Supplementary material for:

Role of vegetation change in future climate under the A1B scenario and a climate stabilisation scenario, using the HadCM3C earth system model

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vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S14: Timeseries of changes in annual average temperature in HadCM3C simulations under A1B and 2C20 scenarios with interactive and fixed vegetation: a) global mean ; b) Amazon region, and c) high latitude region. Regions are defined in Table 2.

Figure S15: Change in thirty year mean temperatures in HadCM3C simulations (2080s-1860s): a) A1B scenario with interactive vegetation; b) difference between A1B simulations with interactive and fixed vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S16: Change in thirty year seasonal mean temperatures in HadCM3C simulations (2080s-1860s) showing difference between A1B simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S17: Change in thirty year seasonal mean temperature in HadCM3C simulations (2080s-1860s) showing difference between 2C20 simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S18: Change in thirty year mean precipitation in HadCM3C simulations (2080s-1860s): a) A1B scenario with interactive vegetation; b) difference between A1B simulations with interactive and fixed vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S19: Change in thirty year seasonal mean precipitation in HadCM3C simulations (2080s-1860s) showing difference between A1B simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S20: Change in thirty year seasonal mean precipitation in HadCM3C simulations (2080s-1860s) showing difference between 2C20 simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S21: Change in thirty year mean evaporation in HadCM3C simulations (2080s-1860s): a) A1B scenario with interactive vegetation; b) difference between A1B simulations with interactive and fixed vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S22: Change in thirty year seasonal mean evaporation in HadCM3C simulations (2080s-1860s) showing difference between A1B simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

Figure S23: Change in thirty year seasonal mean evaporation in HadCM3C simulations (2080s-1860s) showing difference between 2C20 simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

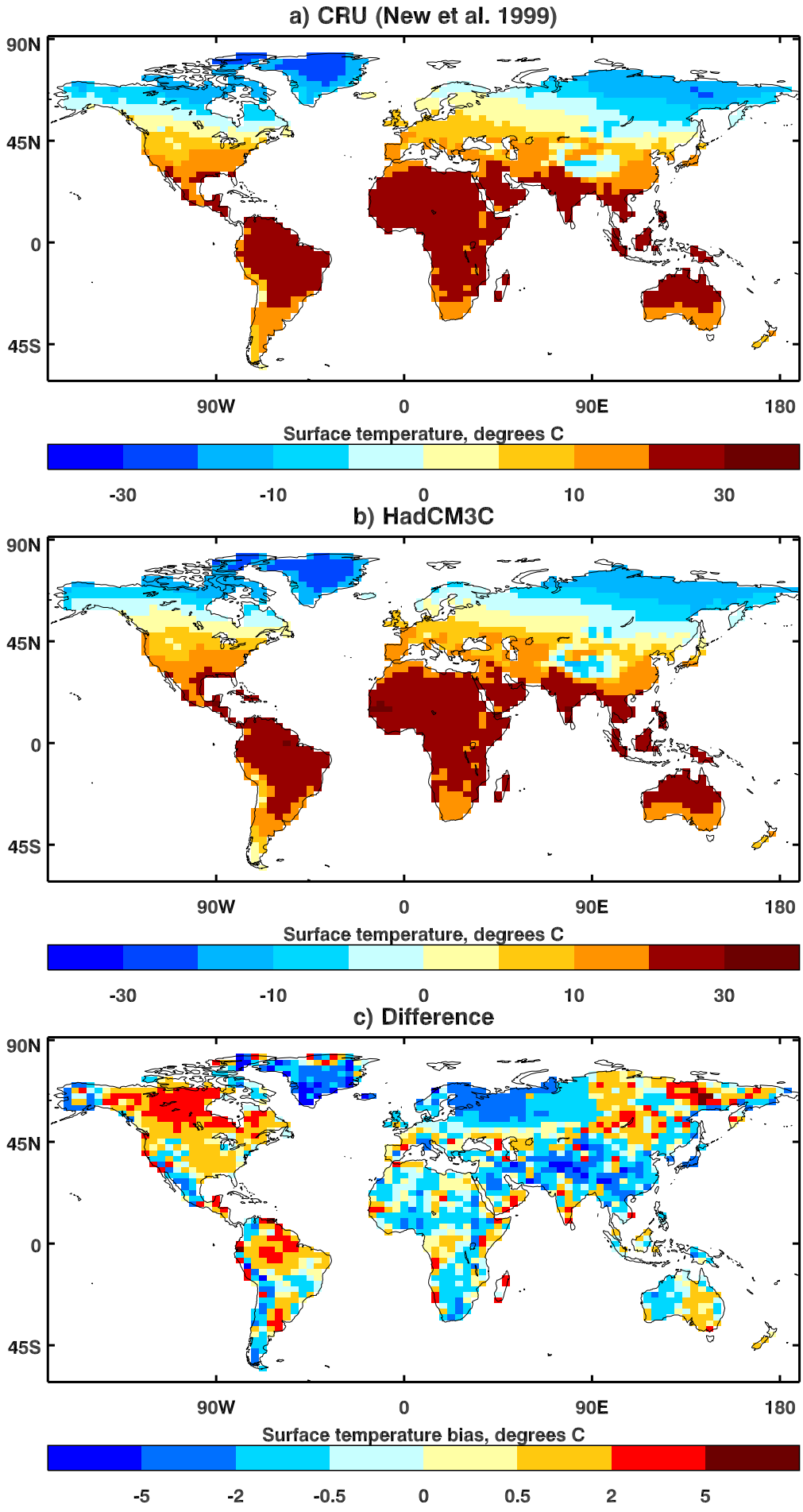


Figure S1: Annual mean land-only surface temperatures in a) CRU dataset (New et al., 1990), b) HadCM3C INTVEG simulation (1971-2000) and c) difference (HadCM3C - CRU).

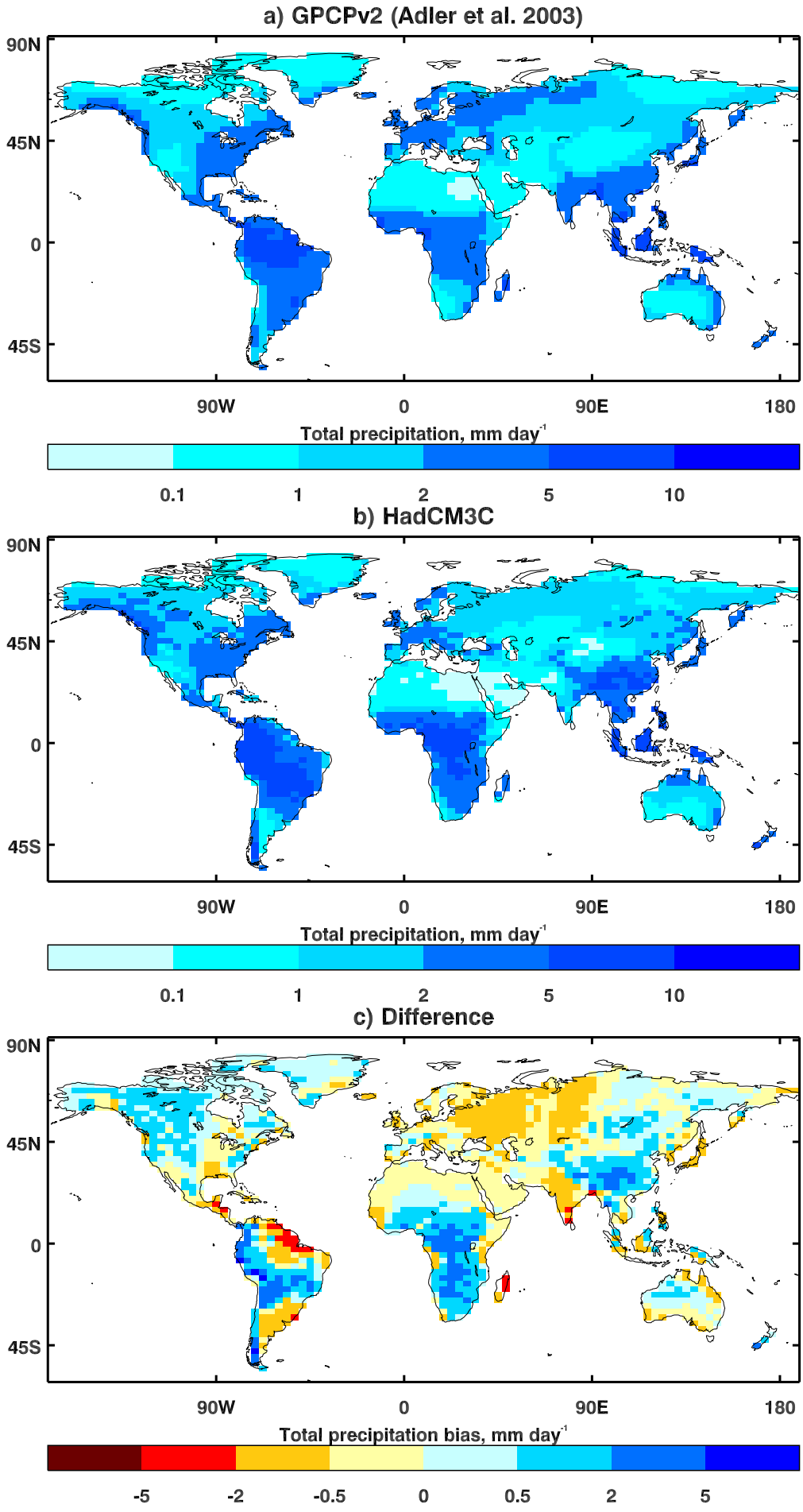


Figure S2: Annual mean land-only precipitation in a) GPCPv2 dataset (Adler et al., 2003), b) HadCM3C INTVEG simulation (1971-2000) and c) difference (HadCM3C – GPCPv2).

