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Supplement of

The multi-scale structure of atmospheric energetic constraints on globally averaged precipitation

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Figure S1. Same as manuscript Figure 1 but computed using Detrended Cross-Correlation Analysis (DCCA, see Podobnik & Stanley, 2008 for a description of DCCA). The correlation coefficients against temporal scale computed for global-mean time-series of a) precipitable water vapor vs 2-m surface temperature (solid) and precipitable water vapor vs SST (dashed); b) SST vs global-land near-surface temperature; and c) precipitation multiplied by latent heat of vaporization ($L_v P$) vs 2-m surface temperature (solid) and $L_v P$ vs SST (dashed). Red lines represent results from ERA-20C, blue lines are from ERA-20CM, pink lines are from 20CR and black lines are estimated from observational products.

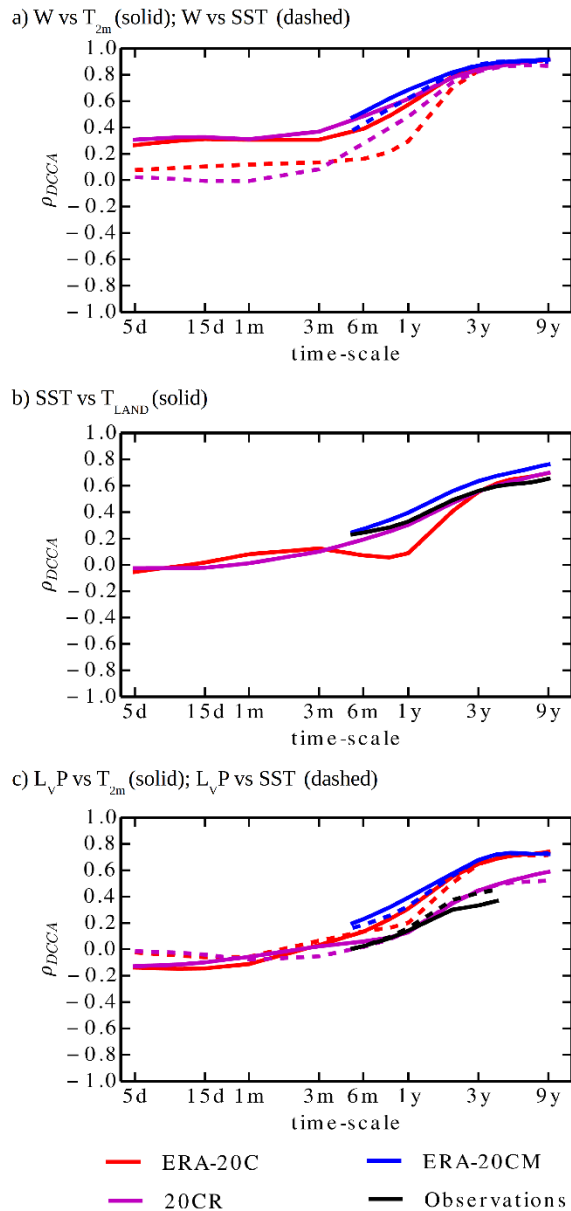


Figure S2. Same as manuscript Figure 2 but computed using Detrended Cross-Correlation Analysis (DCCA). Correlation coefficients against temporal scale computed for a) L_vP vs R_{atm} (solid), L_vP vs $(R_{atm} + F_{SH})$ (dashed) and L_vP vs F_{SH} (dot-dashed); b) L_vP vs R_{atm} (solid), L_vP vs $R_{LW,net}$ (dashed), and L_vP vs $R_{SW,net}$ (dot-dashed); c) L_vP vs R_{atm} (solid), L_vP vs $R_{LW,SFC}$ (dashed), and L_vP vs $R_{LW,TOA}$ (dot-dashed); and d) L_vP vs R_{atm} (solid), L_vP vs DLR (dashed), and L_vP vs $R_{LW,SFC,UP}$ (dot-dashed). Red lines are computed from ERA-20C, blue lines are from ERA-20CM, pink lines are from 20CR and black lines are computed from GPCP and CERES-EBAF observational products. Notice that R_{atm} and $R_{SW,net}$ are not available from 20CR.

