Figure S1 – Changes in global total forest area for the Max Forest scenario compared to the SSPs, Bonn Challenge ('Bonn'), and Global Restoration Commitments database ('GRC').
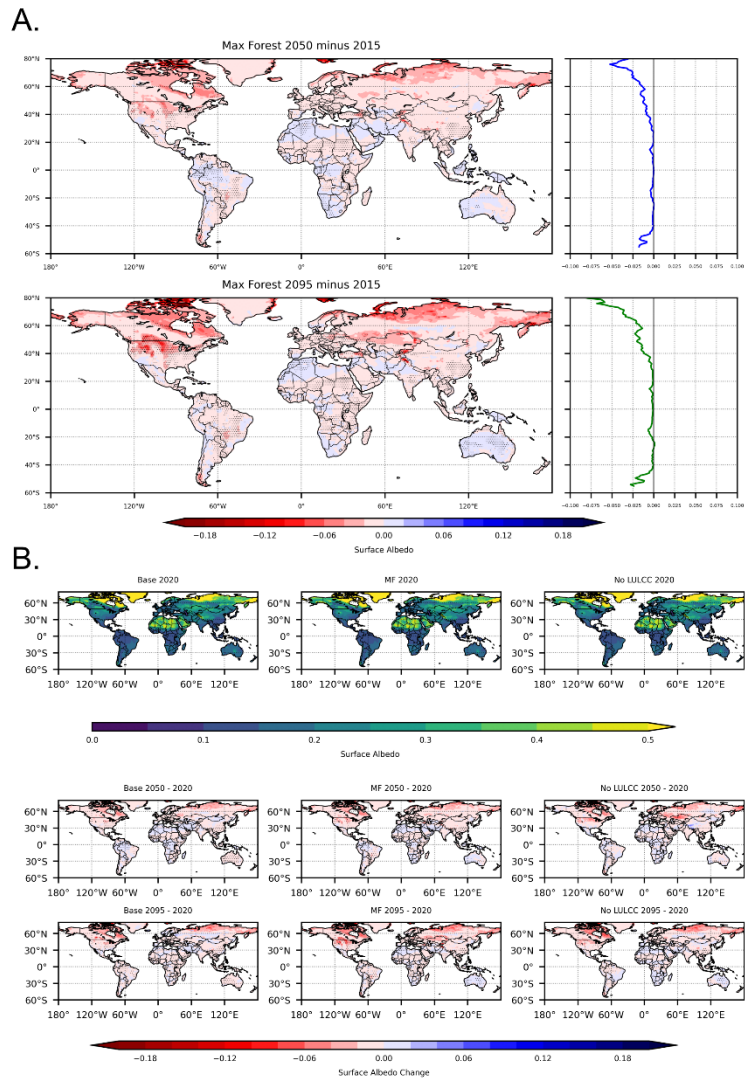
Figure S2 — A- Surface albedo differences at 2095 between Base (top) and Max Forest (bottom) and No LULCC experiments, with zonal means of the differences at right. B- Surface albedo values at 2020 (top row), differences between 2050 and 2020 (middle row), and between 2095 and 2020 (bottom row) for each experiment.