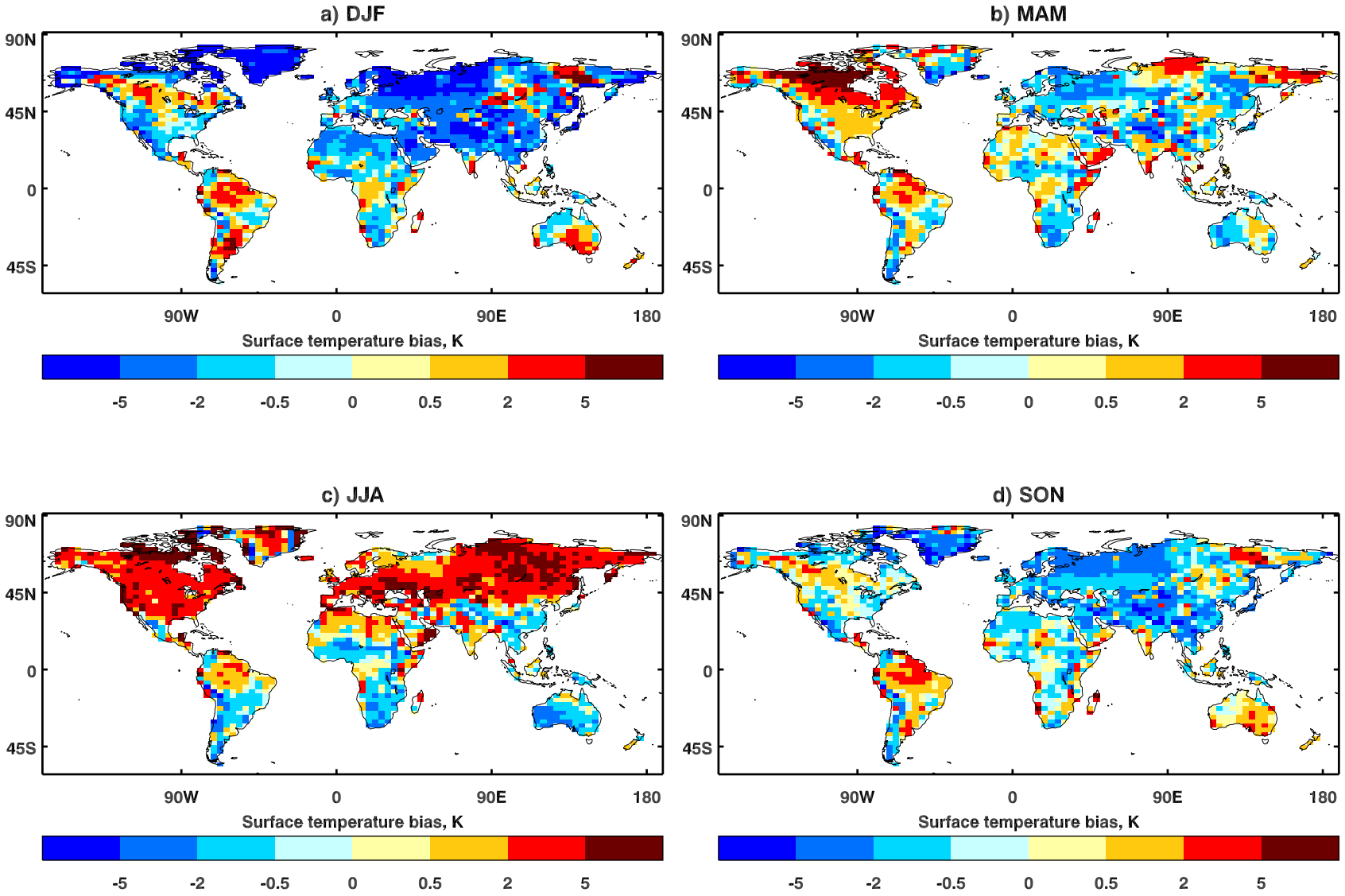


Figure S3: Seasonal mean land-only surface temperature differences between HadCM3C INTVEG simulation (1971-2000) and CRU dataset (New et al., 1999) for a) December-February, b) March-May, c) June-August, d) September-November.

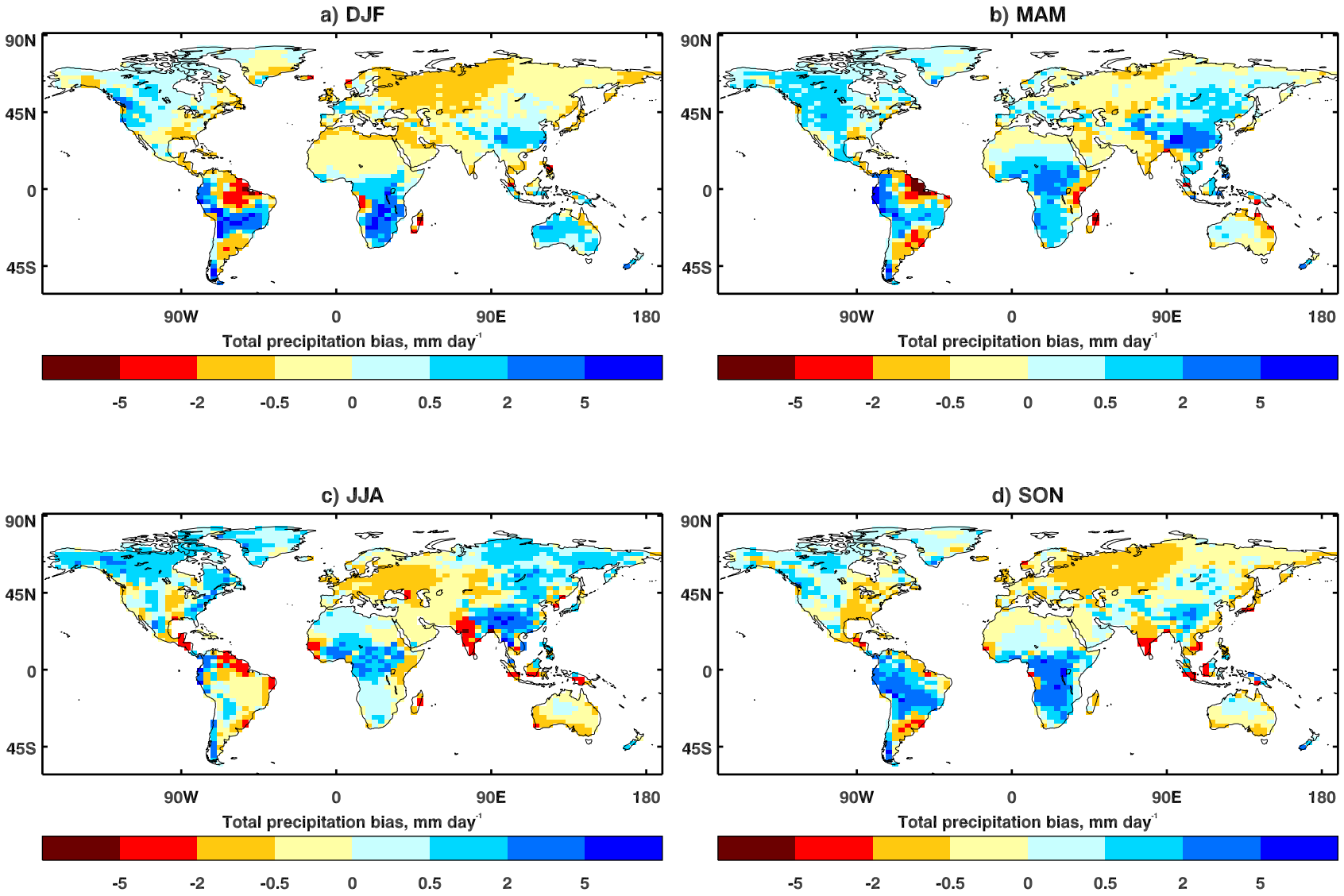


Figure S4: Seasonal mean land-only precipitation differences between HadCM3C INTVEG simulation (1971-2000) and GPCPv2 dataset (Adler et al., 2003) for a) December-February, b) March-May, c) June-August, d) September-November.

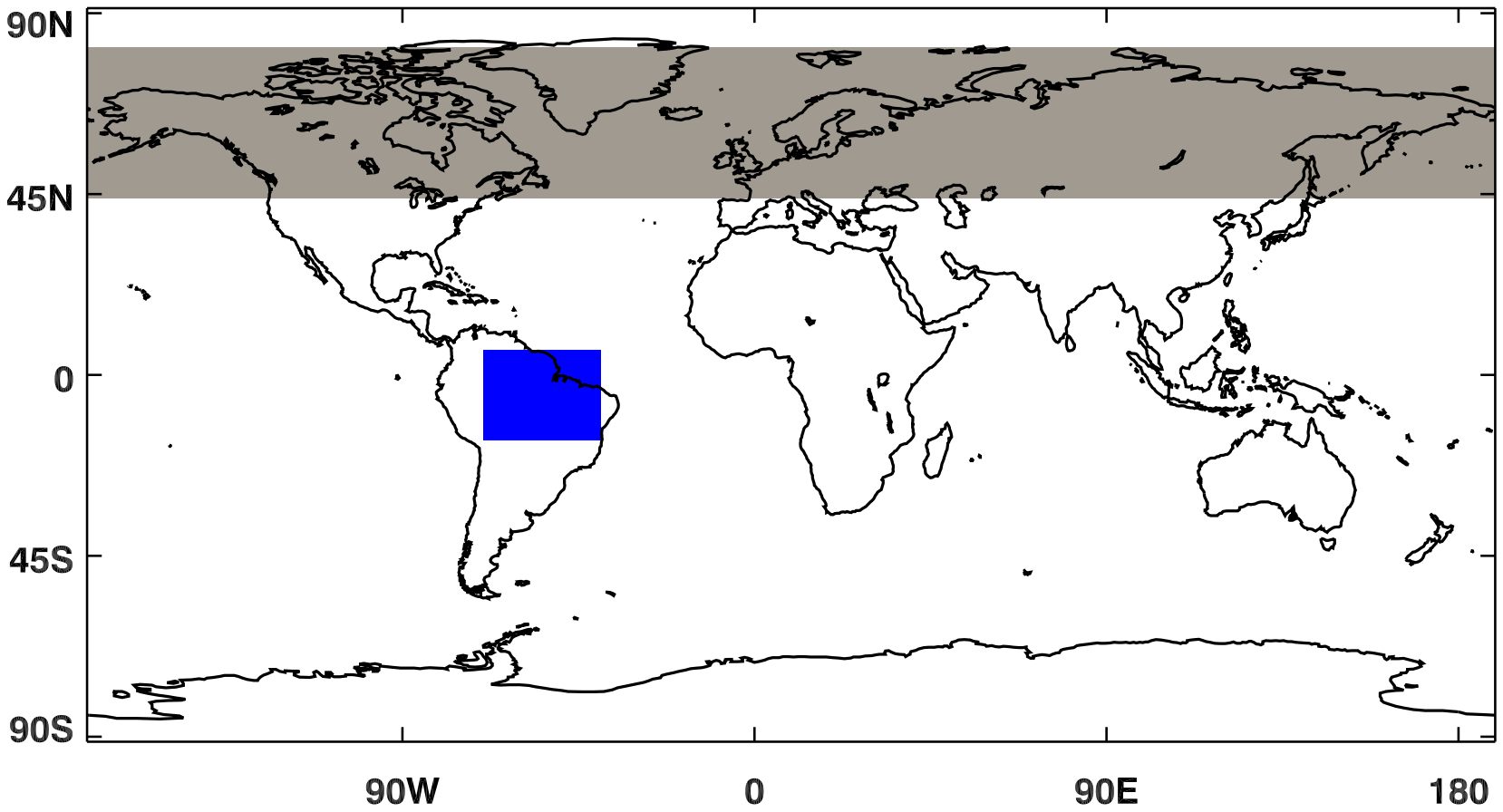


Figure S5: Regions used for area-averages in the present study: High latitudes (HIGHLAT) in grey, Amazon (AMZ) in blue. See Table 2 for full definition.

