

## Supplementary material

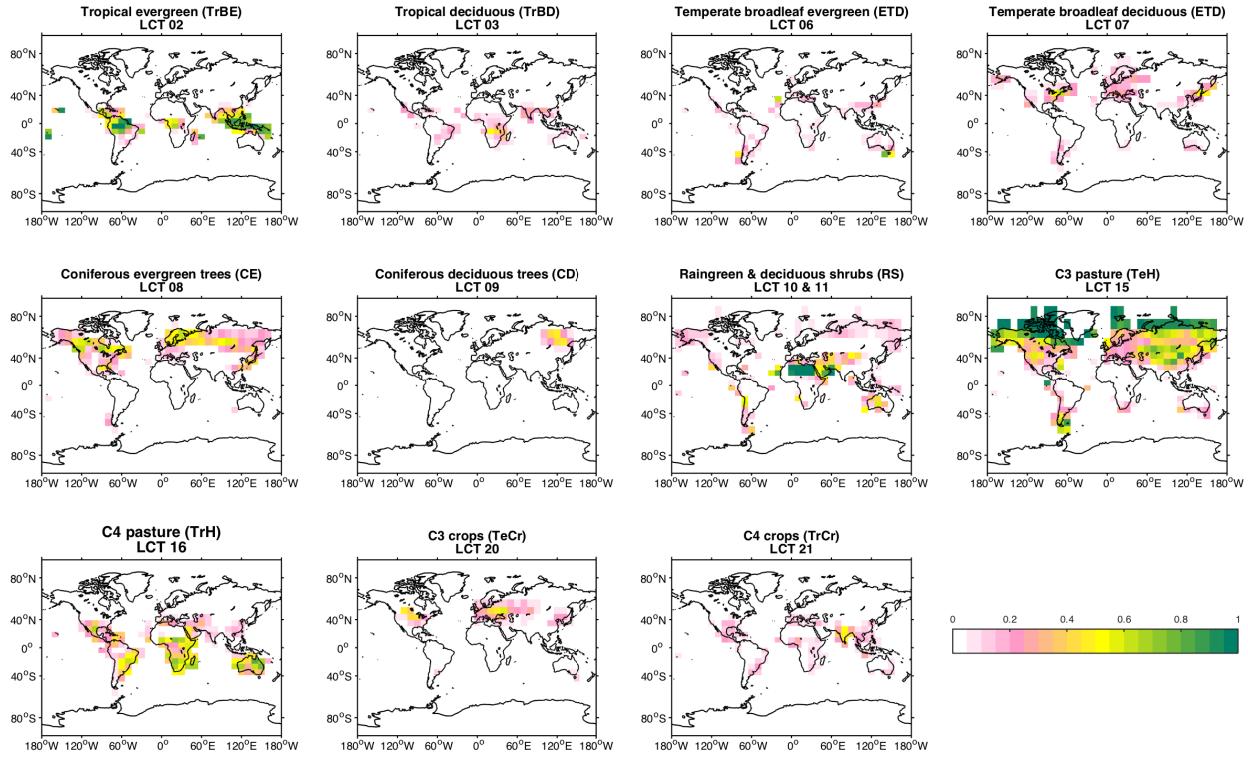


Figure S1 – Spatial distribution of the fraction on each pixel for the ten plant functional traits prescribed in the model: Tropical evergreen (TrBE) and deciduous (TrBD) trees; Extra-tropical deciduous and evergreen trees (ETD); Coniferous evergreen (CE) and deciduous (CD) trees; Rain-green shrubs (RS); C3 grasses (TeH) and crops (TeCr); C4 grasses (TrH) and crops (TrCr).

