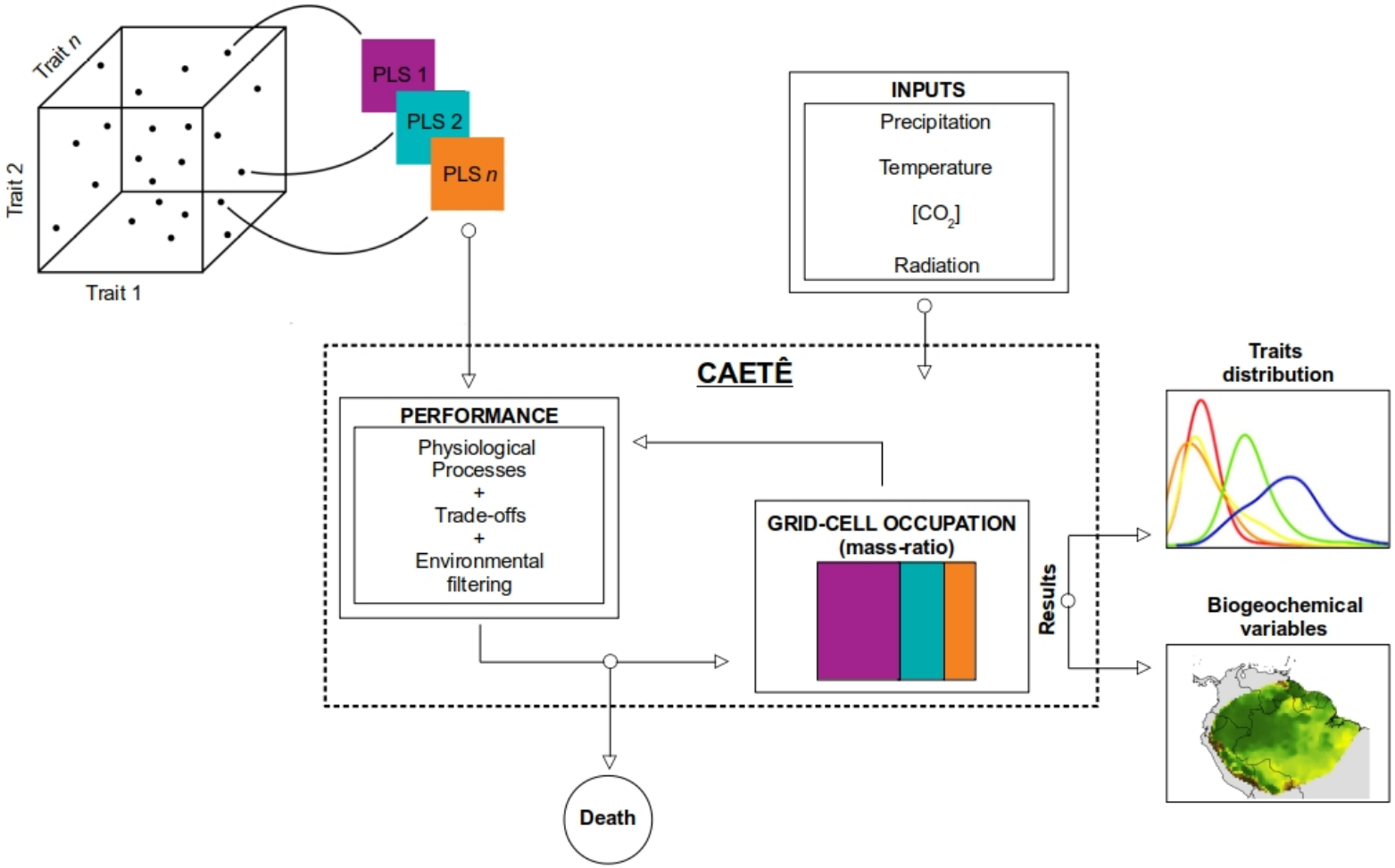

Fig. 1: Schematic diagram of CAETÊ in its trait-based model approach. From functional trait ranges the values are uniformly sampled and the combination of all creates a potential functional space. Each combination of trait values is a Plant Life Strategy (PLS) which will present a different performance, in terms of carbon balance, depending on the grid cell. From the potential functional space 3000 PLS are randonmly sampled. The environmental filtering, the trade-offs between the chosen functional traits and the physiological processes determine if a PLS survives (positive carbon balance) or dies. From the performance (its relative biomass in the grid-cell) of the PLSs the grid-cell is occupied as a mosaic. This modelling framework allow us to access the model results not only regarding to biogeochemical varibles but also in terms of trait distribution and functional diversity.