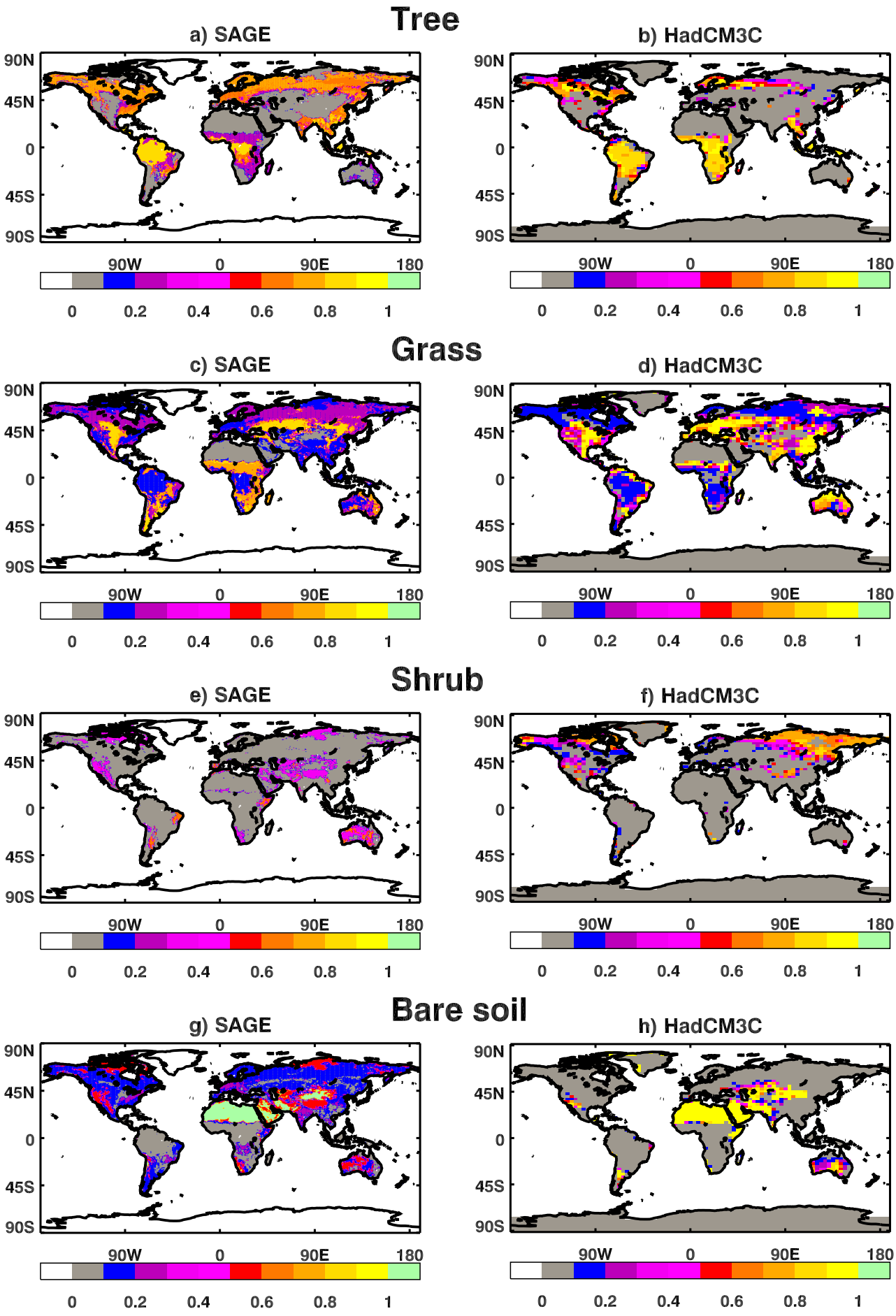


Figure S6: Comparison of aggregated HadCM3C-simulated vegetation fractions (averaged over 1971-2000) with the SAGE potential vegetation dataset (Ramankutty and Foley, 1999). SAGE: a) tree, c) grass, e) shrub, g) bare soil; HadCM3C: b) tree, d) grass, f) shrub, g) bare soil.

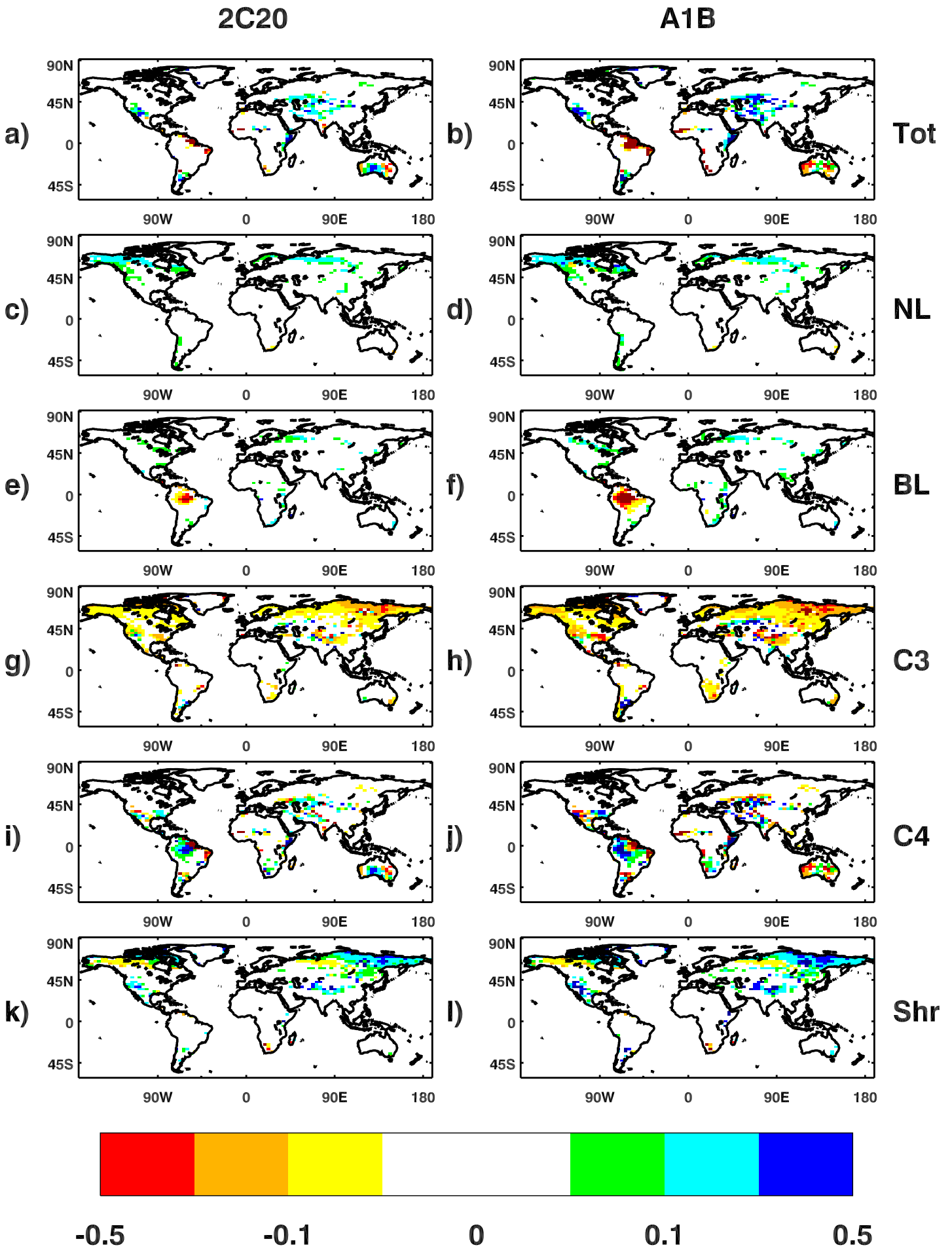


Figure S7: changes in vegetation fractions under the INTVEG simulations: 2C20 scenario, a) total vegetation, c) needleleaf tree, e) broadleaf tree, g) C3 grass, i) C4 grass, k) shrub; A1B scenario, b) total vegetation, d) needleleaf tree, f) broadleaf tree, h) C3 grass, j) C4 grass, l) shrub.

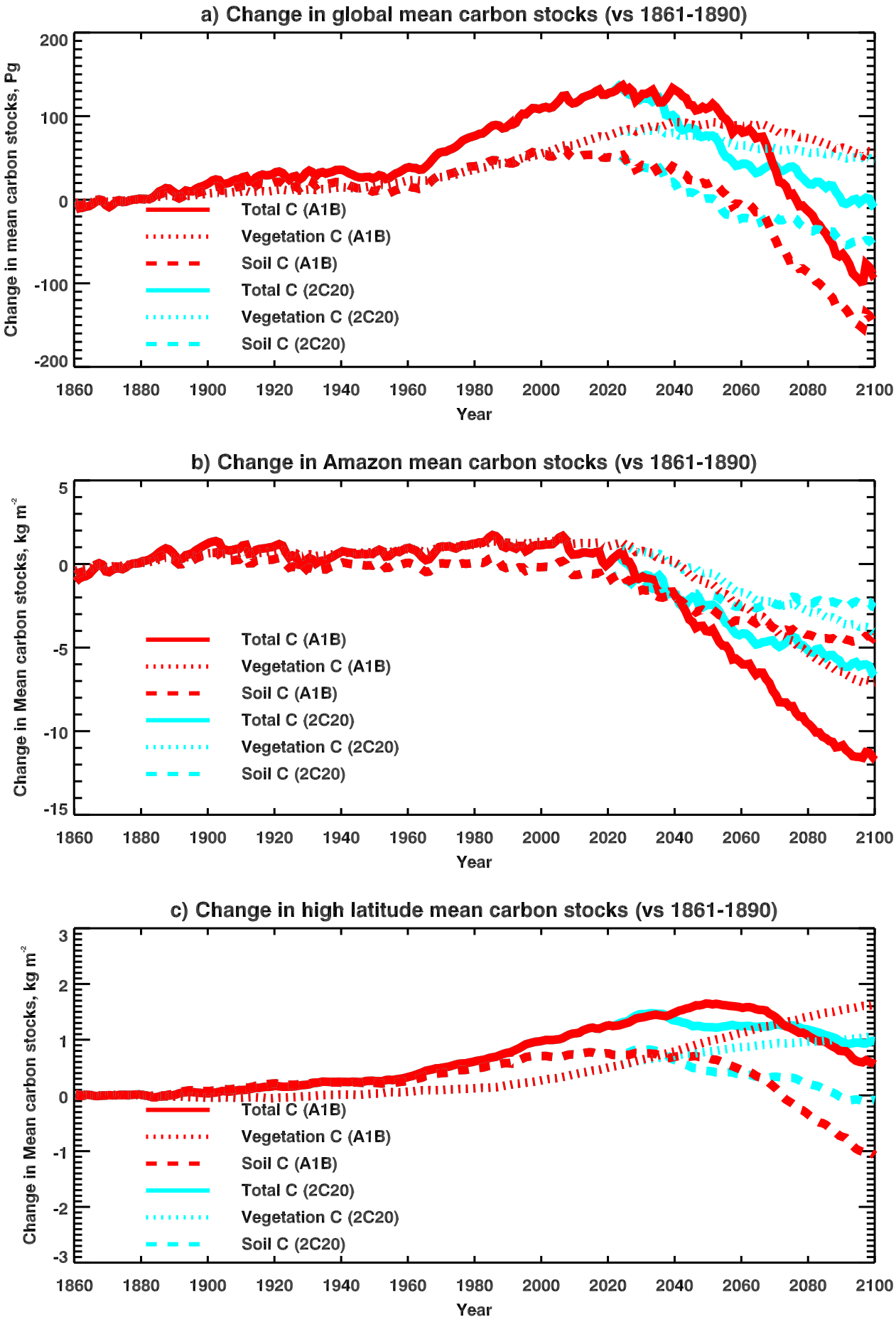


Figure S8: Timeseries of changes in terrestrial carbon storage in HadCM3C simulations under A1B and 2C20 scenarios with interactive and fixed vegetation: a) global mean; b) Amazon region, and c) high latitude region. Regions are defined in Table 2.