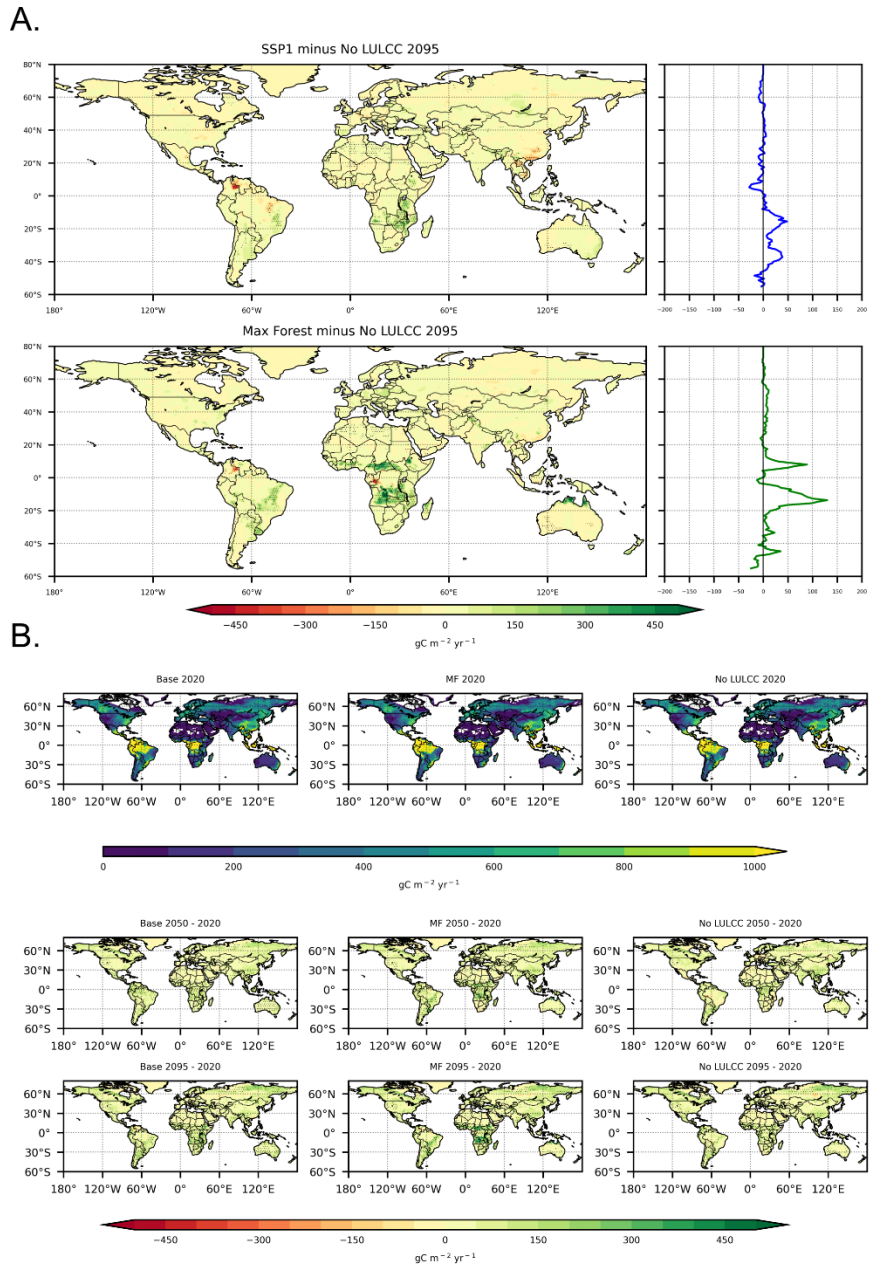
Figure S3 – A- Net primary productivity (NPP) differences at 2095 between Base (top) and Max Forest (bottom) and No LULCC experiments, with zonal means of the differences at right. B- NPP values at 2020 (top row), differences between 2050 and 2020 (middle row), and between 2095 and 2020 (bottom row) for each experiment.
