

## The importance of tree demography and root water uptake for modelling the carbon and water cycles of Amazonia

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### Supplementary material

#### A. Soil parameters

Table S1, Van genuchten parameters for the three dominant USDA soil class used to compute  $\Psi_s$  (Eq. 4).

Texture Class USDA	$k_{nv}$ (-)	$k_{av}$ (mm <sup>-1</sup> )	$\theta_r$ (m <sup>3</sup> m <sup>-3</sup> )	$\theta_s$ (m <sup>3</sup> m <sup>-3</sup> )	$G_{soil}$ (mm d <sup>-1</sup> )
6	1.56	0.0036	0.078	0.43	249.6
9	1.31	0.0019	0.095	0.41	62.4
12	1.09	0.0008	0.068	0.38	48.0

#### B. ORCHIDEE-CAN calibration for tropical forests

##### B.1 Parameterization

Parameter	Unit	Signification	Calibrated PFT2 values	References
$k_{cmaint}$	-	Fraction of allocatable photosynthates that is consumed for maintenance and growth respiration	0.2	[Ryan, 1991] [Sitch <i>et al.</i> , 2003]
$k_m$	m <sup>-1</sup>	Relaxation constant of intra-specific competition relationship	1.05	assumed
Nmax trees		Maximum number of trees per hectare	10000	assumed
$\kappa$	-	Recruitment parameter (Eq. 2)	0.15	assumed

**B2 Evaluation against regional gridded product**

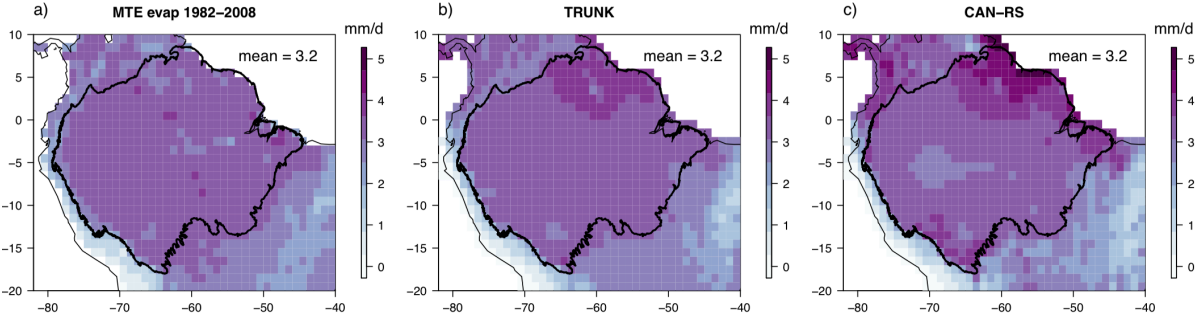


Fig. S4 Annual mean (1982-2008) ET simulated by TRUNK (b) and CAN-RS (c) compared to the FLUXCOM product (a) [Jung et al., 2011]

### C. Climate data

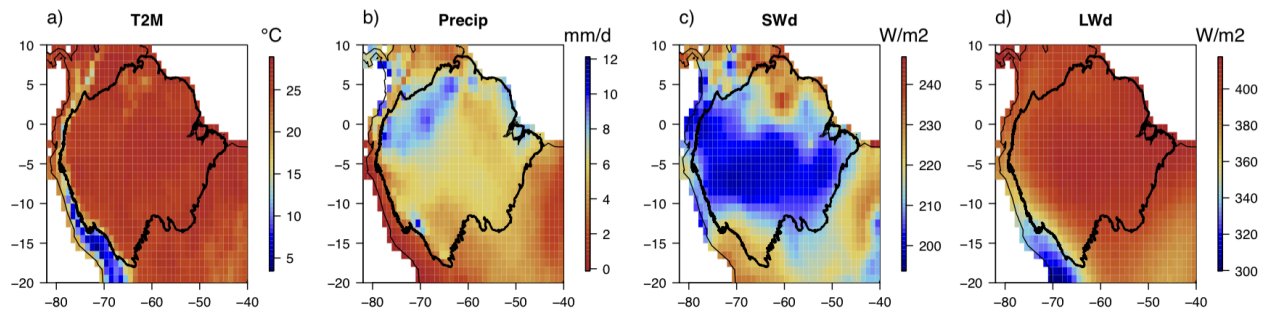


Fig. S2 Mean (1981-2016) climatology of temperature (a), precipitation (b), shot wave (c) and long wave (d) down from CRU-NCEP.

