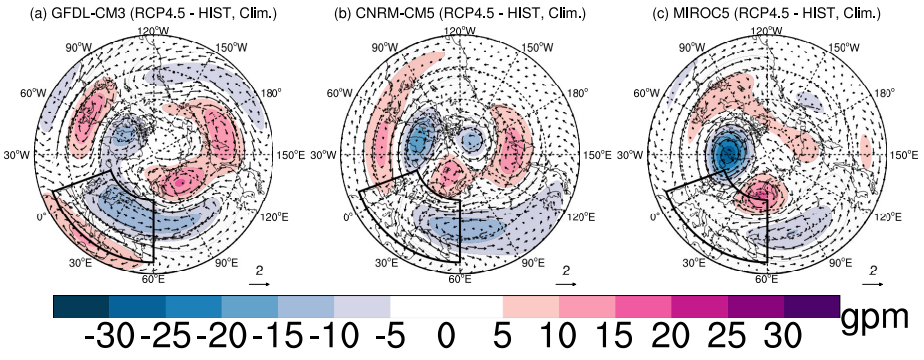

Figure S4: Differences between HIST and RCP4.5 climatologies for MJJAS mid-troposphere (500 hPa) planetary Rossby-wave circulation (geopotential height anomalies and winds) for GFDL-CM3 (a), CNRM-CM5 (b) and MIROC5 (c). The RCP4.5 climatologies are computed for the period 2070 to 2100. Geopotential height anomalies are shaded. Wind speed in m/s is indicated by the arrow length.

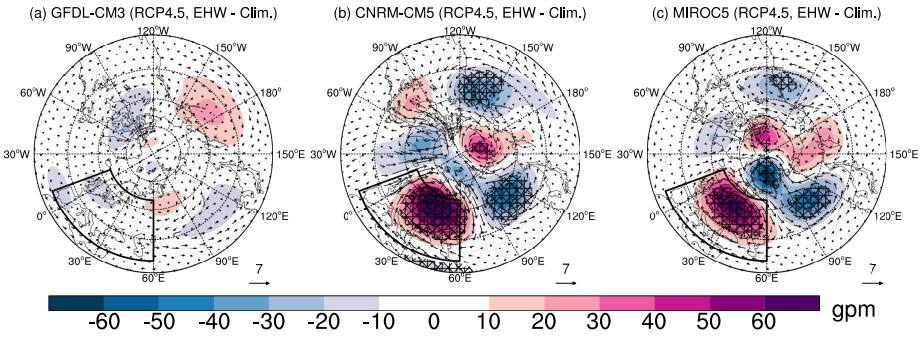

Figure S5: Differences between EHW composites and climatologies for MJJAS mid-troposphere (500 hPa) planetary Rossby-wave circulation (geopotential height anomalies and winds) for RCP4.5 simulations: GFDL-CM3 (a), CNRM-CM5 (b) and MIROC5 (c). Geopotential height anomalies are shaded. Wind speed in m/s is indicated by the arrow length. Stippling indicates grid cells that are significant with 95%-confidence.