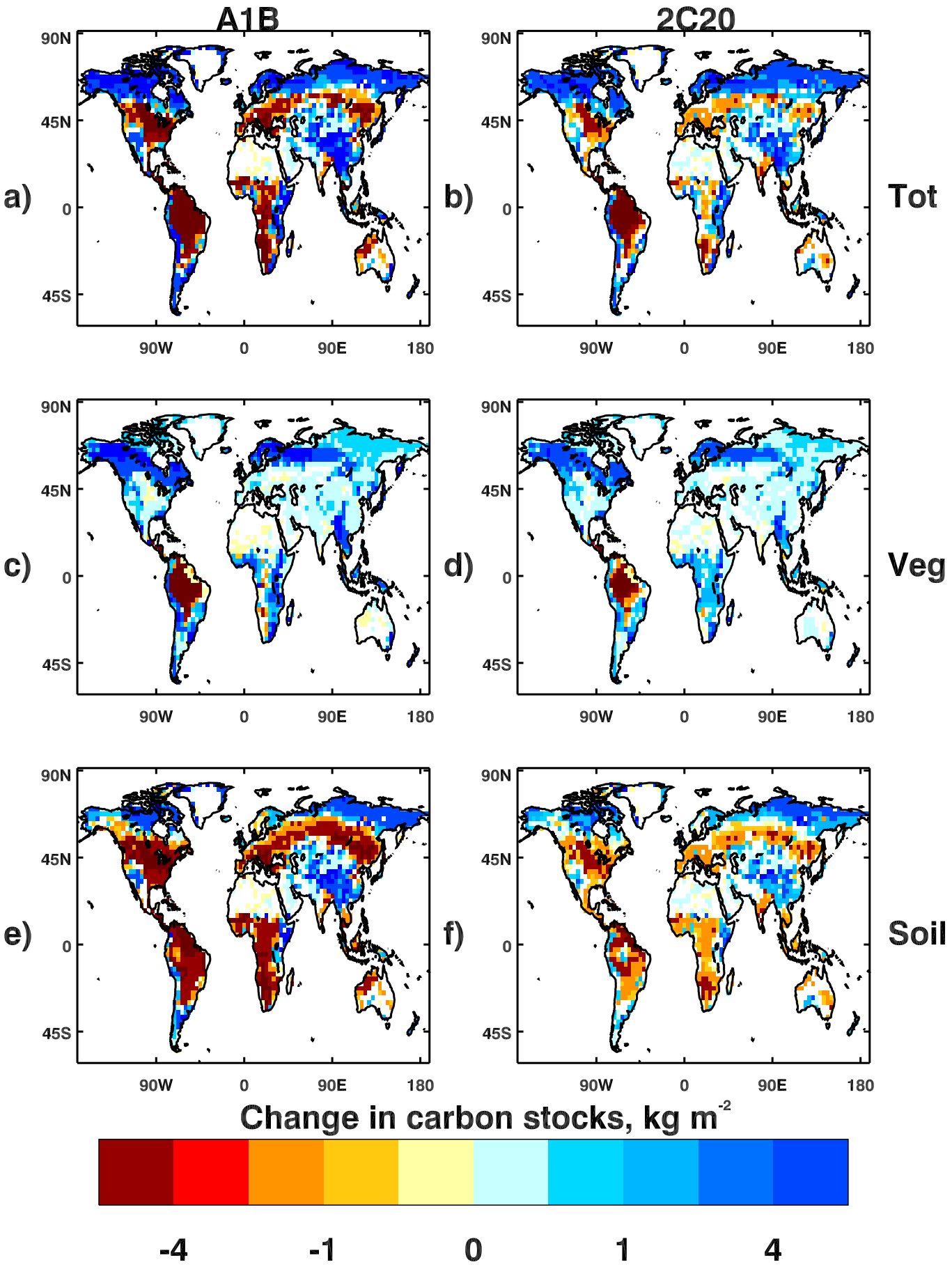


Figure S9: Change in thirty year mean carbon storage in HadCM3C simulations with interactive vegetation (2080s-1860s): total carbon a) A1B scenario, b) 2C20 scenario; vegetation carbon c) A1B scenario, d) 2C20 scenario; soil carbon e) A1B scenario, f) 2C20 scenario. Changes smaller than two standard deviations from the control simulation are masked out (white areas).

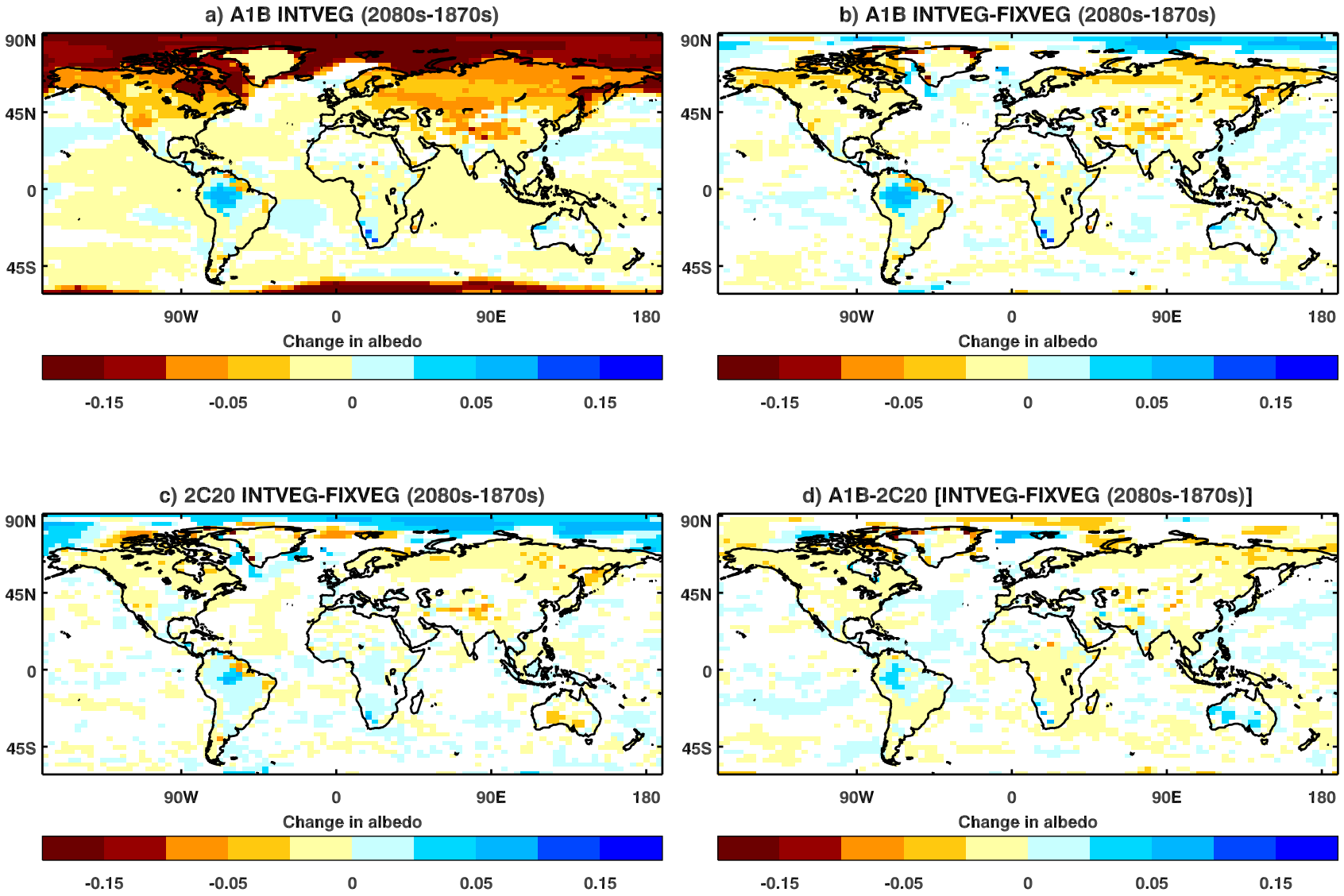


Figure S10: Change in thirty year mean albedo in HadCM3C simulations (2080s-1860s): a) A1B scenario with interactive vegetation; b) difference between A1B simulations with interactive and fixed vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).

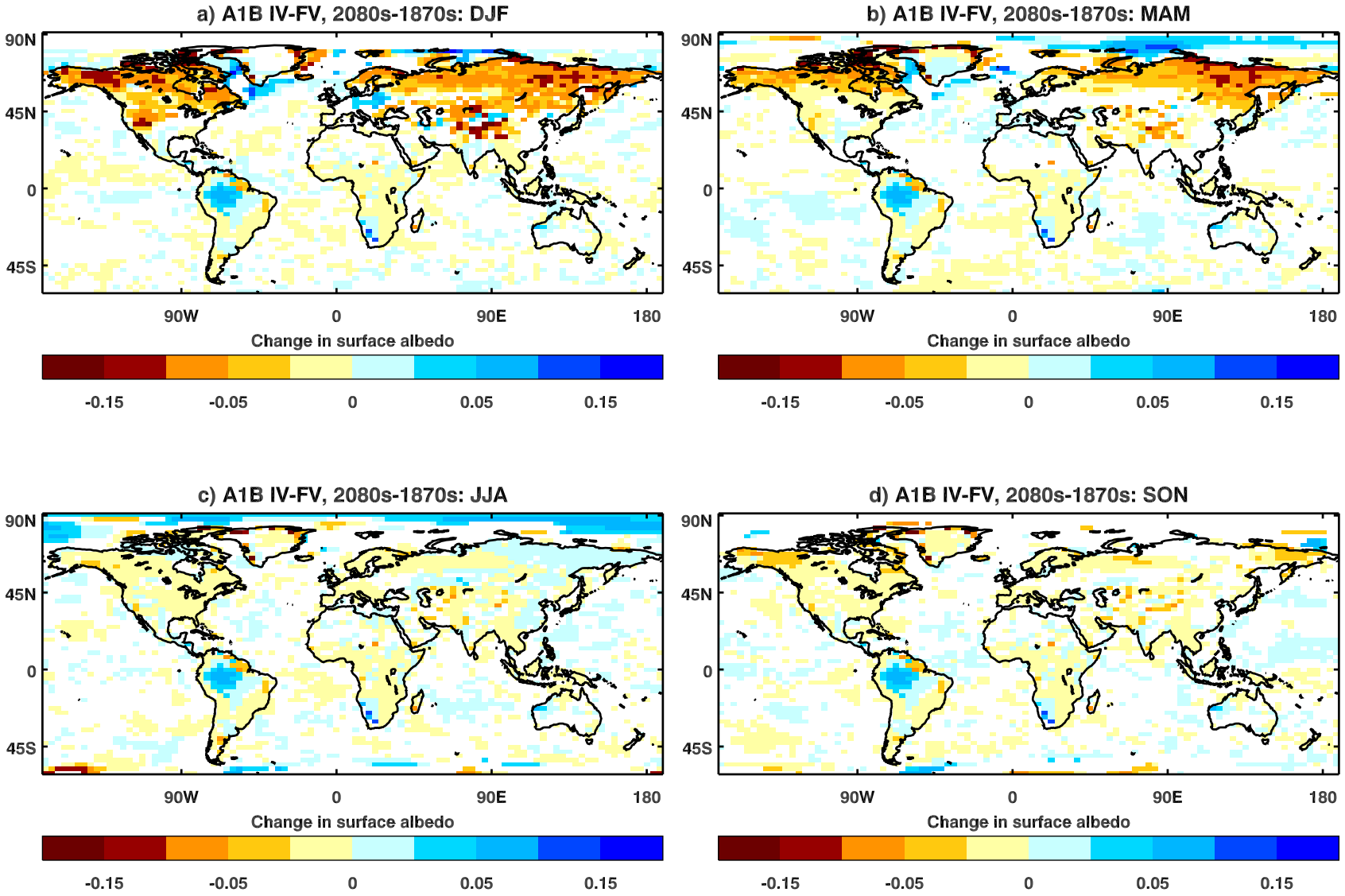


Figure S11: Change in thirty year seasonal mean albedo in HadCM3C simulations (2080s-1860s) showing difference between A1B simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