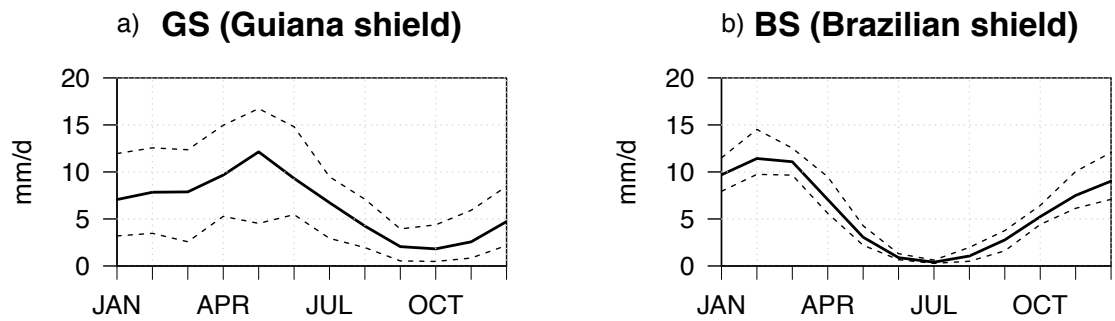


Fig. S3 Annual mean cycle of Precipitation in CRU-NCEP calculated for 1982-2013 and associated min and max envelopes over the Guiana (a) and Brazilian (b) shields.

## D. Simulated AGB NPP relationship

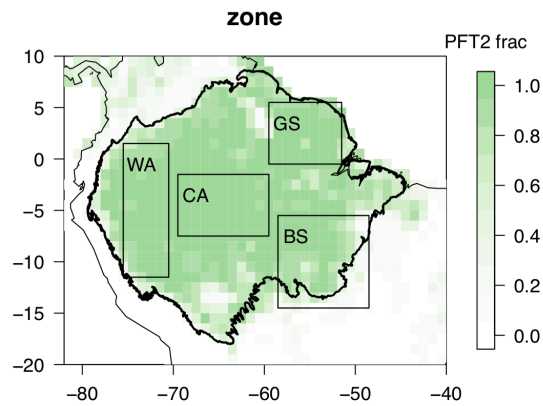


Fig. S4 Evergreen tropical plant functional type cover over the Amazon and zonal

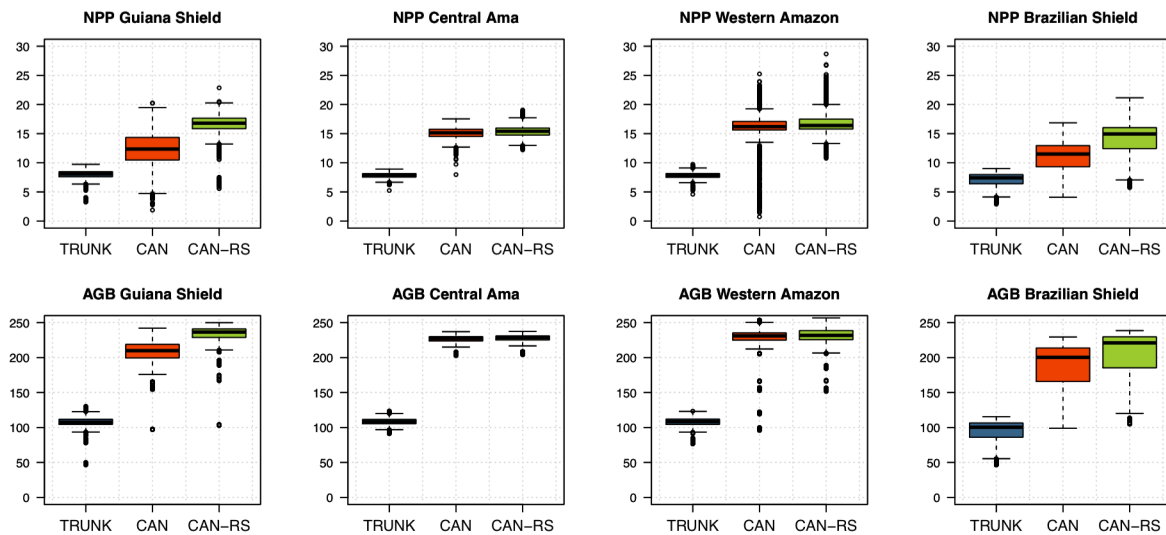


Fig. S5 Boxplot of yearly NPP and AGB over the 4 regions of the Amazon described in Fig. S4

## Bibliography

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