	Functional trait value					
	Allocation (%)			Residence time (years)		
	α_{Leaf}	α_{Abgw}	$\alpha_{Fineroots}$	τ_{Leaf}	τ_{Abgw}	$\tau_{Fineroots}$
Tropical evergreen tree	30	35	35	3	30	3
Tropical deciduous tree	35	35	30	2	30	2
Tropical grass	35	0	55	2	0	2

Table 1: Functional traits values for each Plant Functional Type (PFT) used in the PFT modelling approach. The values were chosen based on previous literature: Enquist & Niklas, 2002, Foley, 1996; Krinner et al., 2005; Kucharik et al., 2000; Malhi et al., 2009; Malhi, Doughty, Galbraith, 2011; Sitch et al., 2003. α: allocation; τ: residence time; Abgw: aboveground woody tissues

Functional trait range value					
Allocation (%)			Residence time		
α_{Leaf}	α_{Abgw}	$\alpha_{Fineroots}$	τ_{Leaf}	τ_{Abgw}	$\tau_{Fineroots}$
15 - 85	15 - 85	15 - 85	1 (m*) - 8 (y**)	1 (m) – 8 (y)	1(y) – 80 (y)

Table 2: Range of functional traits values from which values are sampled uniformly and its combinations create the different Plant Life Strategys (PLS). Used in the trait-based modelling approach. α: allocation; τ: residence time; Abgw: aboveground woody tissues; *months; **years

Functional trait	Approach	Climate scenario	Distribution dissimilarity	Richness	Change (%)	Evenness	Change (%)	Divergence	Change (%)
α_{Leaf}	TB	Reg. clim.	0.68	0.376	15.15	0.118	114.41	0.083	207.22
		Low prec.		0.433		0.253		0.255	
	PFT	Reg. clim.	0.733	0.426	0.47	0.11	-57.27	0.142	-5.63
		Low prec.		0.428		0.047		0.134	
α_{Abgw}	TB	Reg. clim.	0.638	0.381	24.69	0.114	254.78	0.972	-19.68
		Low prec.		0.475		0.405		0.781	
	PFT	Reg. clim.	0.481	0.303	8.31	0.139	30.97	0.893	11.19
		Low prec.		0.328		0.181		0.993	
$\alpha_{Fineroots}$	TB	Reg. clim.	0.656	0.566	19.33	0.113	276.54	0.976	-26.01
		Low prec.		0.675		0.426		0.722	
	PFT	Reg. clim.	0.896	0.561	4.94	0.231	-74.71	0.991	0.15
		Low prec.		0.588		0.058		0.993	
τ_{Leaf}	TB	Reg. clim.	0.678	5.532	6.95	0.147	225.55	0.974	-65.73
		Low prec.		5.917		0.478		0.588	
	PFT	Reg. clim.	0.694	5.574	0.85	0.142	-53.74	0.942	4.61
		Low prec.		5.621		0.066		0.986	
τ_{Abgw}	TB	Reg. clim.	0.755	32.816	26.97	0.102	144.66	0.614	-4.81
		Low prec.		41.666		0.251		0.585	
	PFT	Reg. clim.	0.466	29.767	-12.52	0.155	33.95	0.847	-19.54
		Low prec.		26.041		0.208		0.682	
$\tau_{Fineroots}$	TB	Reg. clim.	0.664	6.82	20.19	0.152	176.56	0.967	-34.02
		Low prec.		8.198		0.421		0.638	
	PFT	Reg. clim.	0.708	7.813	1.26	0.146	-61.19	0.944	5.08
		Low prec.		7.911		0.0567		0.992	

Table 3: Functional diversity results regarding to the six functional traits with the application of a 50% reduction on precipitation for the Amazon basin. The results are shown for the two modelling approaches used: the PFT approach (low functional diversity) and the Trait-based (high functional diversity). α: allocation; τ: residence time; TB: trait-based; Abgw: aboveground woody tissues; Reg. clim.: regular climate; Low prec.: low precipitation.

