



Supplement of

The new plant functional diversity model JeDi-BACH (version 1.0) in the ICON Earth System Model (version 1.0)

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1. Figures S1 to S5

This document provides supplementary results for the comparisons of the CTRL simulation—discussed in Section 5.2—with different benchmarks. It specifically focuses on the global distributions of 2m air temperature, precipitation, evapotranspiration, biomass, and GPP.

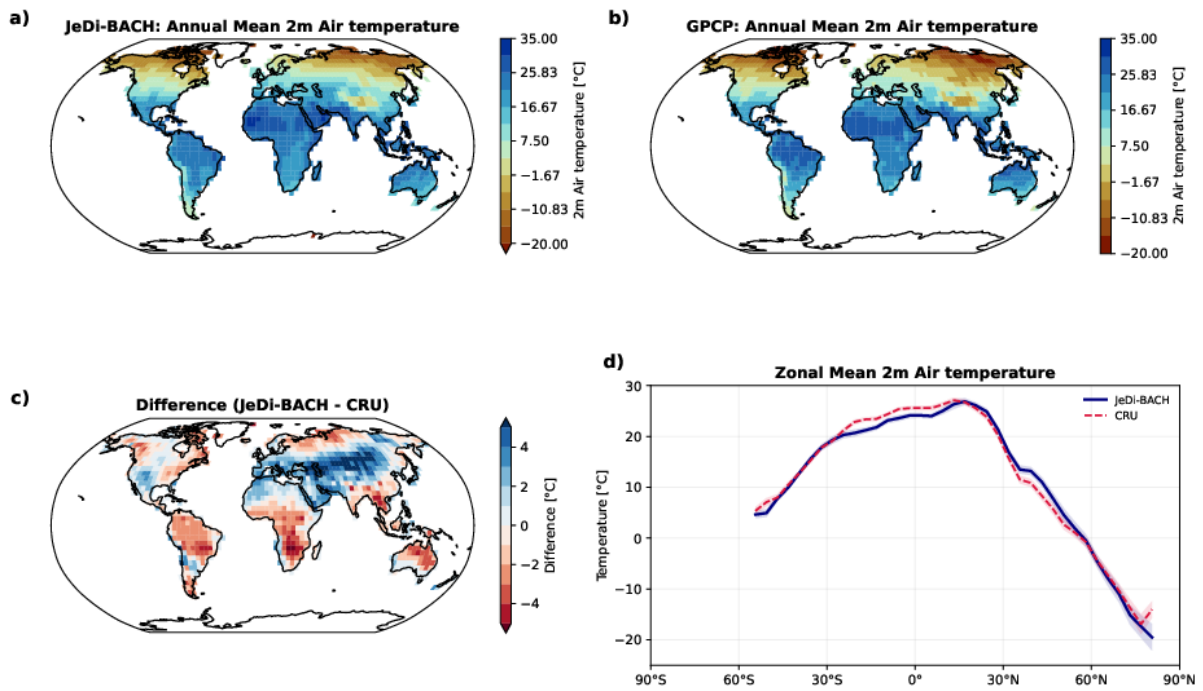


Figure S1 Annual mean 2-meter air temperature ($^{\circ}\text{C}$) for: (a) the CTRL simulation ($N=400$); (b) the CRU dataset (Harris et al. 2014); (c) the difference between the CTRL simulation and the CRU dataset; and (d) the zonal mean 2-meter air temperature. The shaded area represents the interannual variability (± 2 standard deviations from the mean).

