

# Modified Figures:

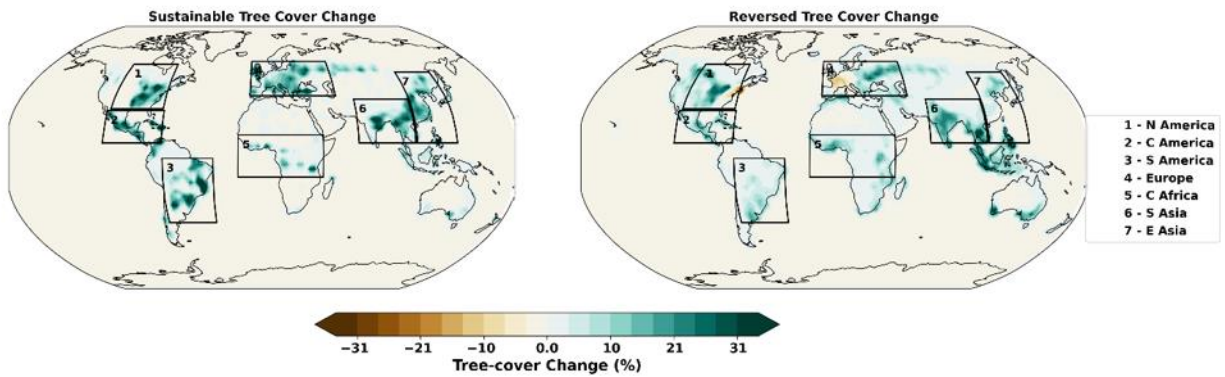