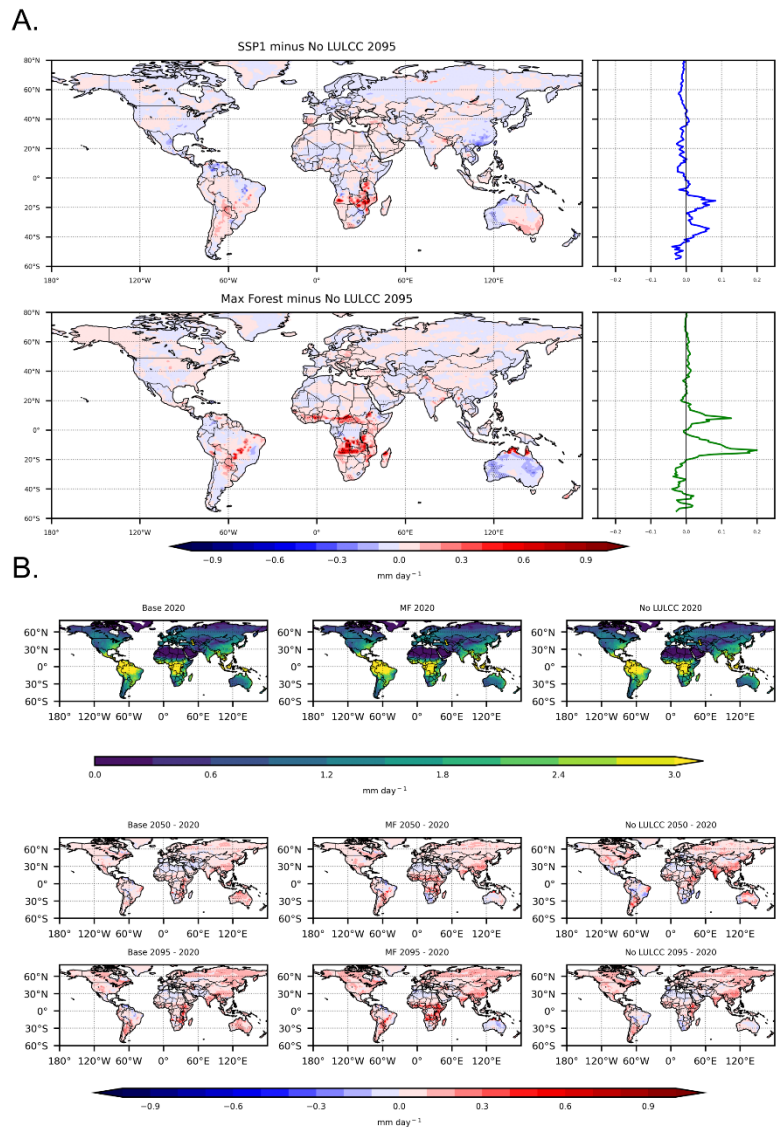
Figure S4 – A- Evapotranspiration (canopy evaporation + canopy transpiration + soil evaporation) differences at 2095 between Base (top) and Max Forest (bottom) and No LULCC experiments, with zonal means of the differences at right. B- Evaporation values at 2020 (top row), differences between 2050 and 2020 (middle row), and between 2095 and 2020 (bottom row) for each experiment.
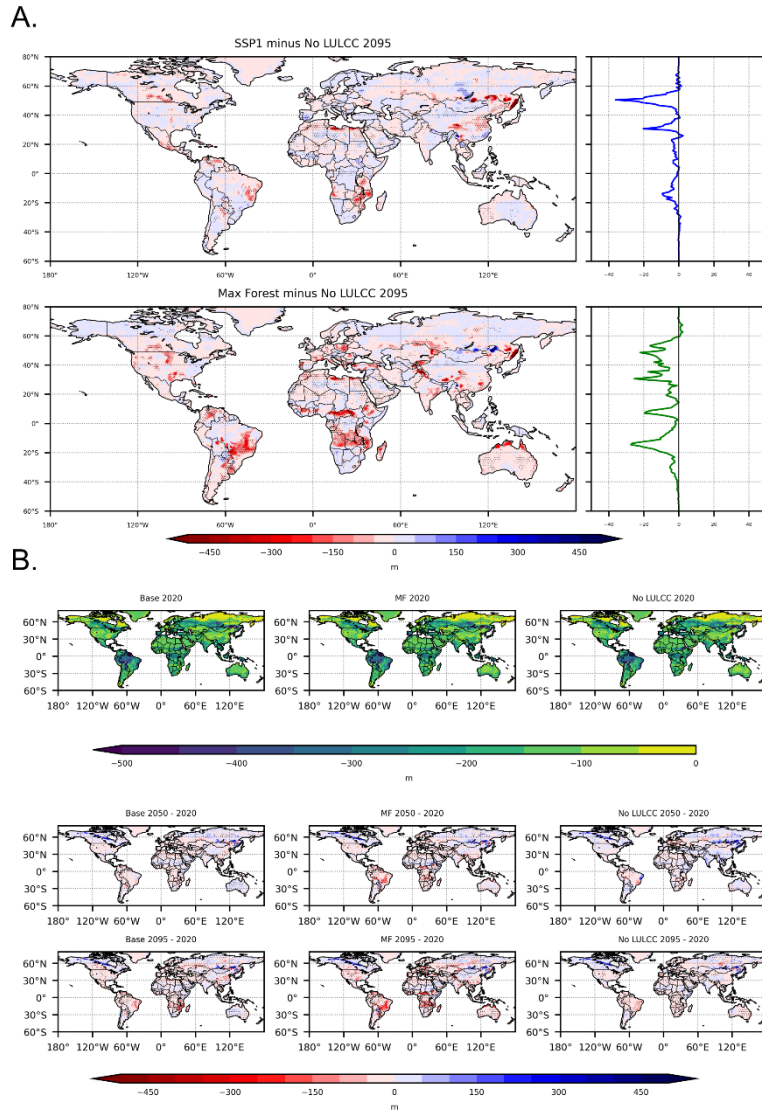
