Land-atmosphere feedbacks amplify aridity increase over land under global warming

Supplementary Figures

Figure 1: Top: Global-mean, annual-mean total-column soil moisture (MRSO) change in 28 CMIP5 models, using historical and RCP8.5 simulations, plotted as a fraction of present-day (1971-2000) global mean for each model. Bottom: Zonal mean change in annual-mean, total-column soil moisture in the 28 CMIP5 models from top panel, expressed in fraction of present-day values.
Figure 2: Future-minus-present changes in mean annual total-column soil moisture in simulation SM_TRND, in absolute values, for the four GLACE-CMIP5 models used in this study. Note the different scale for ESM2M.
Figure 3: Simulated changes (future minus present) in mean annual evaporative demand $E_p$ in simulation SM_FIX (left), SM_TRND (middle), and difference between SM_TRND and SM_FIX (right). Future: 2071-2100; Present: 1971-2000.
Figure 4: Percent of land pixels falling in each bin of mean present-day soil moisture value in simulation SM_TRND (x-axis, kg/m²) and of (prescribed) soil moisture change in SM_TRND (y-axis, kg/m²) from Figure 3a.
Figure 5: For the four models (rows), future-minus-present zonal changes over land in simulation SM_FIX (orange) and SM_TRND (red) in mean annual (left to right) near-surface temperature, specific humidity, relative humidity, and precipitation. Future: 2071-2100; Present: 1971-2000.
Figure 6: Same as figure 2 for Ep and ΔI/P, where Ep is calculated as either (from top to bottom): Penman potential evapotranspiration (same as Fig. 2, plotted here for reference); surface net radiation; using the Priestley-Taylor formula; and with the Penman-Monteith reference crop calculation (Methods). Note differences in scales for P/Ep between plots.