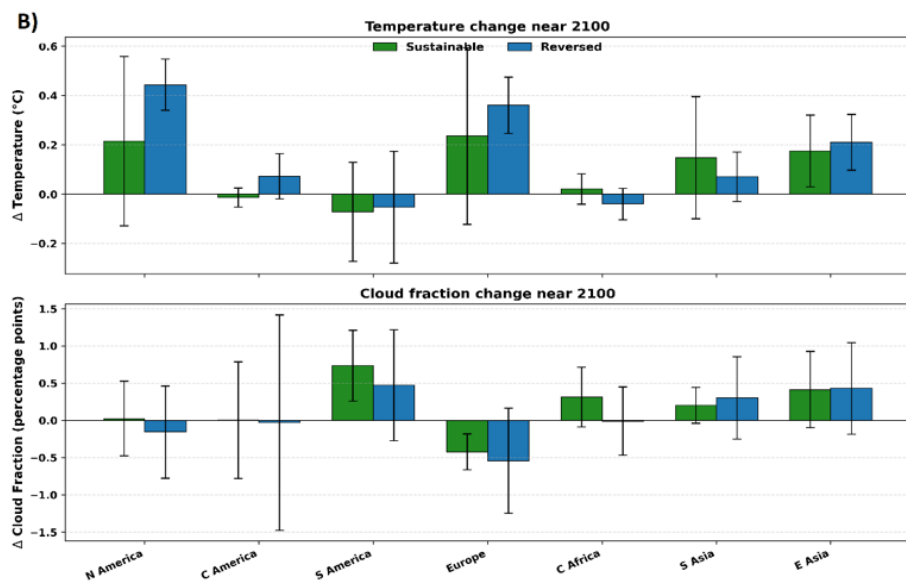
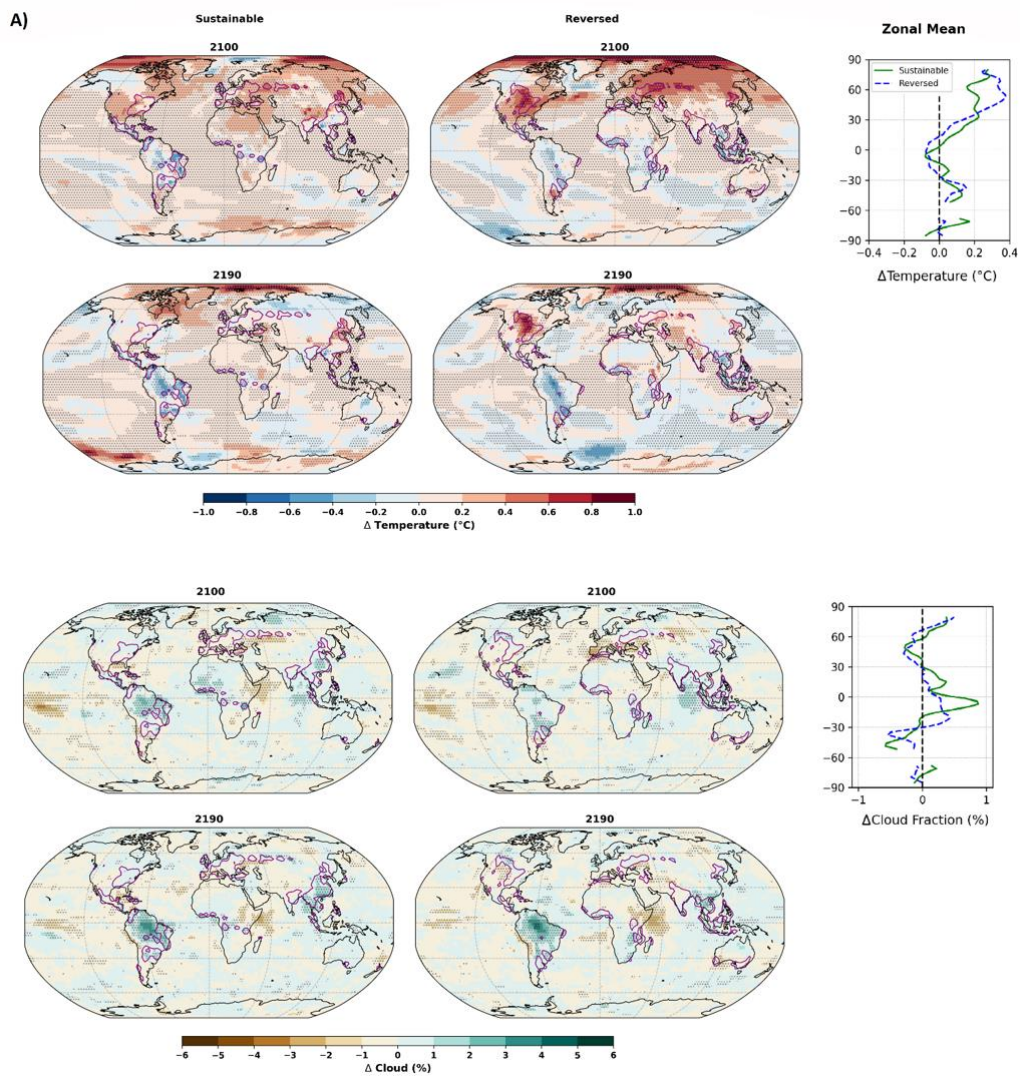