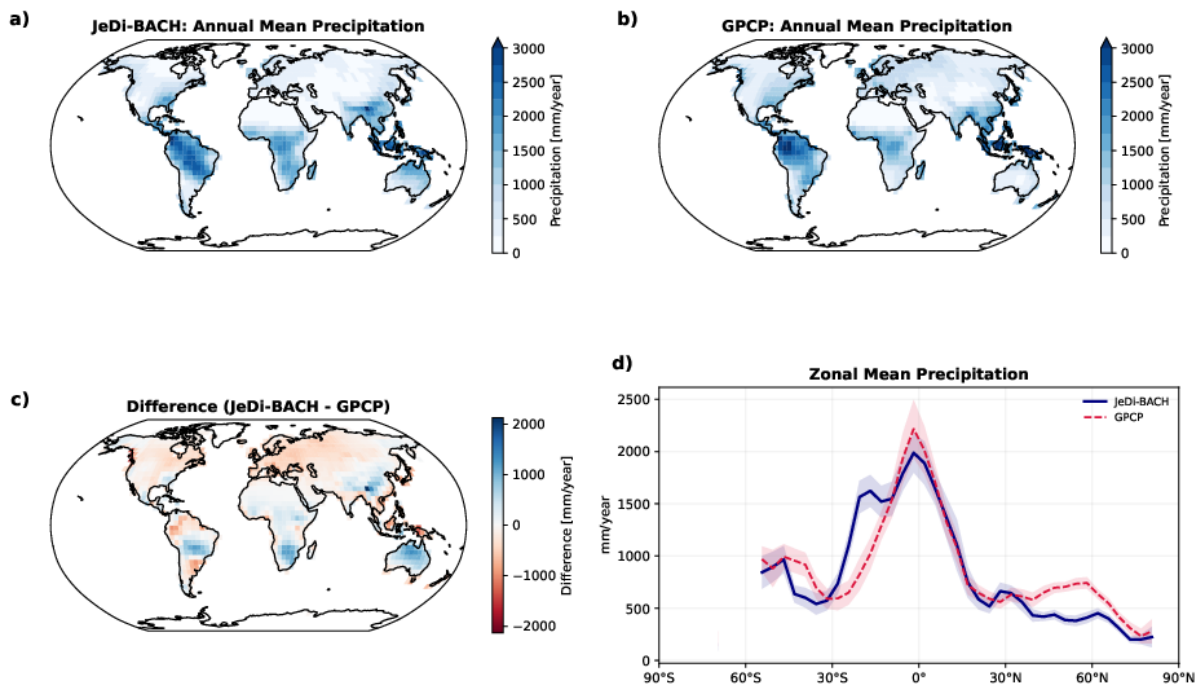


Figure S2 Annual mean precipitation (mm/year) for: (a) the CTRL simulation ($N=400$); (b) the GPCP dataset (Adler et al., 2018); (c) the difference between the CTRL simulation and the GPCP dataset; and (d) the zonal annual mean precipitation. The shaded area represents the interannual variability (± 2 standard deviations from the mean).