Figure S5 — Vegetation water potential (Veg WP) summed over all plant hydraulic components (sunlit leaves, shaded leaves, xylem, and roots) Negative values indicate higher plant water demand. A - differences at 2095 between Base (top) and Max Forest (bottom) and No LULCC experiments, with zonal means of the differences at right. B- Veg WP values at 2020 (top row), differences between 2050 and 2020 (middle row), and between 2095 and 2020 (bottom row) for each experiment..
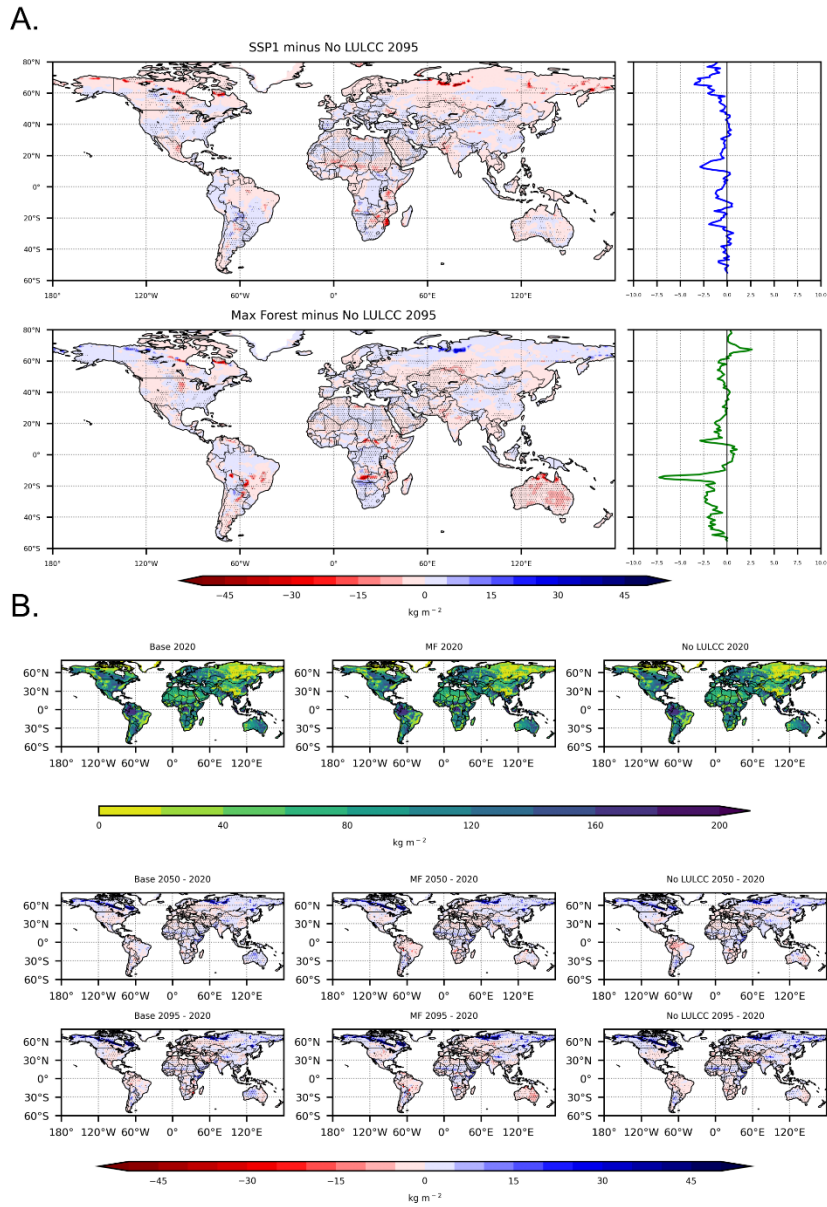