Figure 1. Percentage changes in forest cover from 2015 to 2070, with boxes indicating the different regional domains, for two land-cover scenarios: sustainable and reversed historical reforestation.



*Figure 2. Top: 2m Air temperature (°C) and bottom: cloud fraction (%) differences at year 2100 (2090-2110) and 2190 (2180-2200) for two land cover scenarios (sustainable and reversed historical reforestation) compared to the baseline with fixed year 2015 land cover. Gray dots indicate statistically significant differences at  $p < 0.05$  based on a Wilcoxon signed rank test. Zonal means are calculated over land only grid cells using 10° latitude bands. The purple contour lines delineate regions where the change in tree cover exceeds 10%. B) Regional climate response across seven reforested areas (209-2110). Bars show ensemble means; error bars show 95% CI (n = 5)*

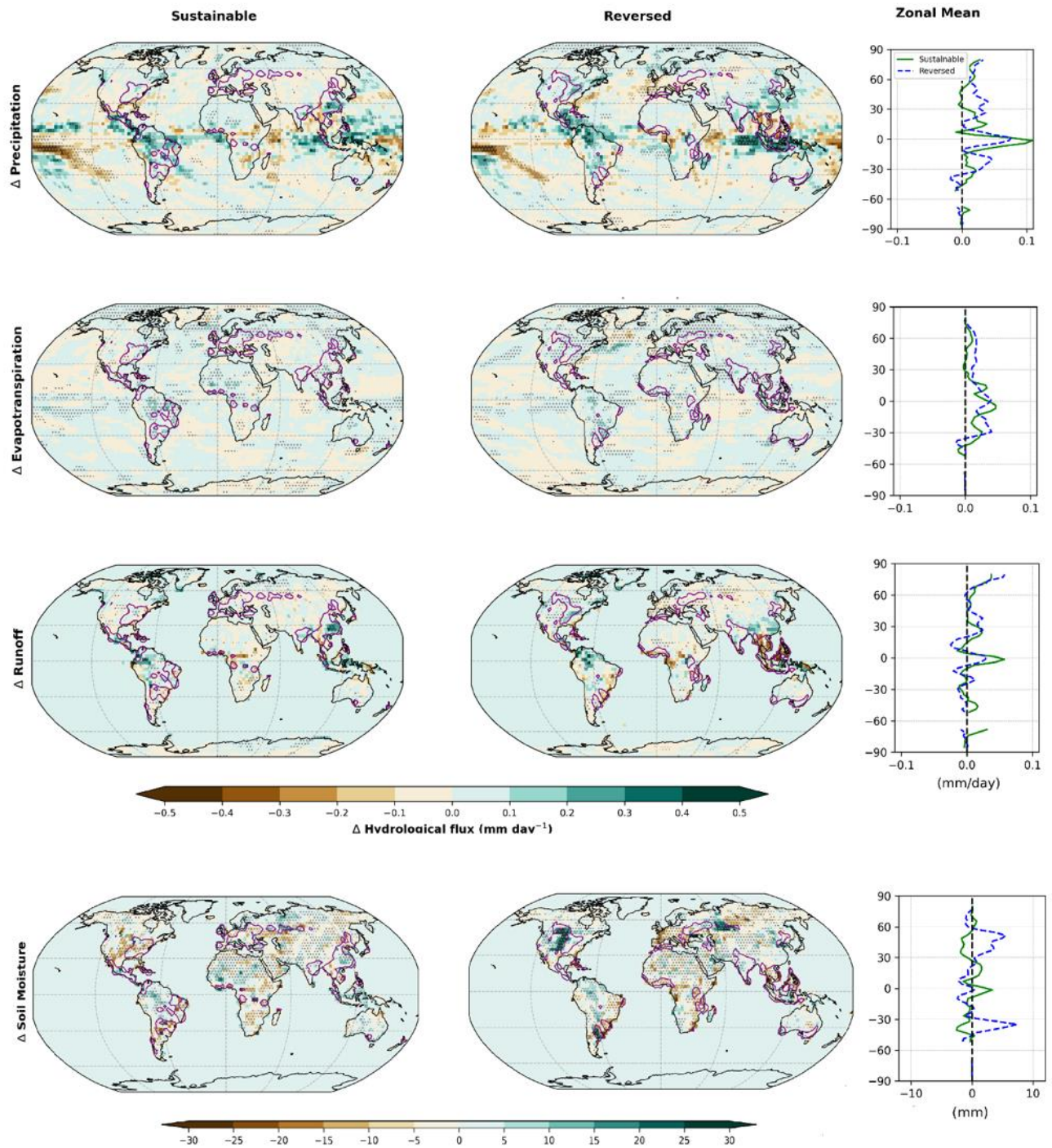


Figure 3. From top to bottom: precipitation, evapotranspiration, runoff changes in ( $\text{mm day}^{-1}$ ), and soil moisture difference in ( $\text{mm}$ ) at 2100 (2090-2110) for two land cover scenarios (sustainable and reversed historical reforestation) compared to the baseline with fixed year 2015 land cover. Gray dots indicate statistical significance of differences assessed using a Wilcoxon test at  $p < 0.05$ ; Land only zonal 10 degree means of the differences are shown on the right. The purple contour lines delineate regions where the change in tree cover exceeds 10%.