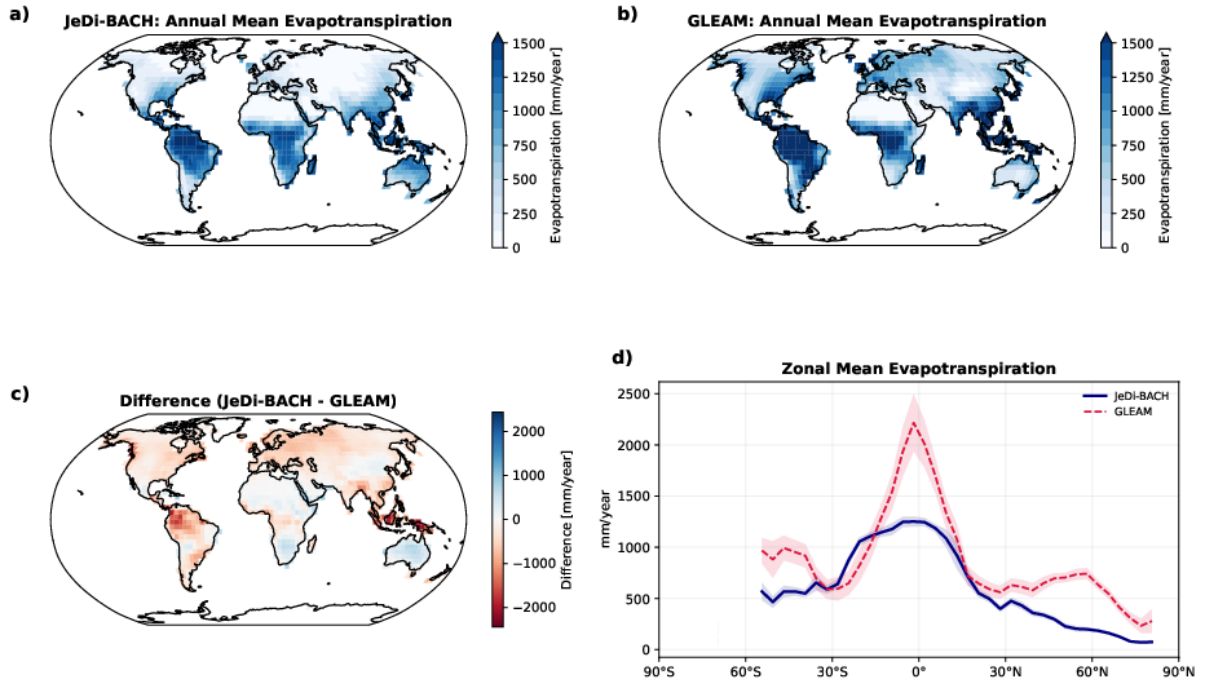


Figure S3 Annual mean evapotranspiration (mm/year) for: (a) the CTRL simulation (N=400); (b) the GLEAM dataset (Martens et al., 2017); (c) the difference between the CTRL simulation and the GLEAM dataset; and (d) the zonal annual mean precipitation. The shaded area represents the interannual variability (± 2 standard deviations from the mean).

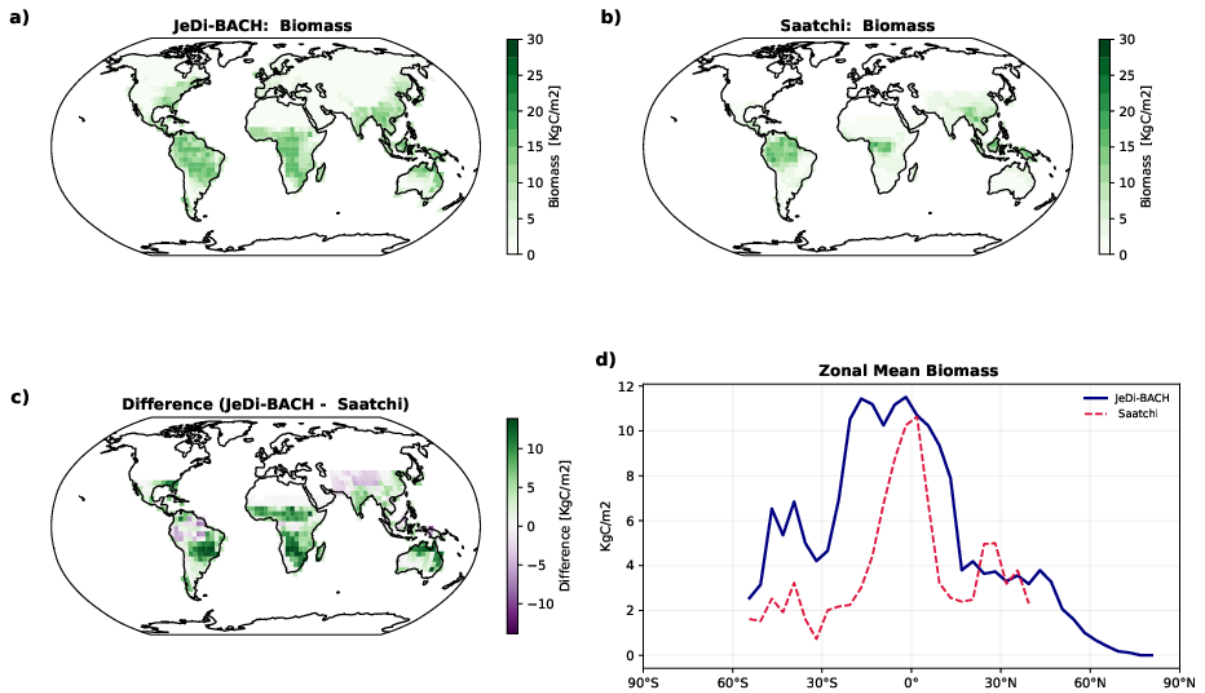


Figure S4 Biomass (kgC/m²) for: (a) the CTRL simulation (N=400); (b) the Saatchi dataset (Saatchi et al. 2011); (c) the difference between the CTRL simulation and the Saatchi dataset; and (d) the zonal mean biomass.