Figure S6 – Soil liquid water averaged over the soil column. A - differences at 2095 between Base (top) and Max Forest (bottom) and No LULCC experiments, with zonal means of the differences at right. B - soil liquid water values at 2020 (top row), differences between 2050 and 2020 (middle row), and between 2095 and 2020 (bottom row) for each experiment.
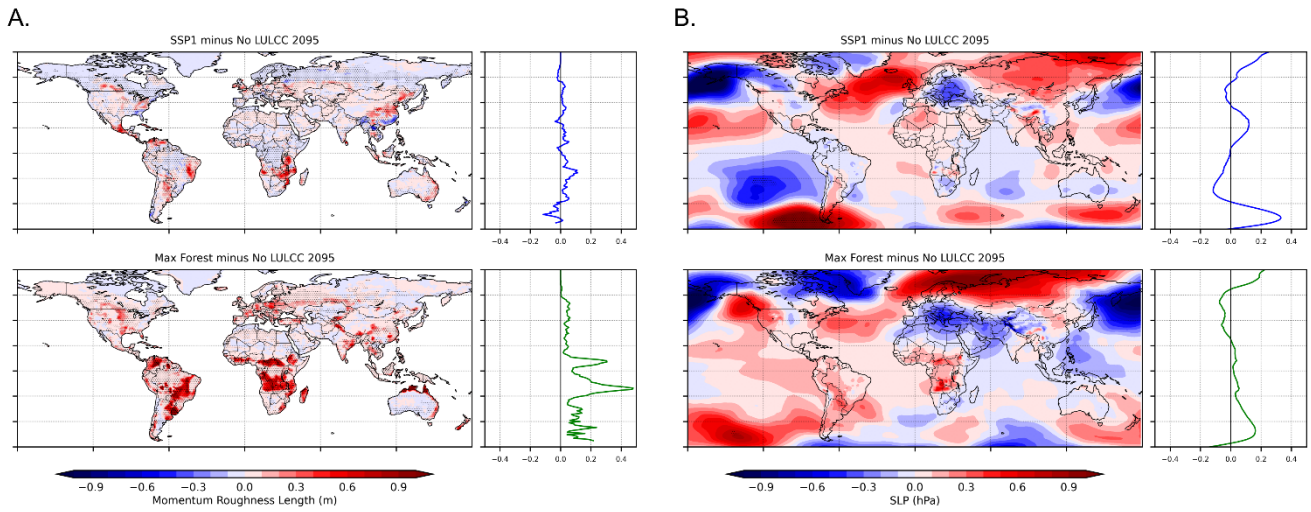
Figure S7 - A. as Figure S2A but showing changes in momentum roughness length. B – as Figure S2A but showing differences in pressure reduced to sea level (SLP).