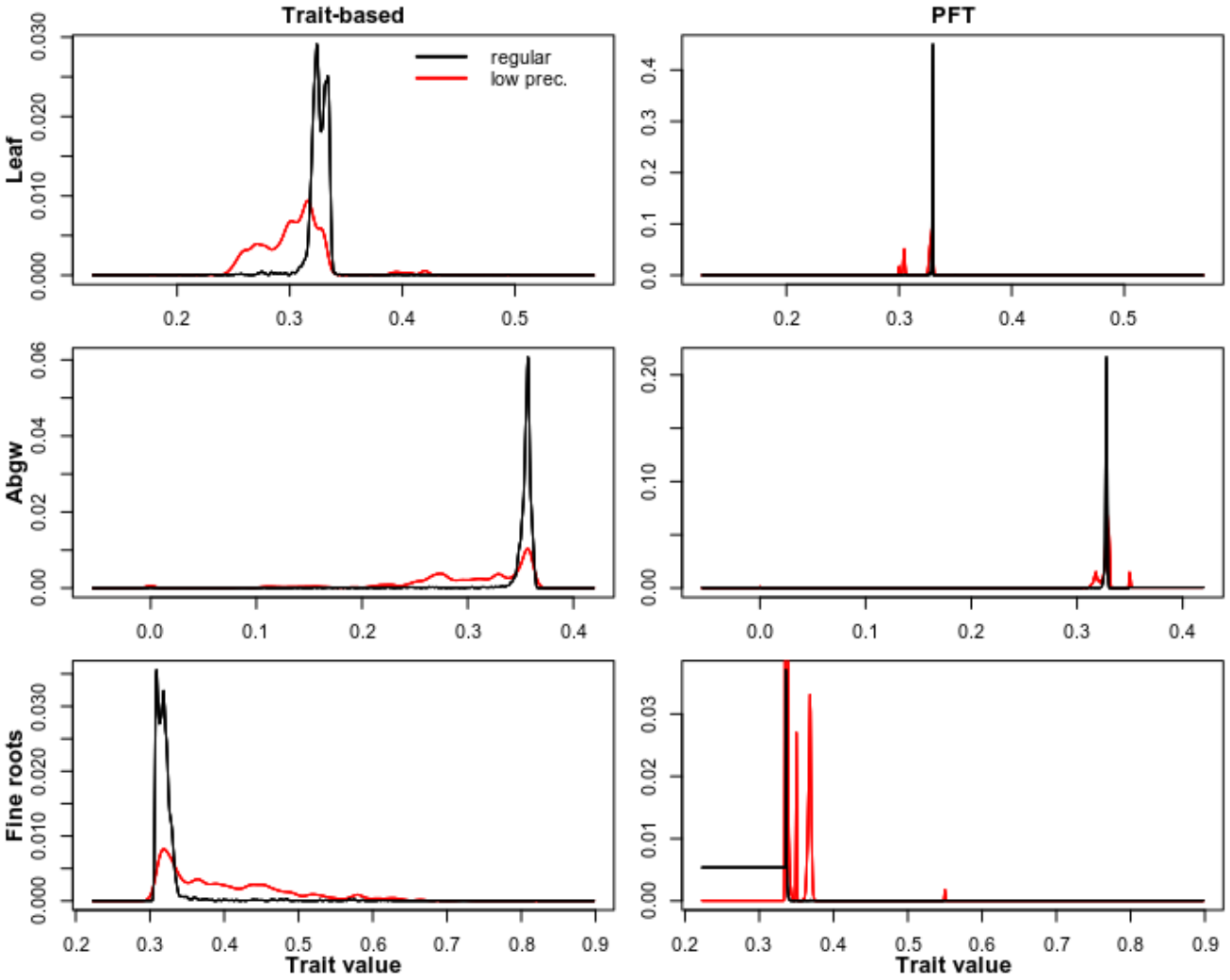

Fig. 2 Density distributions of allocation traits using the Trait probability densities method (TPD; Carmona et al., 2016). The curves corresponds to the density of traits values across the Amazon basin. The red lines represent the results with the applied low precipitation scenario (low prec. in the graph) and the black ones represent the results concerning to the regular conditions of climate (regular in the graph). The left side of the figure show the results regarding to the employed traid-based (high functional diversity) modelling approach, while the right side presents the results obtained with the PFT (Plant Functional Type; low functional diversity) modelling approach. Since the figure corresponds to the allocation traits the unit of the Trait values is in percentages. Abgw: aboveground woody tissues.