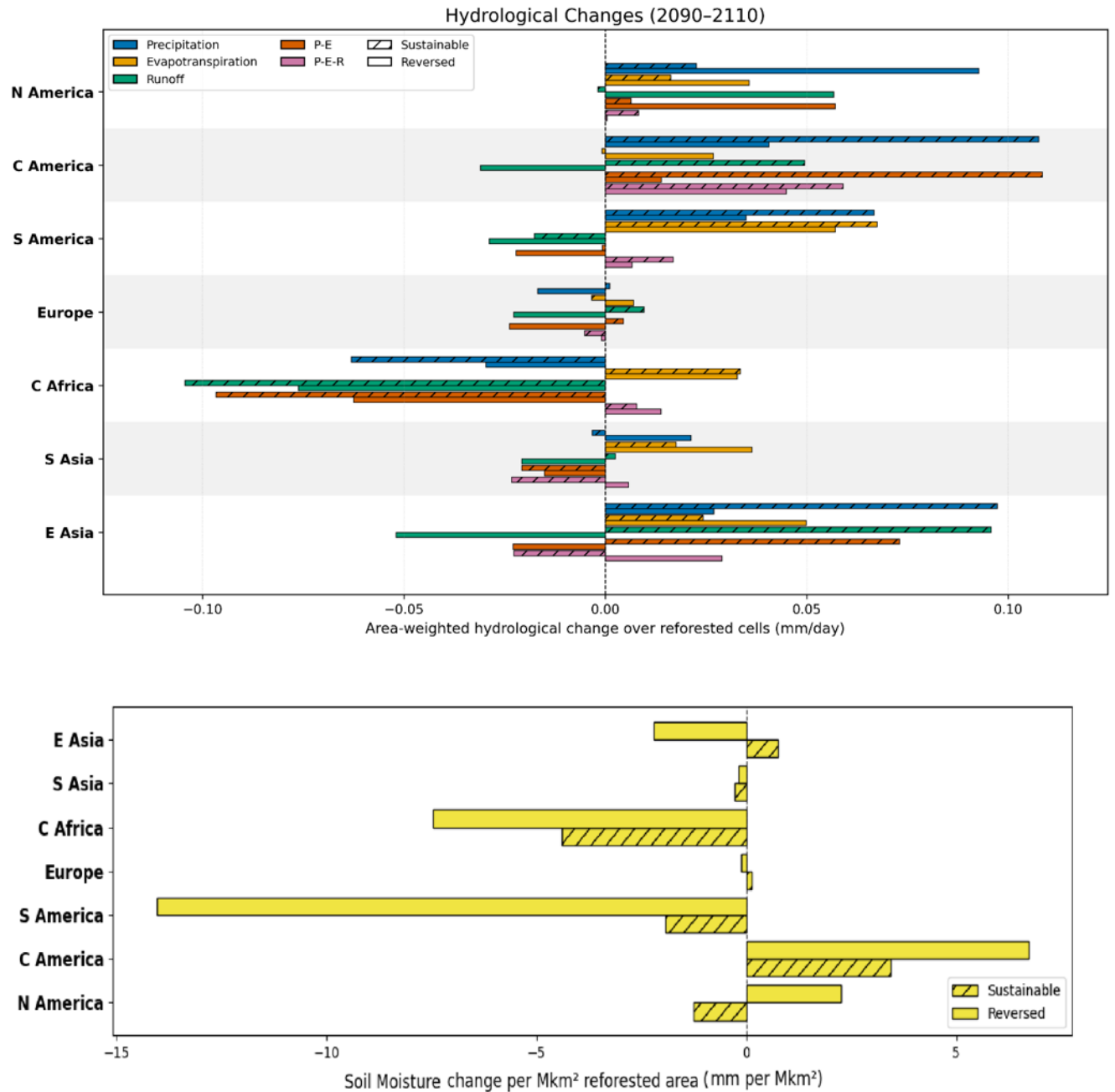


Figure 4. Top) Hydrological flux changes ( $\text{mm day}^{-1}$ ) and bottom) Soil moisture changes (mm) for seven regions normalized by reforested area in  $\text{km}^2$  in 2100 (2090-2110) compared to the baseline scenario with fixed land cover.

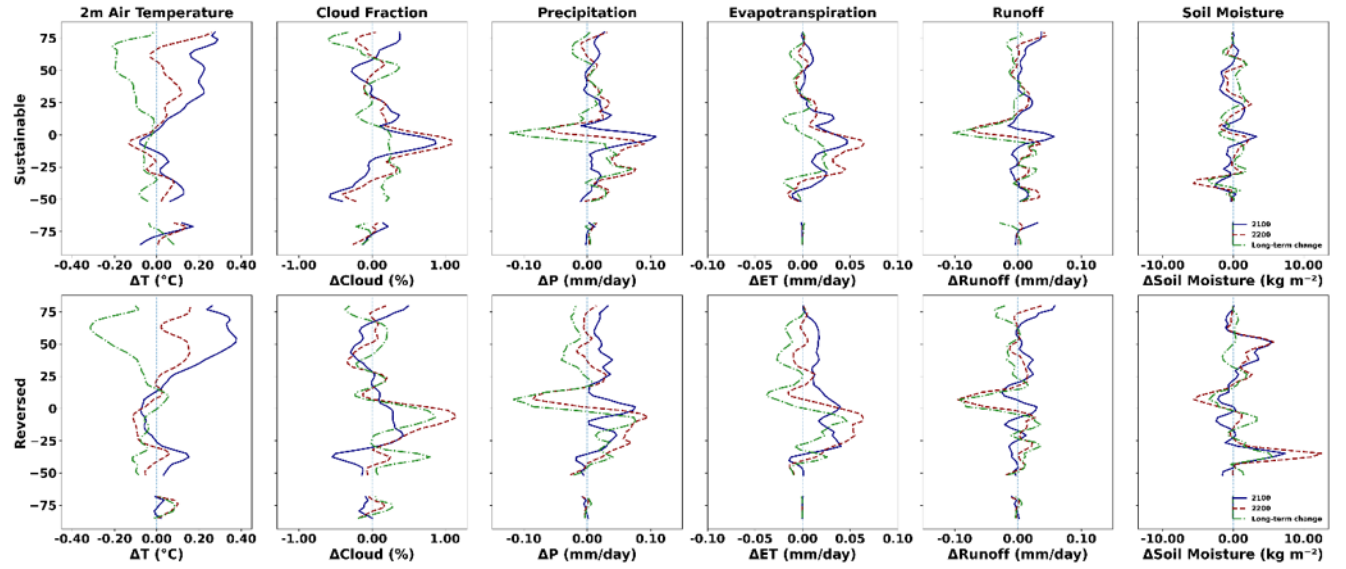


Figure 5. Zonal mean changes (10 degree mean) in hydroclimatic variables in the reforested area for the two reforestation scenarios. The changes are calculated as the difference between 2100 (2090–2110 mean; blue line) and 2190 (2180–2200 mean; dashed red line) for each scenario and the baseline simulation over land regions. Note that the scale differs between plots.