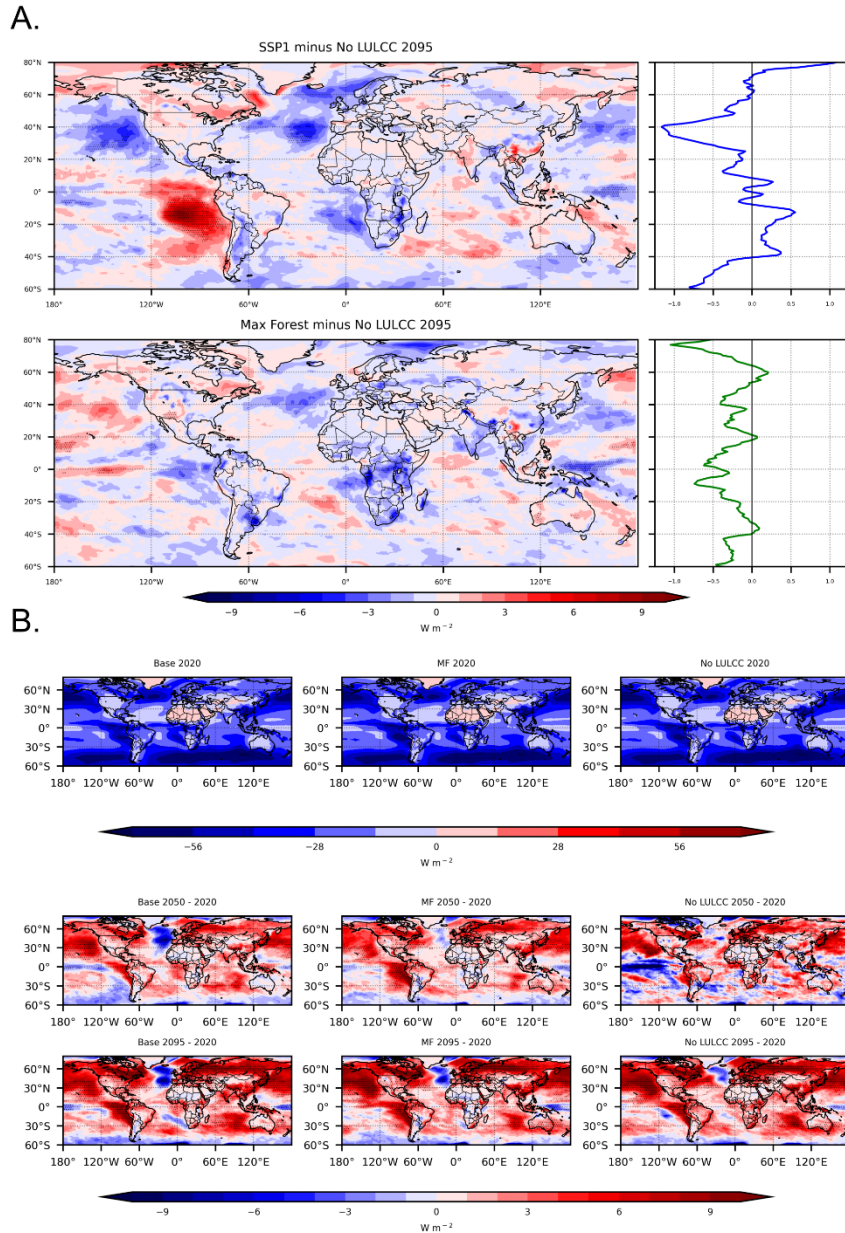
Figure S8 – A. Clean-sky cloud radiative effect (CRE) differences at 2095 between Base (top) and Max Forest (bottom) and No LULCC experiments, with zonal means of the differences at right. B. CRE values at 2020 (top row), differences between 2050 and 2020 (middle row), and between 2095 and 2020 (bottom row) for each experiment.