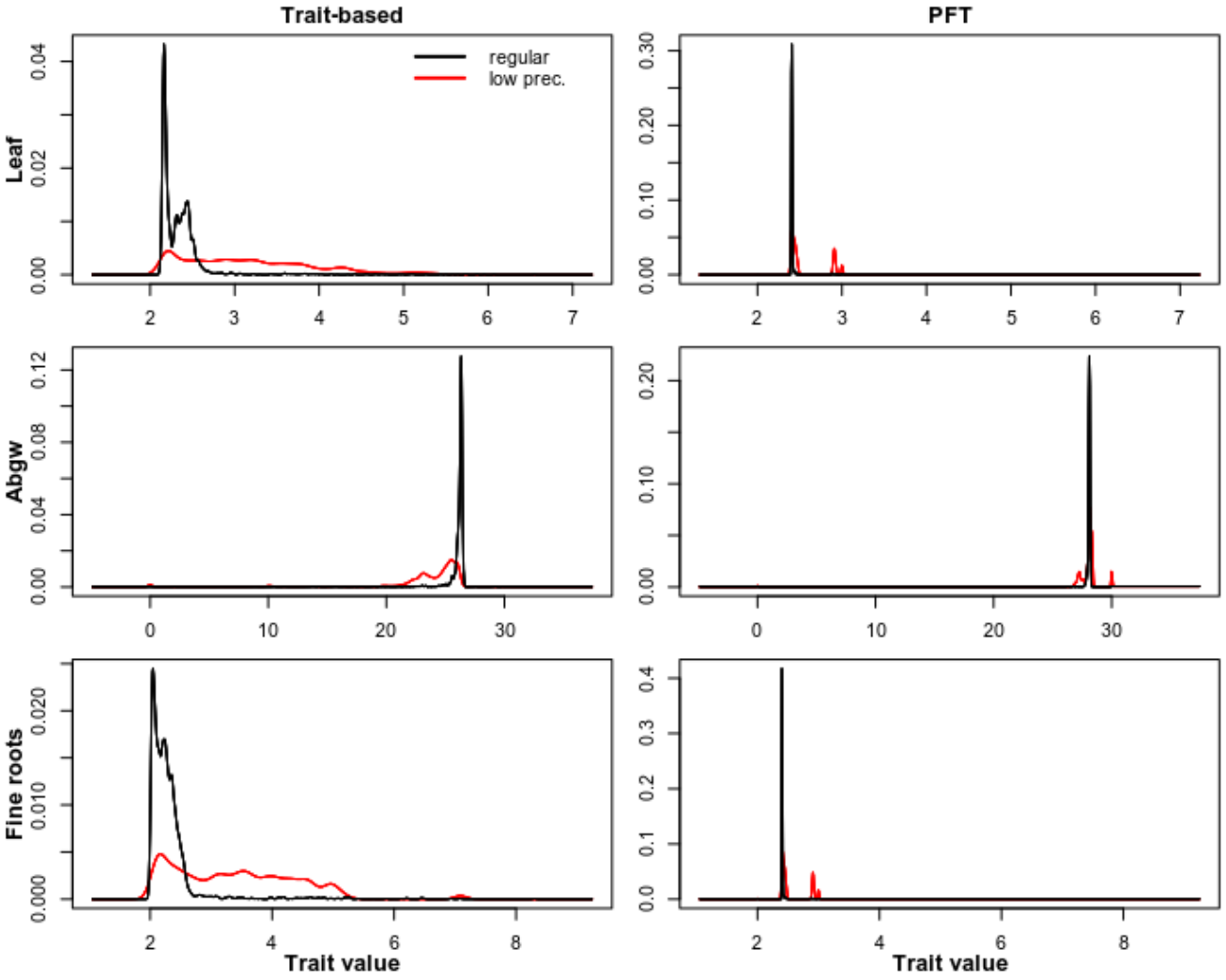

Fig. 3 Density distributions of residence time traits using the Trait probability densities method (TPD; Carmona et al., 2016). The curves corresponds to the density of traits values across the Amazon basin. The red lines represent the results with the applied low precipitation scenario (low prec. in the graph) and the black ones represent the results concerning to the regular conditions of climate (regular in the graph). The left side of the figure show the results regarding to the employed traid-based (high functional diversity) modelling approach, while the right side presents the results obtained with the PFT (Plant Functional Type; low functional diversity) modelling approach. Since the figure corresponds to the residence time traits the unit of the Trait values is in percentages. Abgw: aboveground woody tissues.