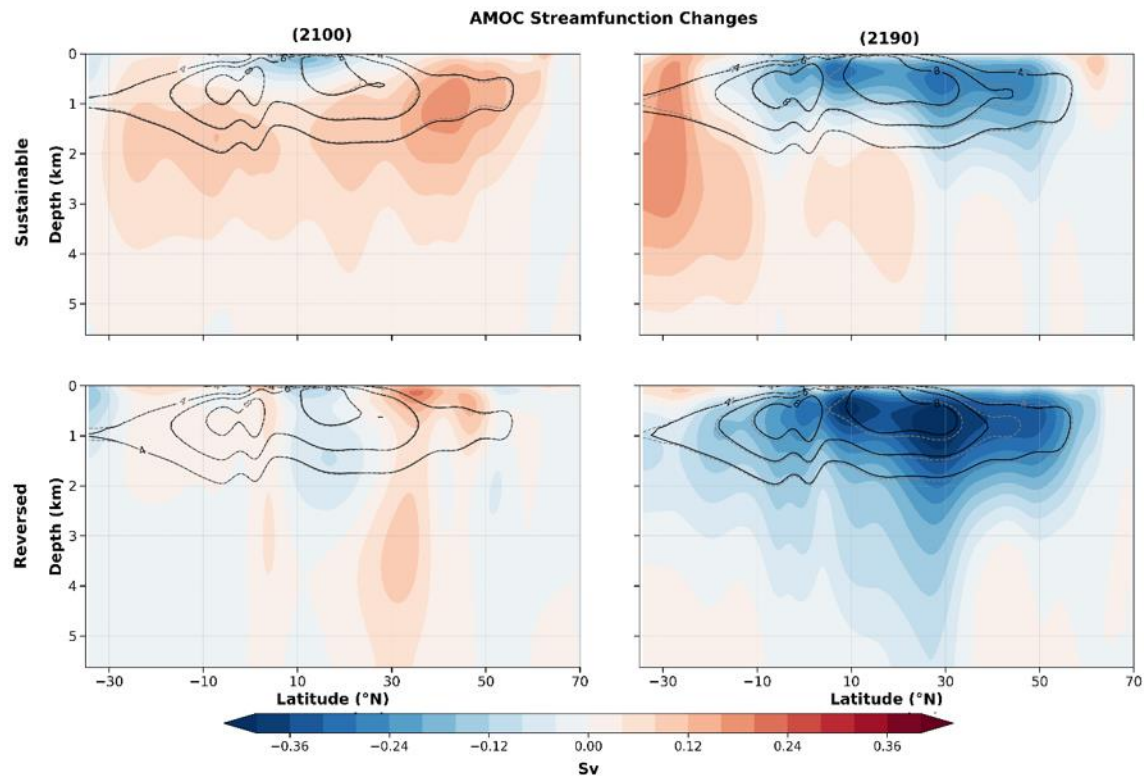
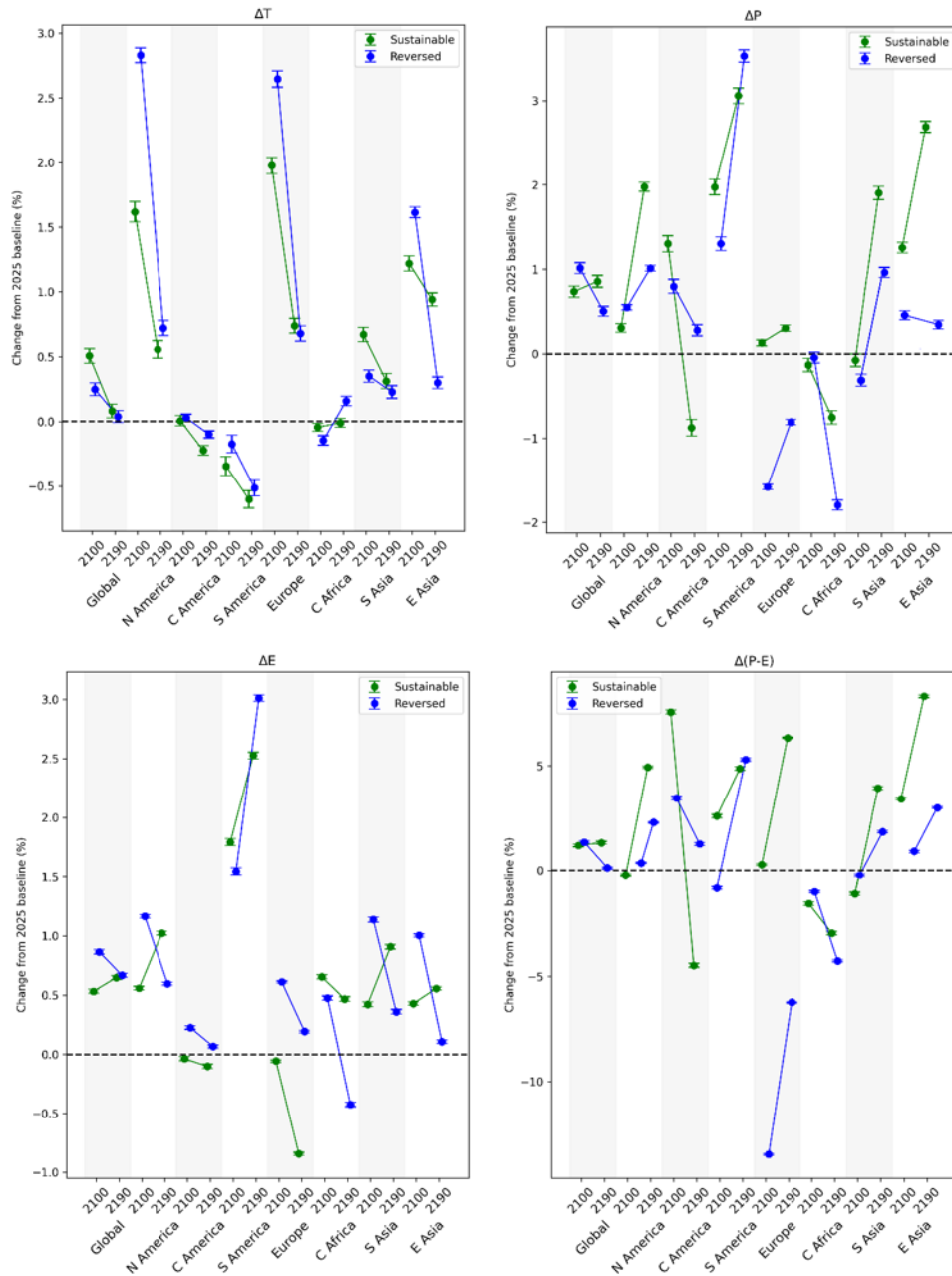


Figure 6. Stream function changes of Top) Hadley cell Bottom) The Atlantic meridional overturning circulation (AMOC), (contours, in Sv, only values above 4 Sv shown with a 4 Sv interval) for a forest (black) and baseline (gray), as well as differences of experiments relative to baseline (shading, in Sv).



**Figure 7.** Area weighted mean values for 2m air temperature, precipitation, evapotranspiration, and P-ET, for grid cells where the increase in tree cover between 2015 and 2070 exceeds 10 %, expressed as percentage differences from 2025 mean for the baseline with fixed land cover globally and for 7 regions: North America, Central America, South America, Europe, Central Africa, South Asia, and East Asia. For each land cover scenario, the left point indicates the 2100 (2090-2110) mean and the right point the 2190 (2080-2200) mean. Note that each plot has a different scale.