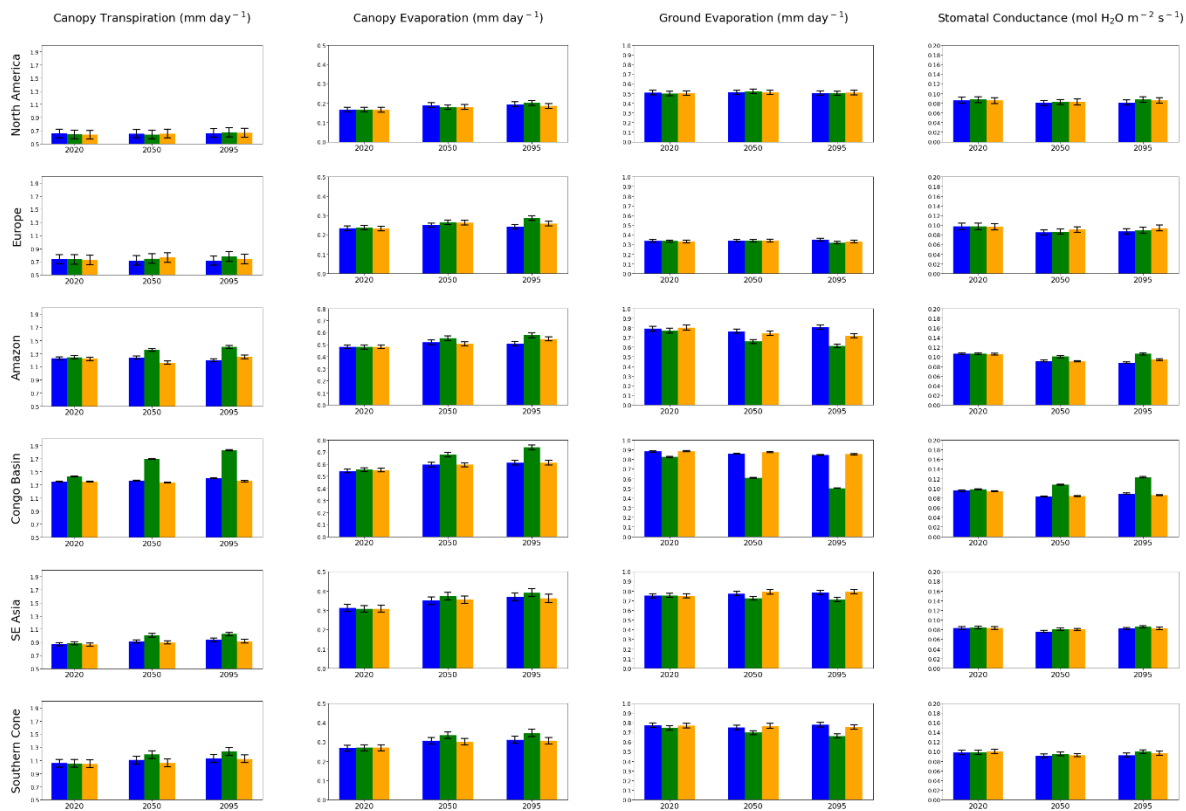
Figure S9 - area-weighted mean values over each of the domains in Figure 1A for canopy transpiration, canopy evaporation, soil evaporation, and stomatal conductance, selecting only grid cells where the change in tree cover between 2015 and 2095 >25 percentage points.