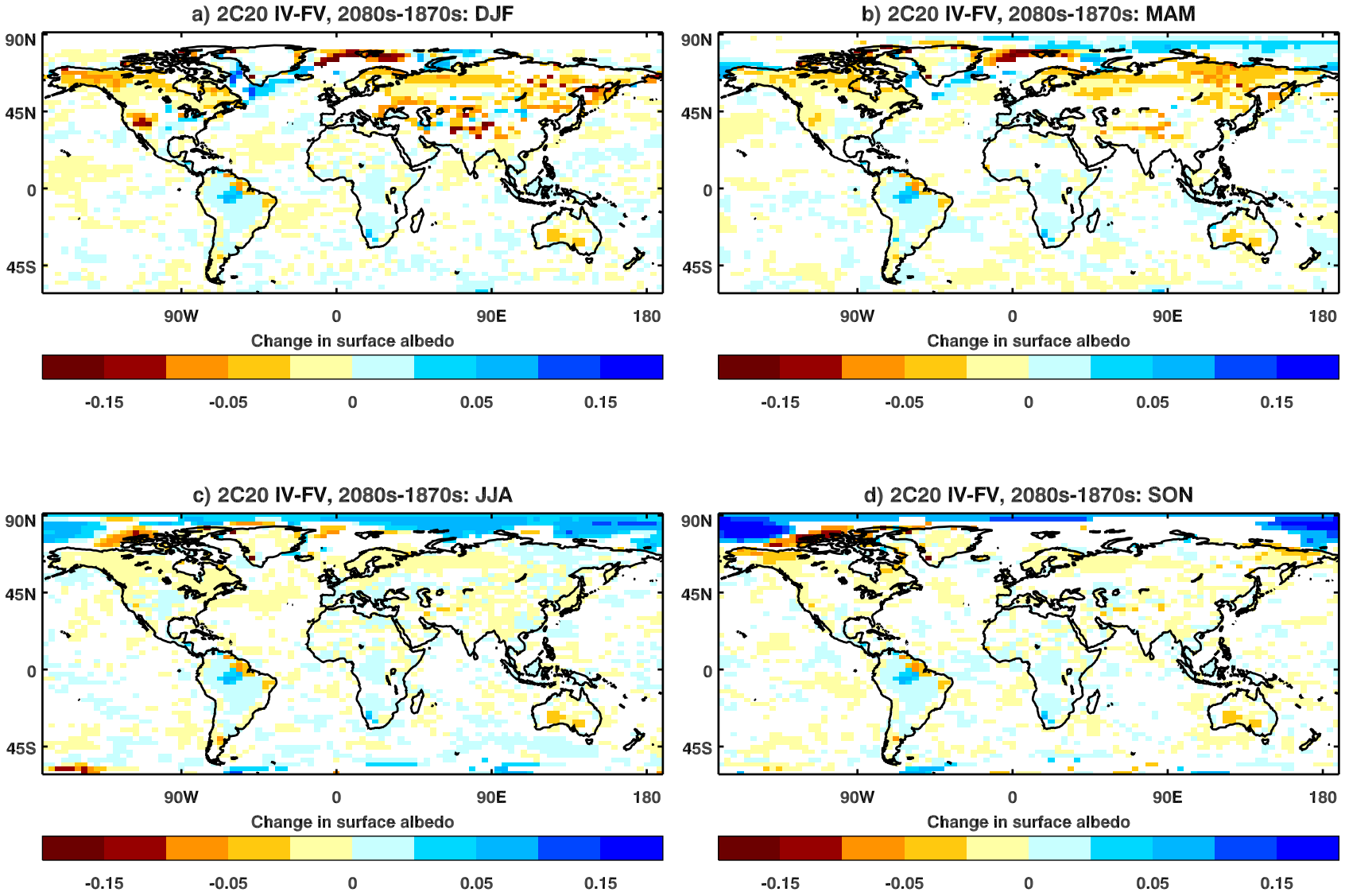


Figure S12: Change in thirty year seasonal mean albedo in HadCM3C simulations (2080s-1860s) showing difference between 2C20 simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

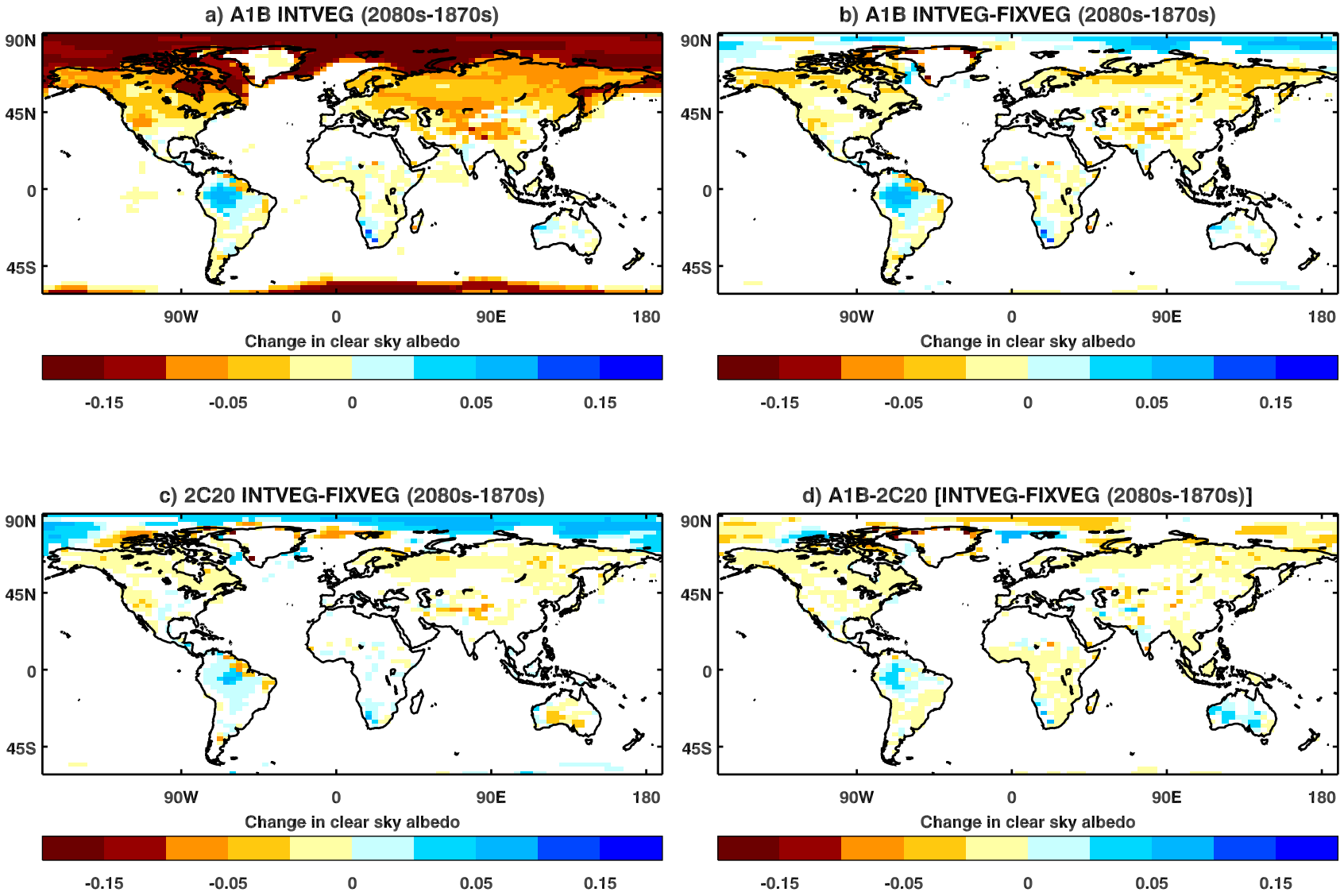
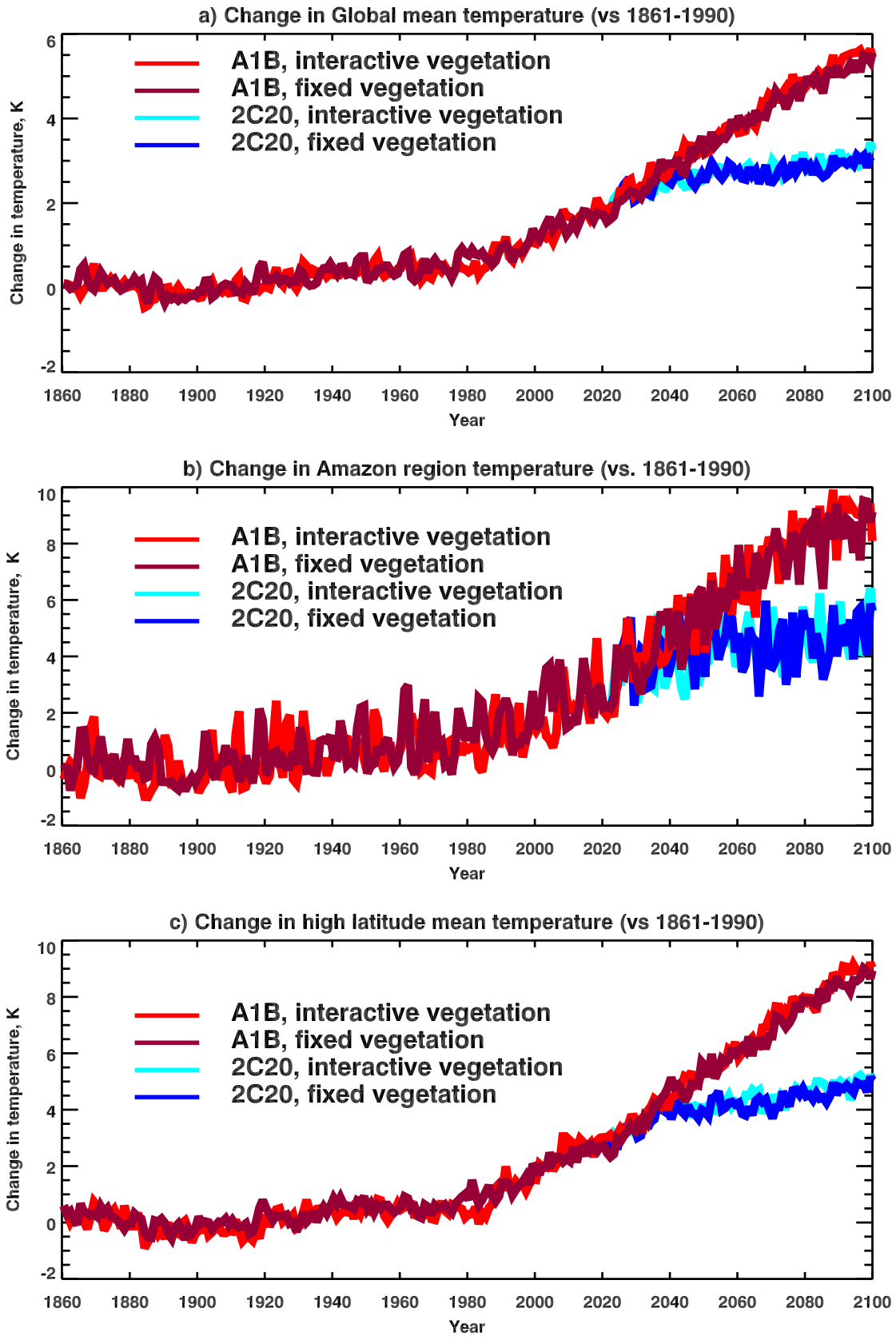


Figure S13: Change in thirty year mean clear-sky albedo in HadCM3C simulations (2080s-1860s): a) A1B scenario with interactive vegetation; b) difference between A1B simulations with interactive and fixed vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).