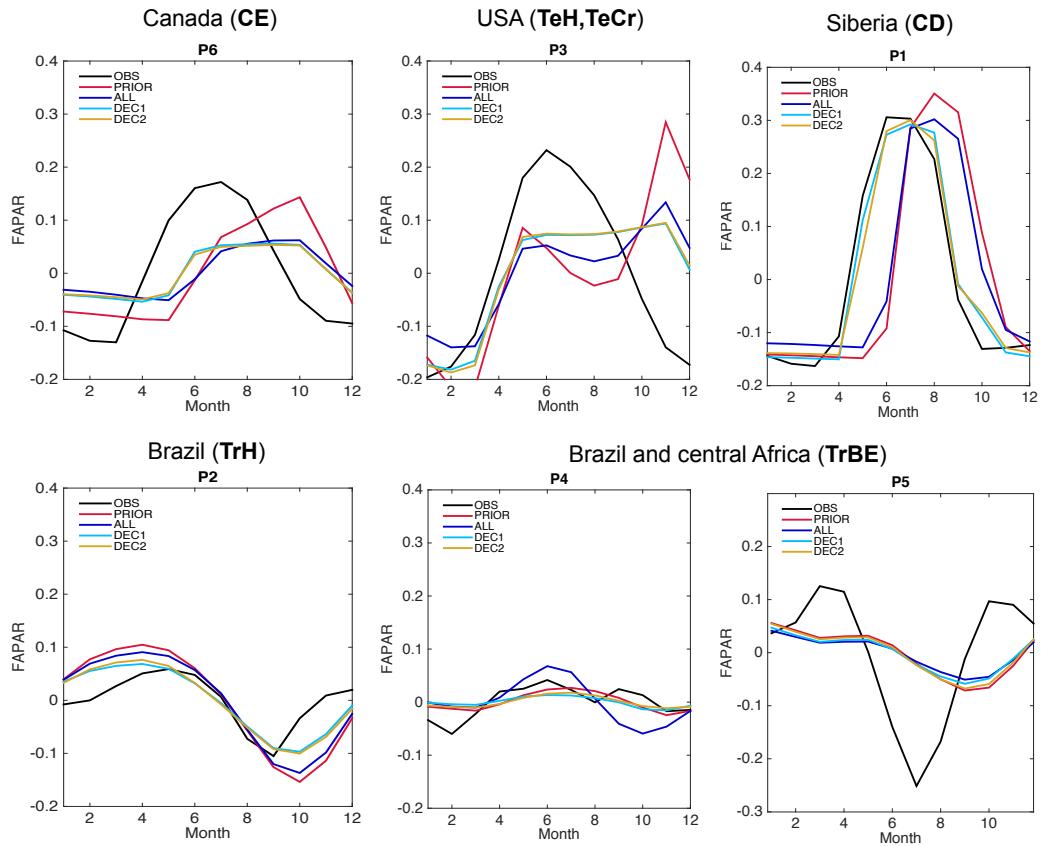


Figure S2 – Mean seasonal cycle of the FAPAR satellite observations and results from the PRIOR and posterior experiments in six globally distributed pixels.

