Supplemental Material

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Supplemental Material

Validating the Land-Atmosphere Coupling Behavior in Weather and Climate Models Using Observationally Based Global Products

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Supplemental Material Content

Figure S1. Global distribution of the Pearson correlation coefficient ($R$) between anomalies of latent heat flux and soil moisture from six observationally-based FLUXCOM RS+METEO products for four different seasons: March–May (MAM), June–August (JJA), September–November (SON), and December–February (DJF). $<R>$ shows the average of $R$ over grid cells which have a finite value of $R$ in all four observational products. $P$ shows the percentage of grid cells with positive significant $R$ (p-value<0.01). The histogram on the lower left of each map shows the frequency distribution of $R$. Bar colors of histograms correspond to color-coding of the colorbar.

Figure S2. Spatial correlation of R(SM,LE) maps from pairings of FLUXCOM RS+METEO products for four different seasons.

Figure S3. Global distribution of the terrestrial coupling index between anomalies of sensible heat flux and soil moisture ($I_{SM:H}$) from two observationally-based (left) FLUXCOM and (right) GEWEX products for four different seasons: March-May (MAM), June-August (JJA), September-November (SON), and December-February (DJF). $<I>$ shows the average of $I_{SM:H}$ over grid cells which have a finite value of $I_{SM:H}$ in all four observational products. $P$ shows the percentage of grid cells with negative significant $I$ (p-value<0.01). The histogram on the lower left of each map shows the frequency distribution of $I_{SM:H}$.

Figure S4. As in Figure S3, but for the five forecast models.

Figure S5. Spatial correlation of $I_{SM:H}$ maps from pairings of (a) observations, (b) models, (c) FLUXCOM versus models, and (d) GEWEX versus models for four different seasons.
Figure S5. Global distribution of the Pearson correlation coefficient (R) between anomalies of latent heat flux and soil moisture from six observationally-based FLUXCOM RS+METEO products for four different seasons: March–May (MAM), June–August (JJA), September–November (SON), and December–February (DJF). <R> shows the average of R over grid cells which have a finite value of R in all four observational products. P shows the percentage of grid cells with positive significant R (p-value<0.01). The histogram on the lower left of each map shows the frequency distribution of R. Bar colors of histograms correspond to color-coding of the colorbar.
Figure S6. Spatial correlation of R(SM, LE) maps from pairings of FLUXCOM RS+METEO products for four different seasons.
Figure S7. Global distribution of the terrestrial coupling index between anomalies of sensible heat flux and soil moisture \((I_{SM:H})\) from two observationally-based (left) FLUXCOM and (right) GEWEX products for four different seasons: March-May (MAM), June-August (JJA), September-November (SON), and December-February (DJF). \(<I>\) shows the average of \(I_{SM:H}\) over grid cells which have a finite value of \(I_{SM:H}\) in all two observational products. \(P\) shows the percentage of grid cells with negative significant \(I\) (\(p\)-value<0.01). The histogram on the lower left of each map shows the frequency distribution of \(I_{SM:H}\).
Figure S8. As in Figure S3, but for the five forecast models.
Figure S5. Spatial correlation of $I_{SMH}$ maps from pairings of (a) observations, (b) models, (c) FLUXCOM versus models, and (d) GEWEX versus models for four different seasons.