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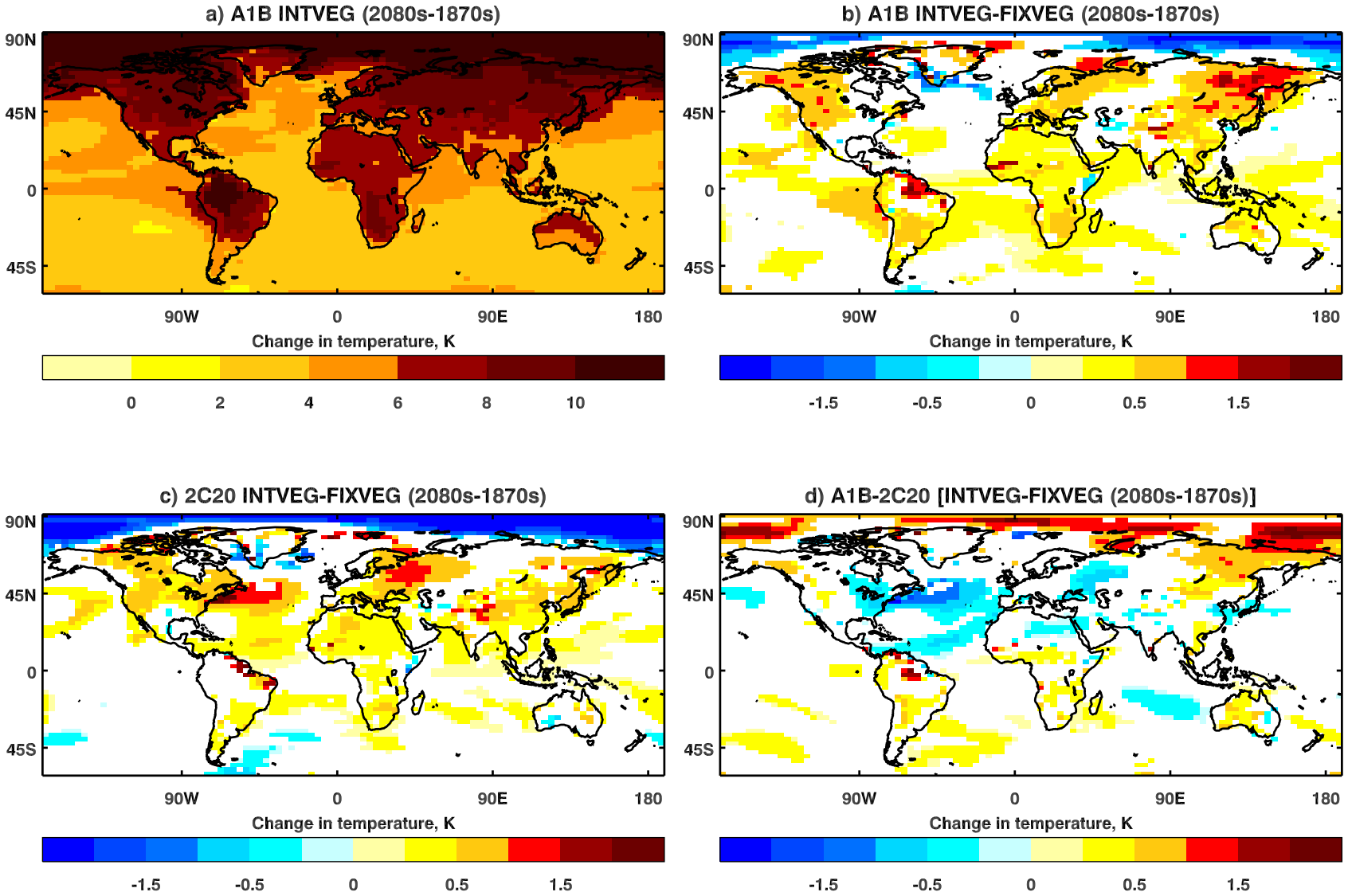
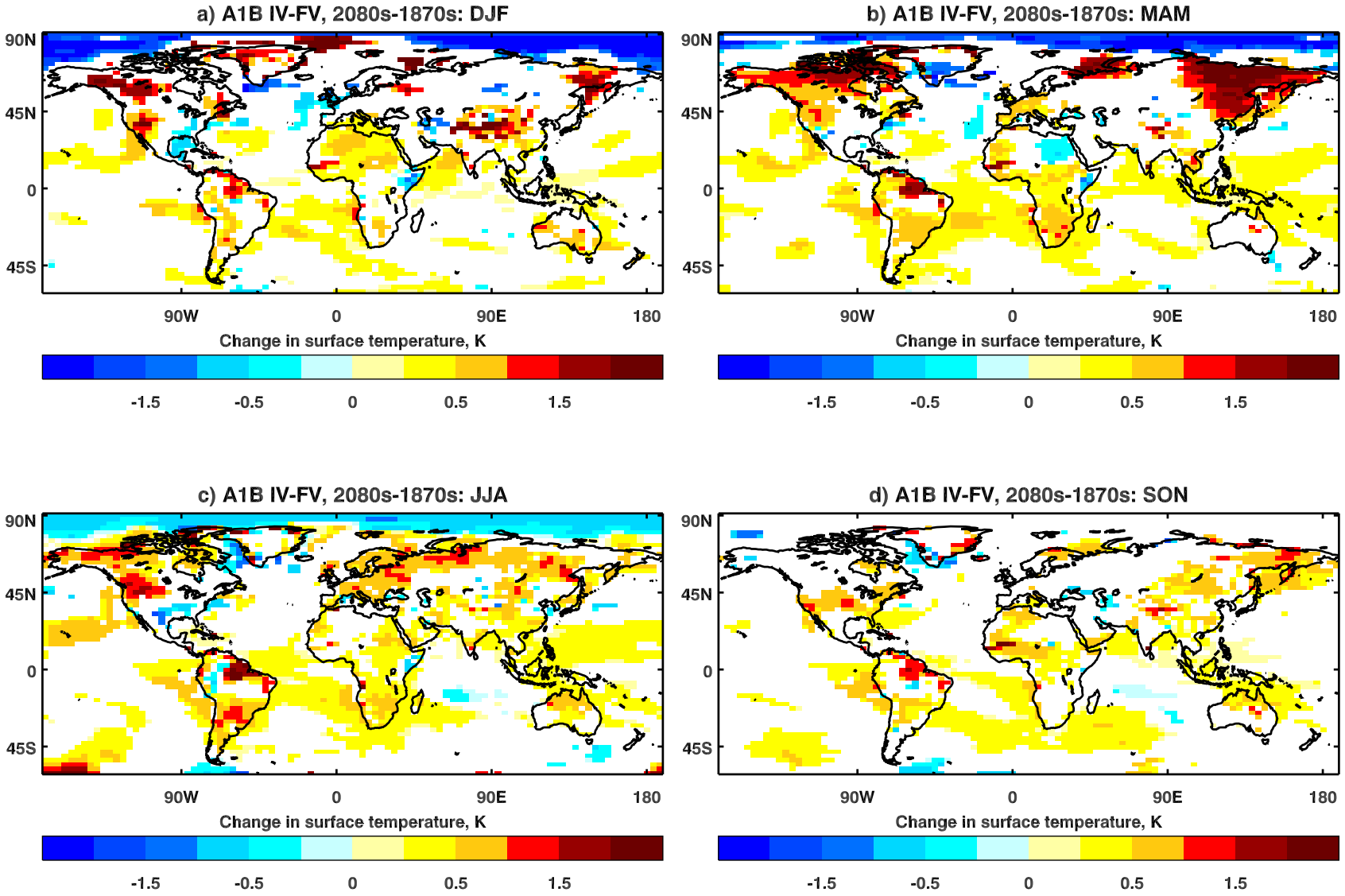


Figure S15: Change in thirty year mean temperatures in HadCM3C simulations (2080s-1860s): a) A1B scenario with interactive vegetation; b) difference between A1B simulations with interactive and fixed vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).



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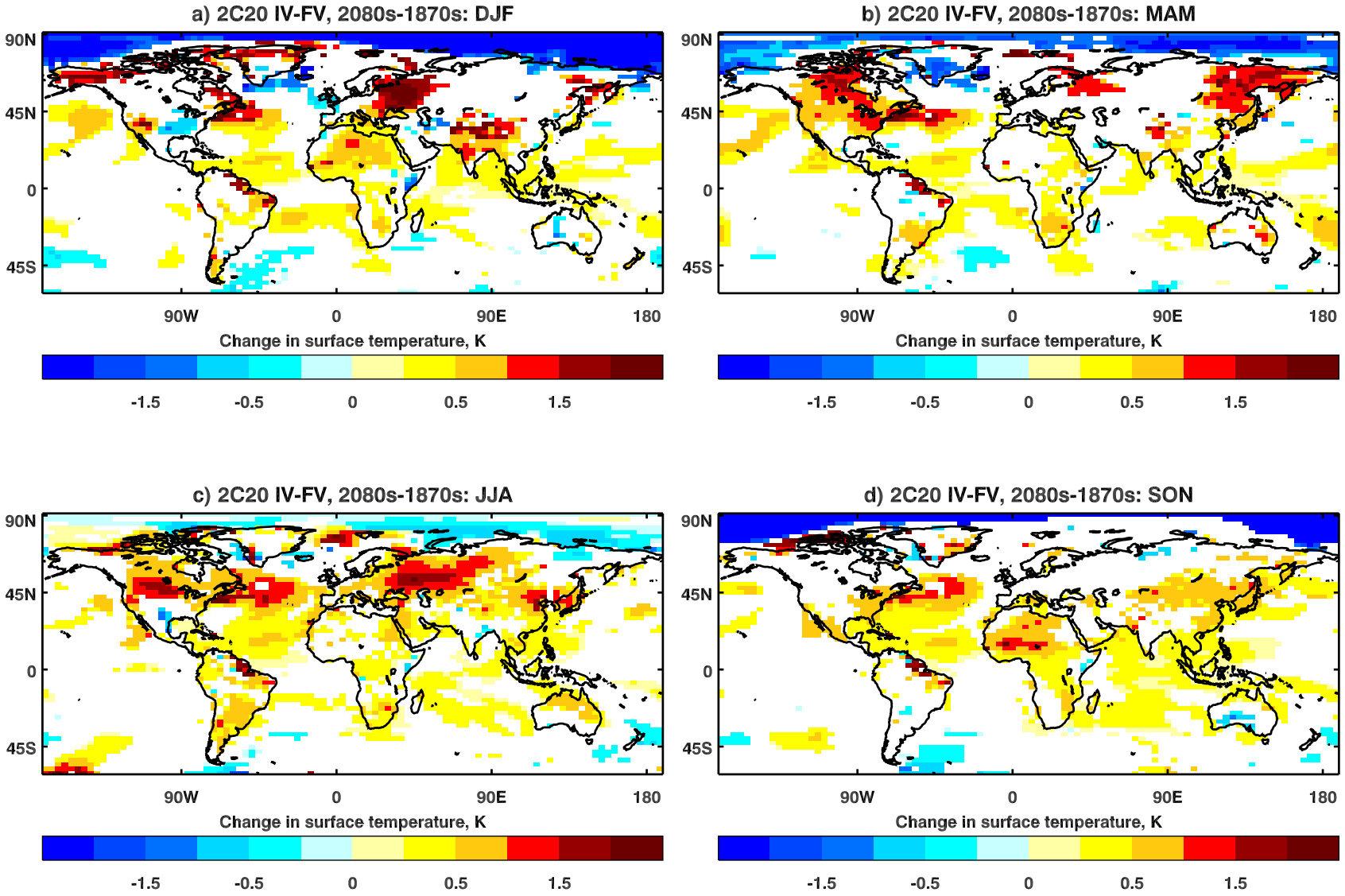

Figure S17: Change in thirty year seasonal mean temperature in HadCM3C simulations (2080s-1860s) showing difference between 2C20 simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