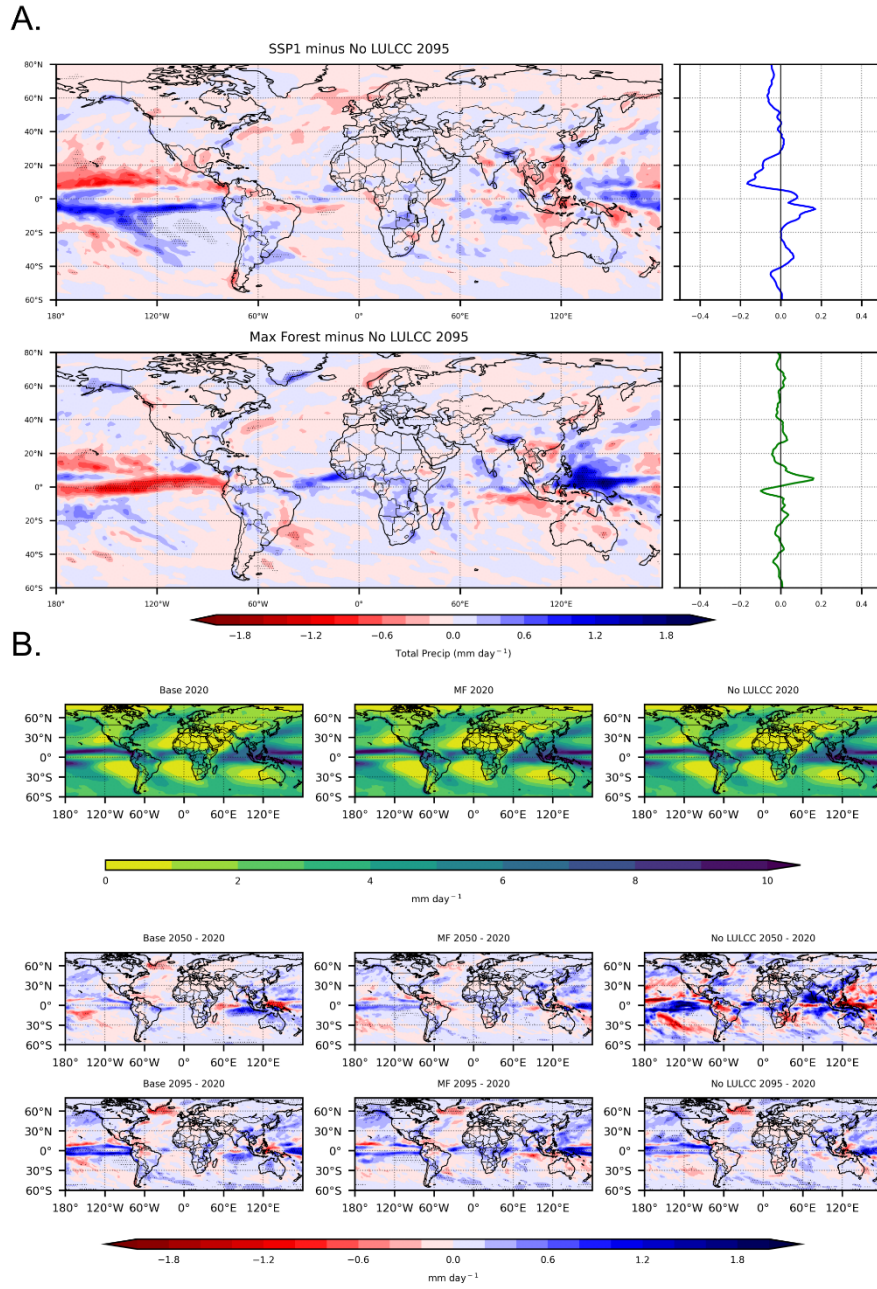
Figure S10 – A. Precipitation differences at 2095 between Base (top) and Max Forest (bottom) and No LULCC experiments, with zonal means of the differences at right. B. Precipitation values at 2020 (top row), differences between 2050 and 2020 (middle row), and between 2095 and 2020 (bottom row) for each experiment.