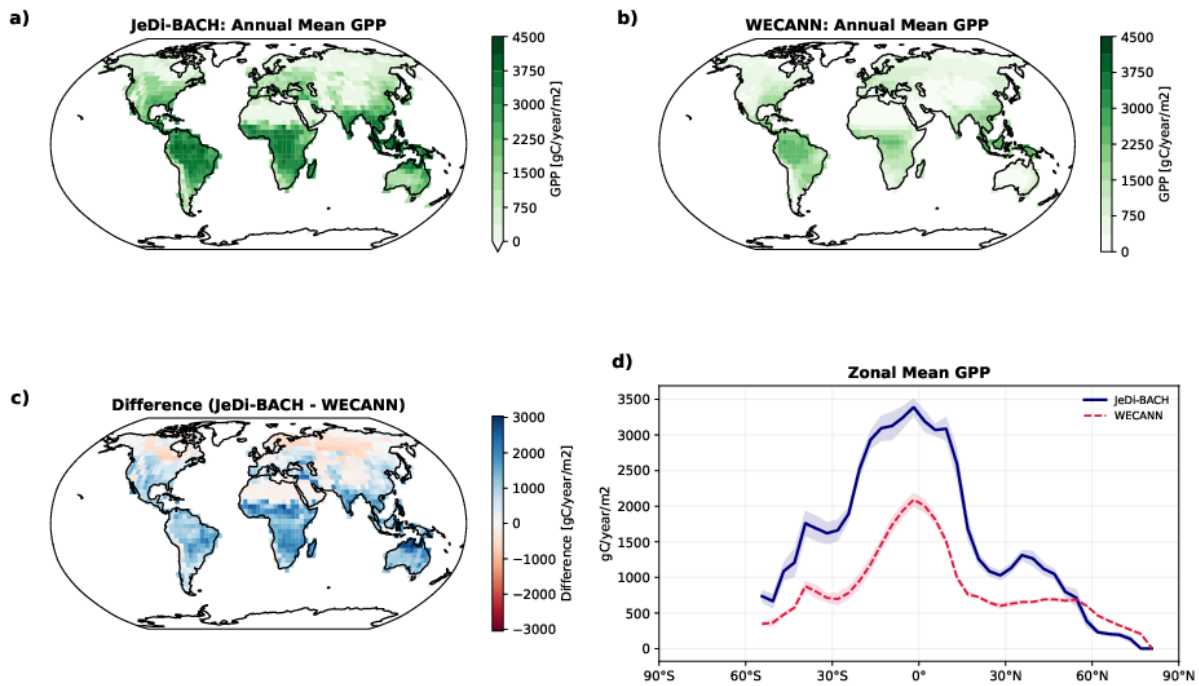


Figure S5 Annual mean GPP (gC/year/m²) for: (a) the CTRL simulation ($N=400$); (b) the WECANN dataset (Alemohammad et al. 2017); (c) the difference between the CTRL simulation and the WECANN dataset; and (d) the zonal mean GPP. The shaded area represents the interannual variability (± 2 standard deviations from the mean).

Literature

Harris, I.P.D.J., Jones, P.D., Osborn, T.J. and Lister, D.H., 2014. Updated high-resolution grids of monthly climatic observations—the CRU TS3. 10 Dataset. *International journal of climatology*, 34(3), pp.623-642.

Adler, R.F., Sapiano, M.R., Huffman, G.J., Wang, J.J., Gu, G., Bolvin, D., Chiu, L., Schneider, U., Becker, A., Nelkin, E. and Xie, P., 2018. The Global Precipitation Climatology Project (GPCP) monthly analysis (new version 2.3) and a review of 2017 global precipitation. *Atmosphere*, 9(4), p.138.

Martens, B., Miralles, D.G., Lievens, H., Van Der Schalie, R., De Jeu, R.A., Fernández-Prieto, D., Beck, H.E., Dorigo, W.A. and Verhoest, N.E., 2017. GLEAM v3: Satellite-based land evaporation and root-zone soil moisture. *Geoscientific Model Development*, 10(5), pp.1903-1925.

Saatchi, S.S., Harris, N.L., Brown, S., Lefsky, M., Mitchard, E.T., Salas, W., Zutta, B.R., Buermann, W., Lewis, S.L., Hagen, S. and Petrova, S., 2011. Benchmark map of forest carbon stocks in tropical regions across three continents. *Proceedings of the national academy of sciences*, 108(24), pp.9899-9904.

Alemohammad, S.H., Fang, B., Konings, A.G., Aires, F., Green, J.K., Kolassa, J., Miralles, D., Prigent, C. and Gentine, P., 2017. Water, Energy, and Carbon with Artificial Neural Networks (WECANN): a statistically based estimate of global surface turbulent fluxes and gross primary productivity using solar-induced fluorescence. *Biogeosciences*, 14(18), pp.4101-4124.