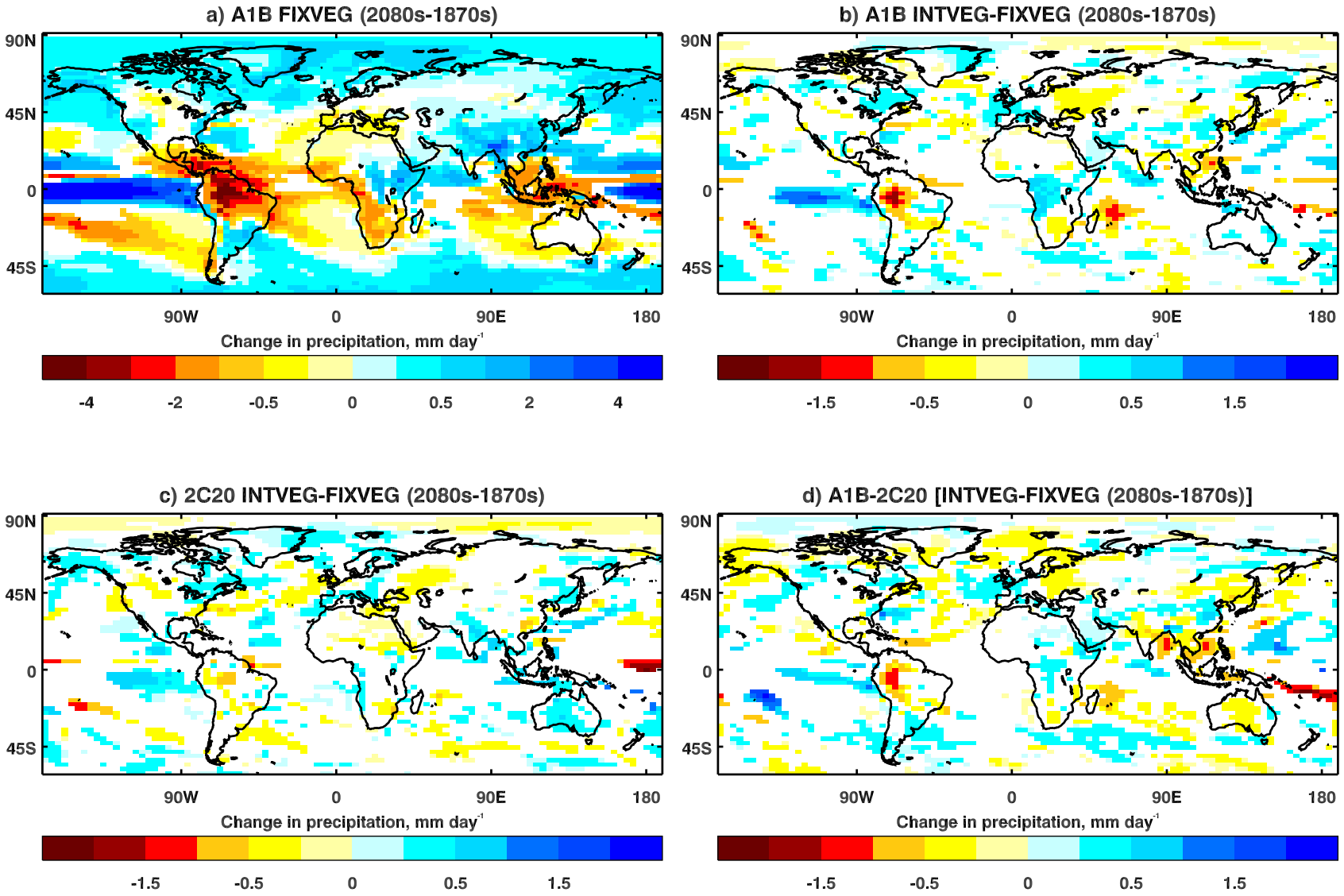

Figure S18: Change in thirty year mean precipitation in HadCM3C simulations (2080s-1860s): a) A1B scenario with interactive vegetation; b) difference between A1B simulations with interactive and fixed vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).

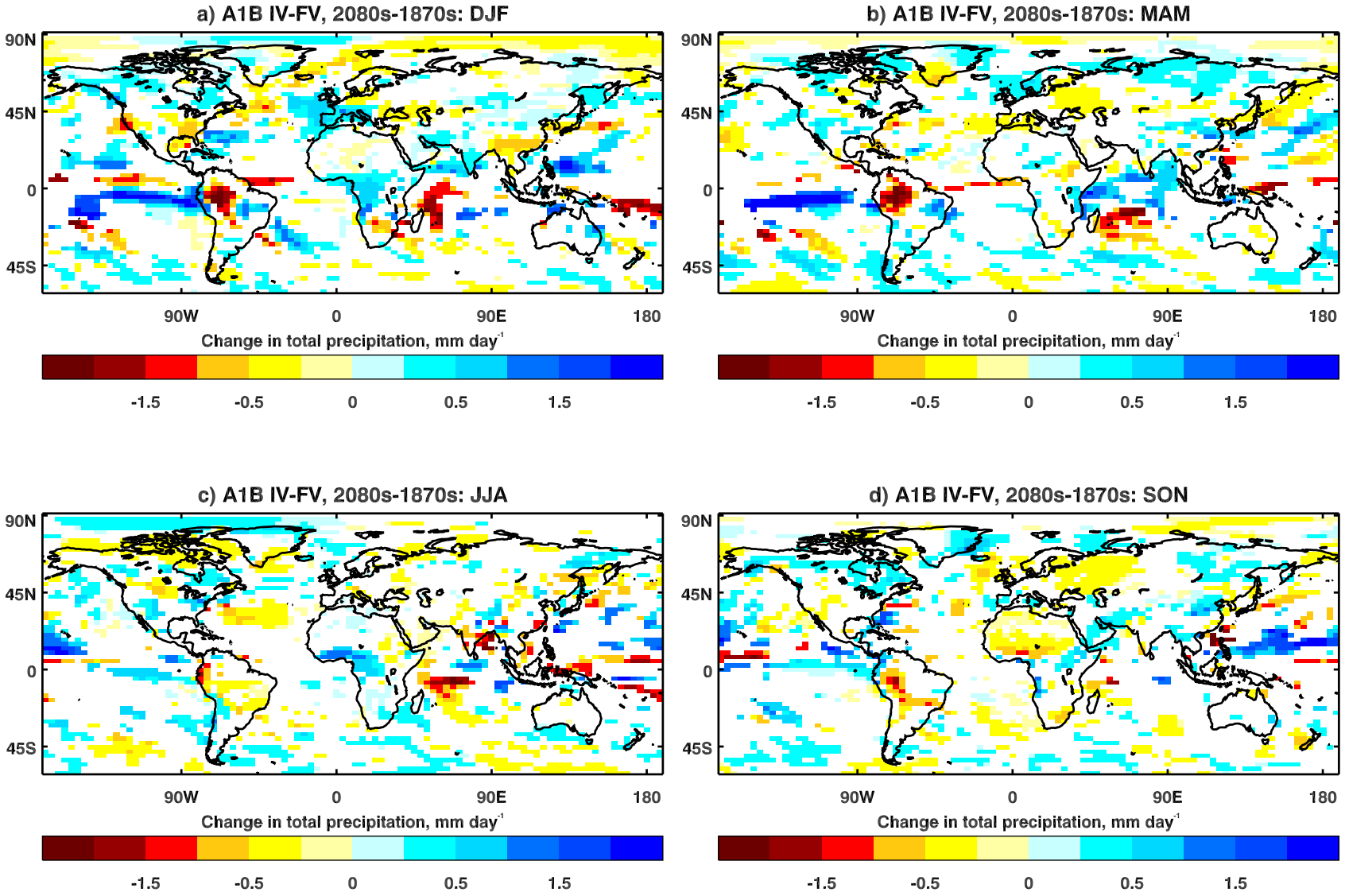

Figure S19: Change in thirty year seasonal mean precipitation in HadCM3C simulations (2080s-1860s) showing difference between A1B simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

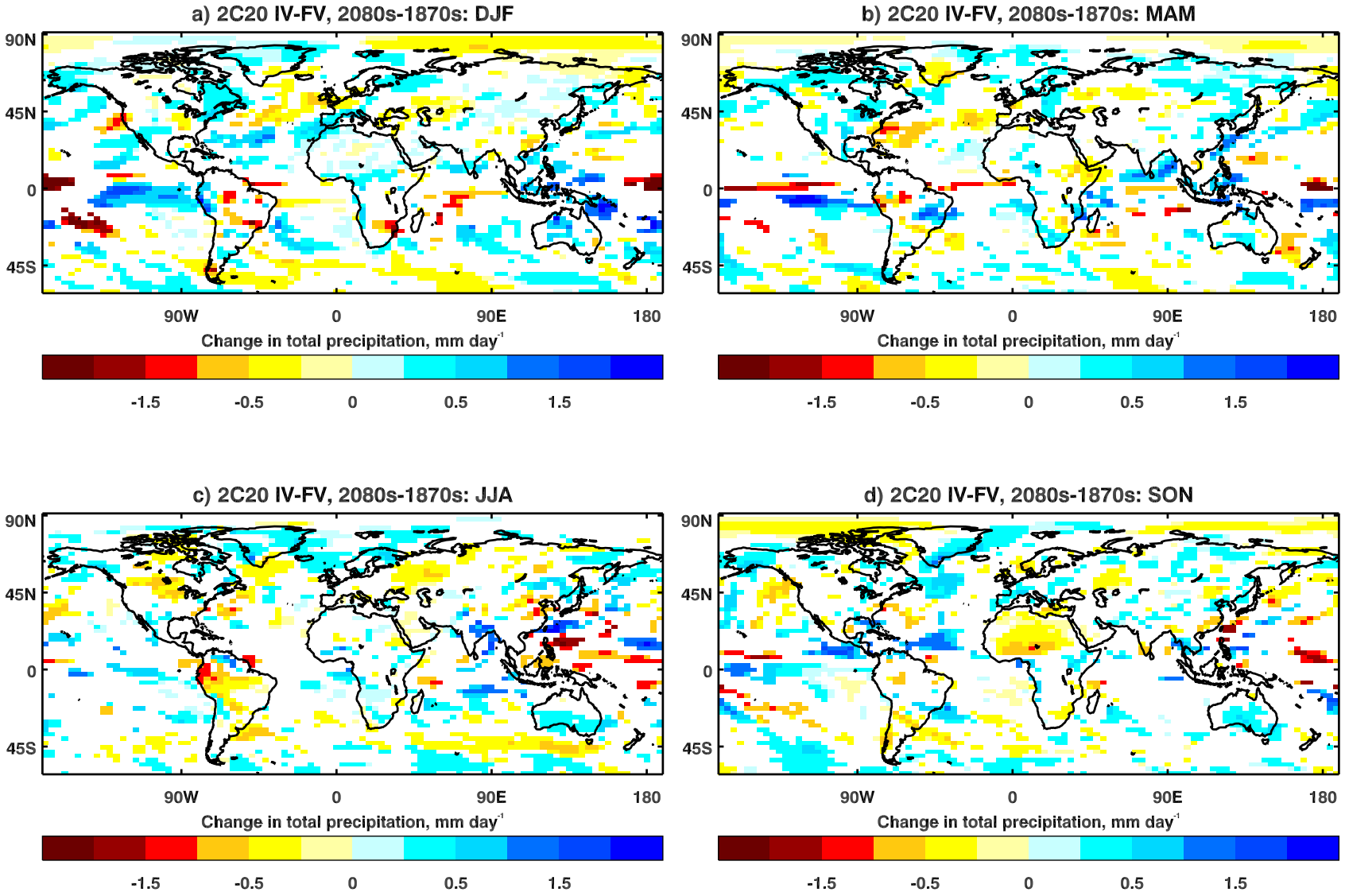

Figure S20: Change in thirty year seasonal mean precipitation in HadCM3C simulations (2080s-1860s) showing difference between 2C20 simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