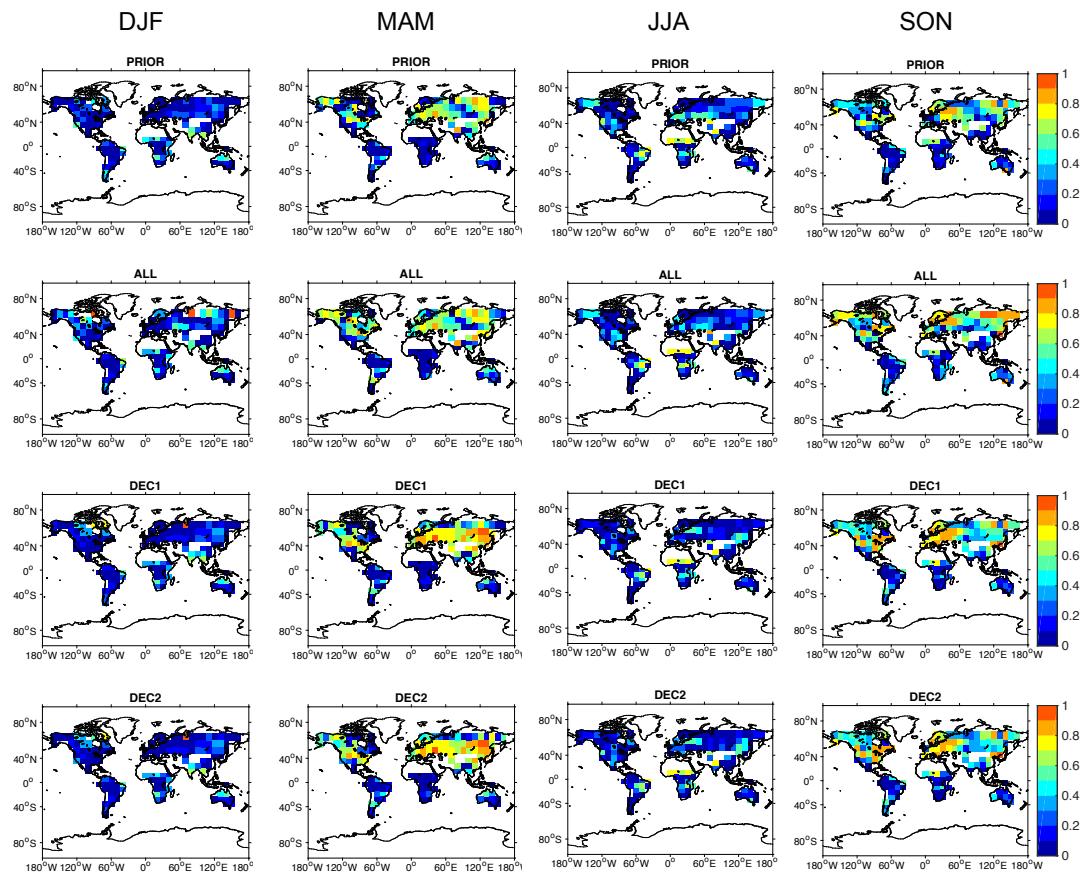


Figure S3 – Seasonal spatial distribution of  $R^2$  from the correlation between FAPAR from observations and from the model output for the period 1982-2006.

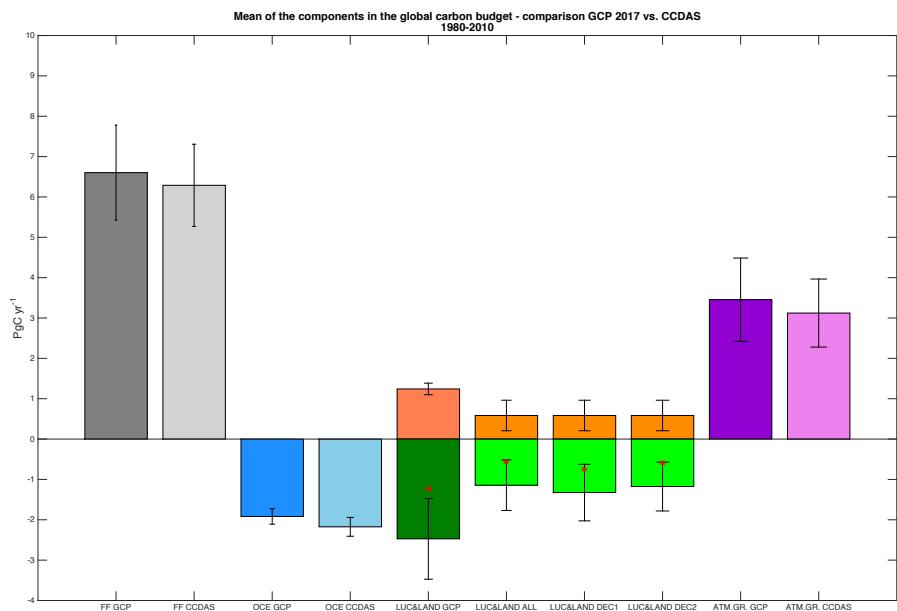


Figure S4 – Mean flux from the C cycle components for the period 1980-2010 from the GCP 2017 and the posterior experiments. Positive is C source to the atmosphere, negative is C sink: Fossil fuels (FF), Ocean (OCE), NEE and flux due to land use change (LUC&LAND) and model calculated atm. CO<sub>2</sub> growth and provided from GCP (ATM.GR.).