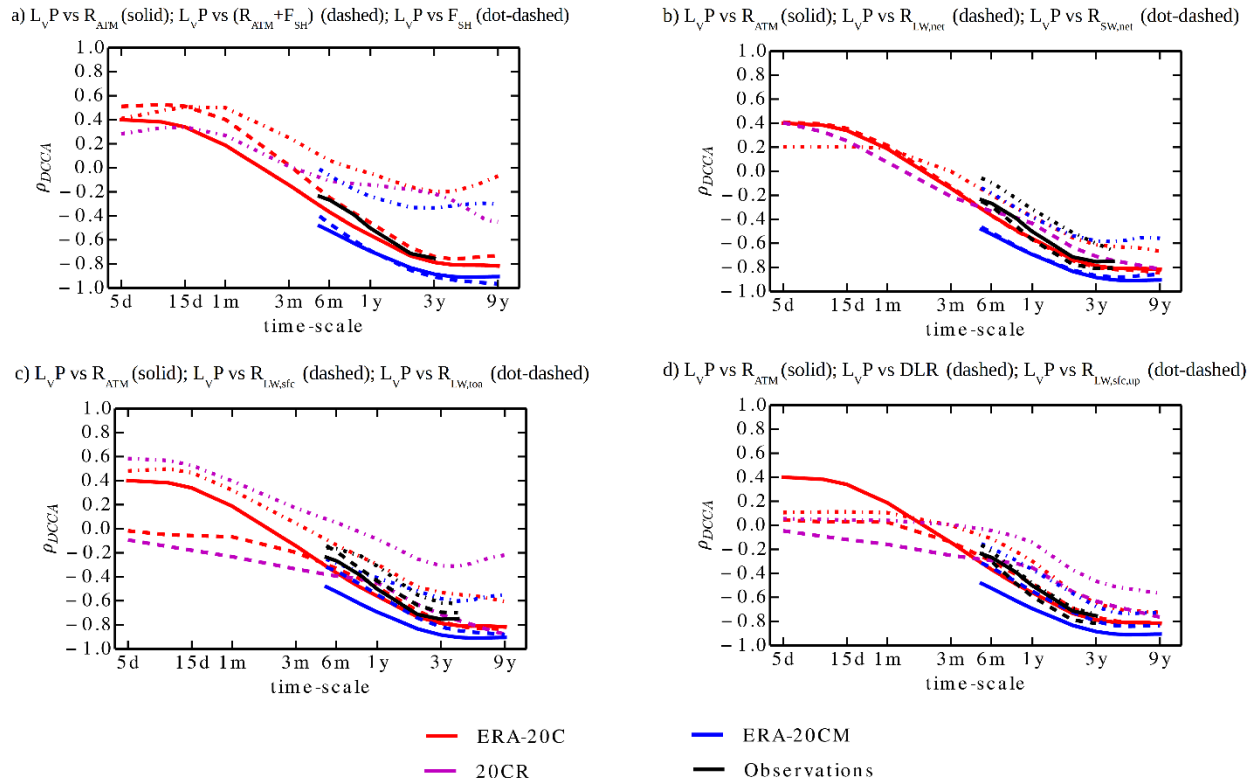
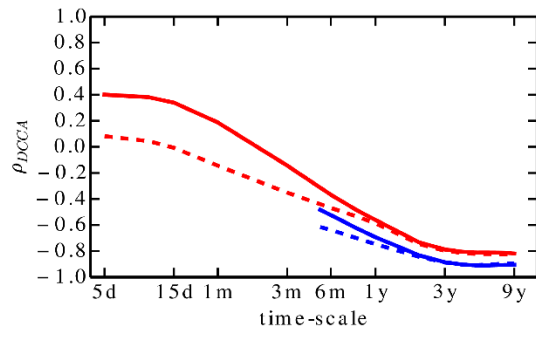
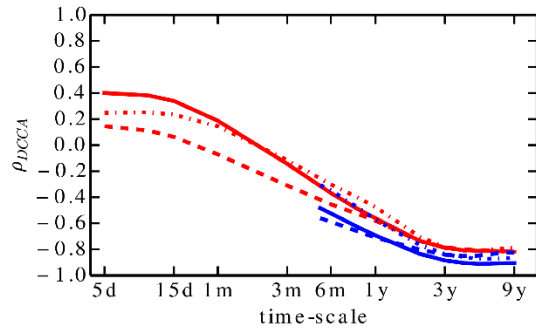


Figure S3. Same as manuscript Figure 3 but computed using Detrended Cross-Correlation Analysis (DCCA). Correlation coefficients against temporal scale computed for a) L_vP vs R_{atm} (solid) and L_vP vs $R_{atm,CS}$ (dashed); b) L_vP vs $R_{LW,SFC}$ (solid) and L_vP vs $R_{LW,SFC,CS}$ (dashed). Red lines are computed from ERA-20C and blue lines are from ERA-20CM.

a) $L_V P$ vs R_{ATM} (solid); $L_V P$ vs $R_{ATM,CS}$ (dashed)



b) $L_V P$ vs R_{ATM} (solid); $L_V P$ vs $R_{LW,net,CS}$ (dashed); $L_V P$ vs $R_{LW,stc,CS}$ (dot-dashed)



— ERA-20C — ERA-20CM