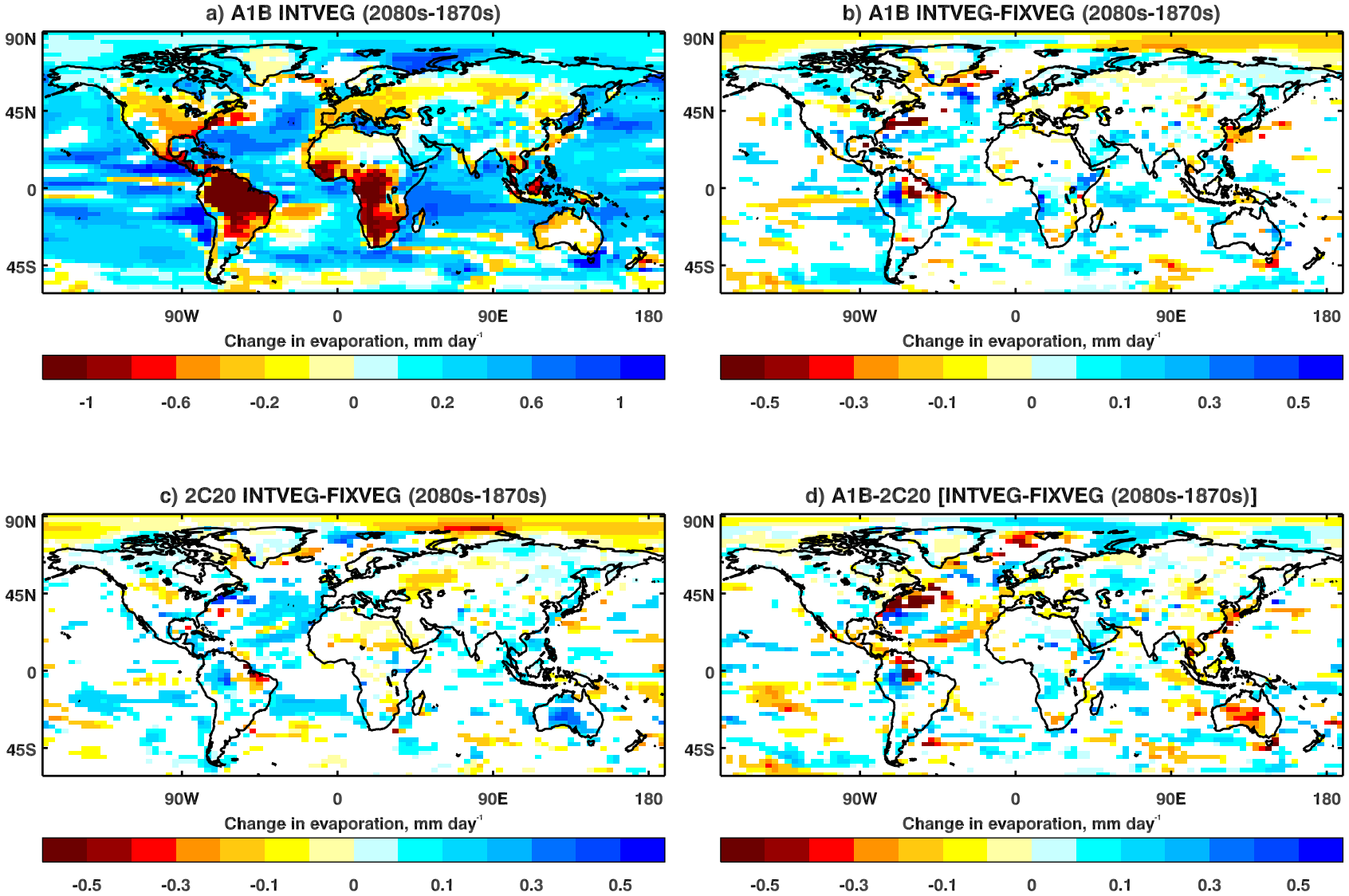

Figure S21: Change in thirty year mean evaporation in HadCM3C simulations (2080s-1860s): a) A1B scenario with interactive vegetation; b) difference between A1B simulations with interactive and fixed vegetation; c) difference between 2C20 simulations with interactive and fixed vegetation; d) difference in the impact of interactive vegetation between A1B and 2C20 simulations. Changes smaller than two standard deviations from the control simulation are masked out (white areas).

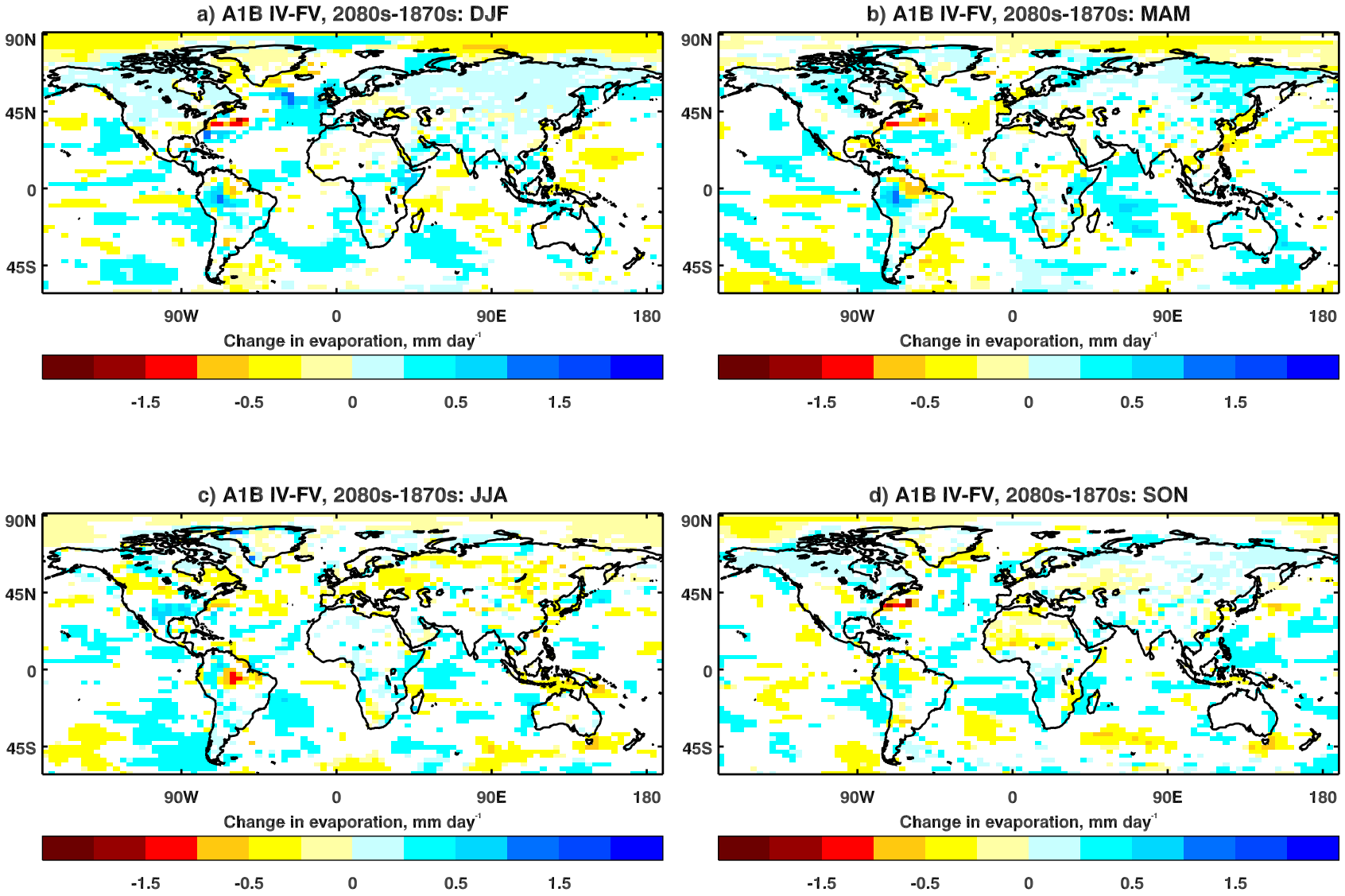

Figure S22: Change in thirty year seasonal mean evaporation in HadCM3C simulations (2080s-1860s) showing difference between A1B simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).

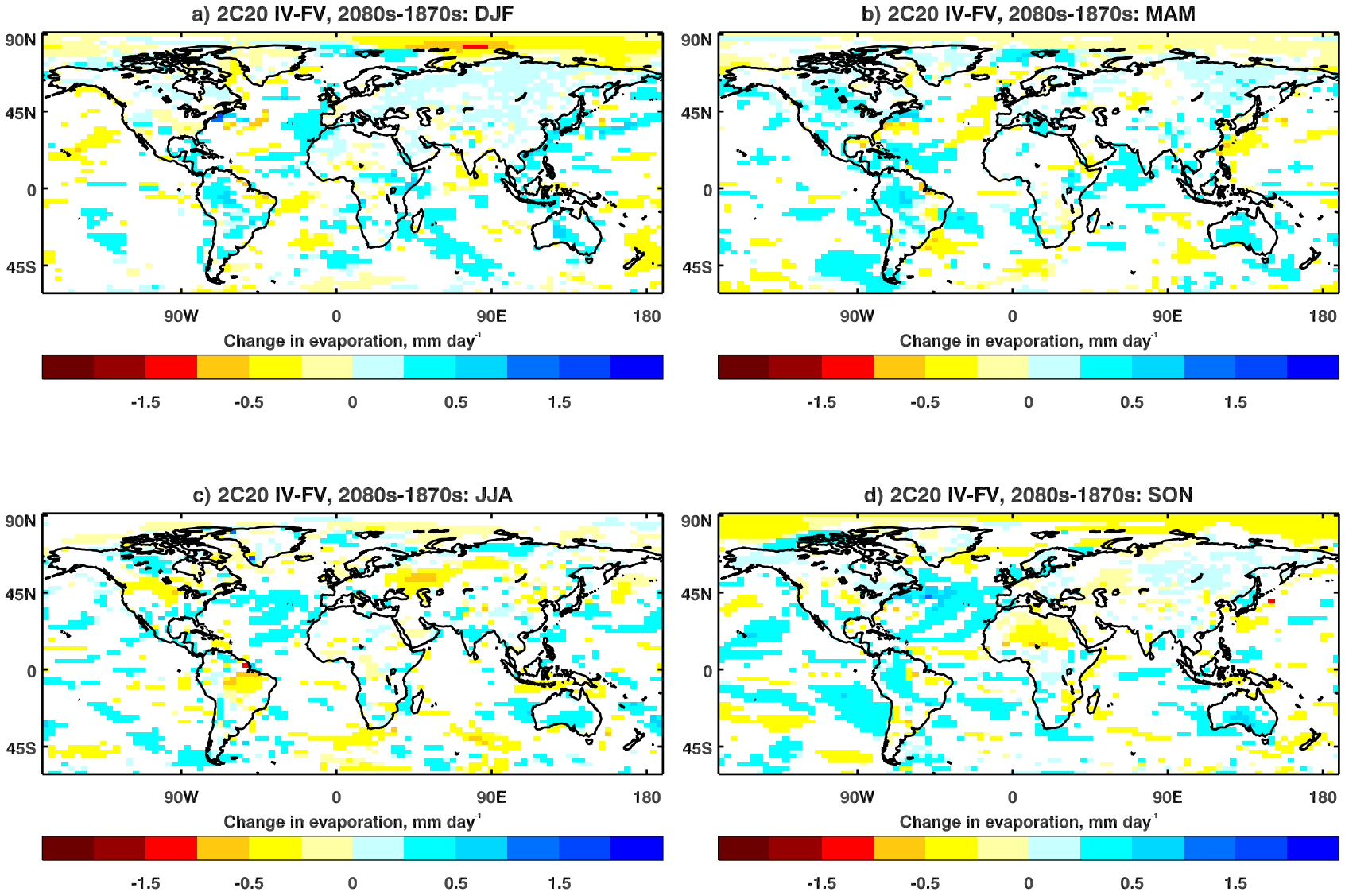

Figure S23: Change in thirty year seasonal mean evaporation in HadCM3C simulations (2080s-1860s) showing difference between 2C20 simulations with interactive and fixed vegetation, for a) December-February (DJF), b) March-May (MAM), c) June-August (JJA) and d) September-November (SON). Changes smaller than two standard deviations from the control simulation are masked out (white areas).