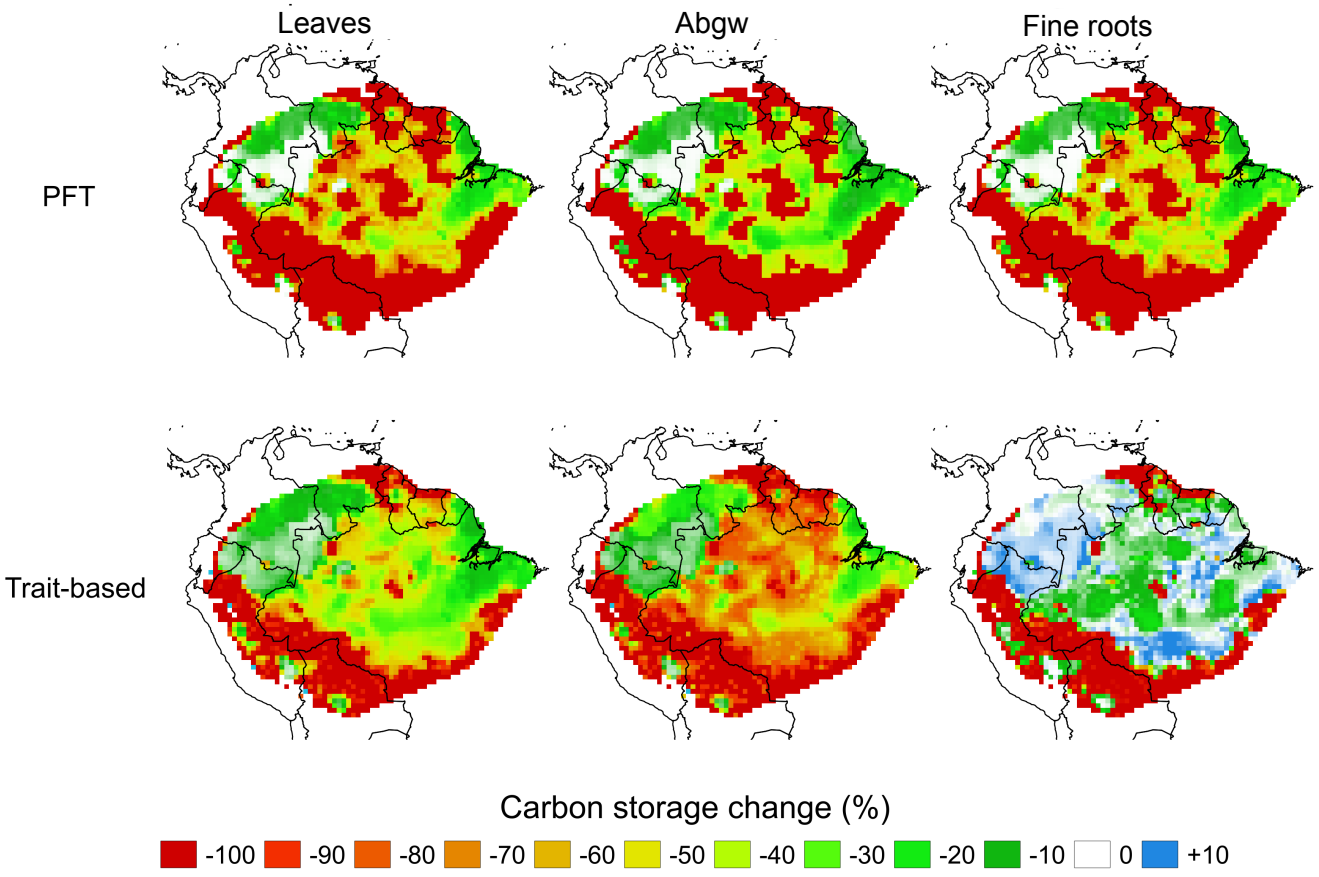

Fig. 4 Change on carbon storage in the Amazon basin with the reduced precipitation scenario (-50%). This figure presents the change on carbon storage for the three considered plant compartments in the the two employed modelling approaches: Trait-based (high functional diversity) and PFT (Plant functional type; low functional diversity). Abgw: abobeground woody tissues.

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