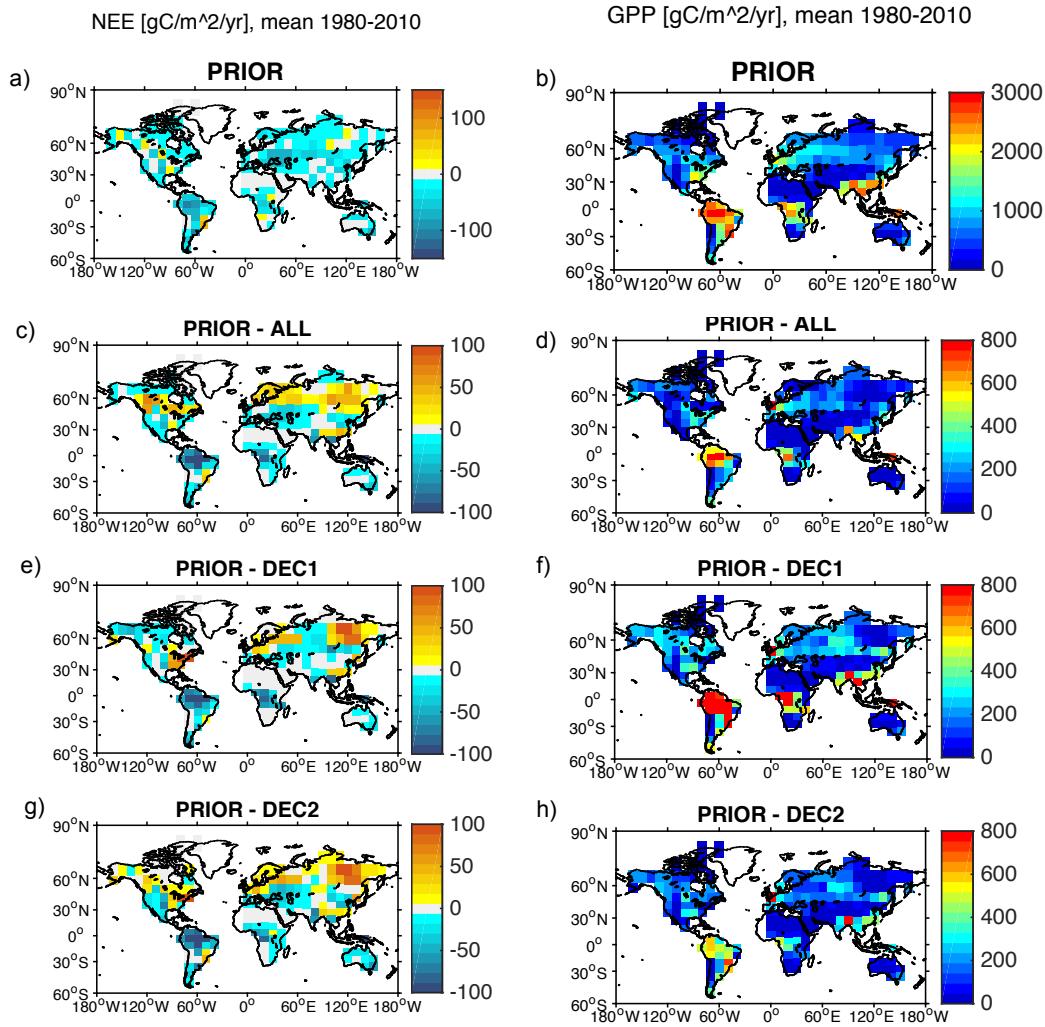


Figure S5 – Spatial distribution of the mean NEE and GPP (both in gC/m<sup>2</sup>/yr) for all the period of the simulation (1980-2010) for the PRIOR (a and b) and the difference to the PRIOR for the posterior experiments (c to h).