High organic inputs explain shallow and deep SOC storage in a long-term agroforestry system – Combining experimental and modeling approaches.

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Table S1. Comparison of predictions with the two pools model with or without priming effect (*PE*), and with the three pools model.

		All soil profile			Topsoil (0-1 m)			Subsoil (1-2 m)		
		2 pools - without *PE*	2 pools - with *PE*	3 pools	2 pools - without *PE*	2 pools - with *PE*	3 pools	2 pools - without *PE*	2 pools - with *PE*	3 pools
Control	RMSE	1.05	0.41	1.04	1.20	0.43	1.25	0.87	0.42	0.79
	BIC	4.40	-2.67	7.37	3.58	-0.17	5.86	2.21	-0.24	3.85
	R^2	0.34	0.90	0.35	0.42	0.86	0.39	0.00	0.97	0.04
	a	1.00	0.99	0.99	0.95	0.98	0.95	1.06	1.01	1.05
Tree row	RMSE	1.00	0.65	0.99	1.15	0.67	1.19	0.82	0.40	0.73
	BIC	4.01	1.31	6.90	3.41	1.72	5.65	1.94	-0.48	3.53
	R^2	0.93	0.97	0.93	0.92	0.96	0.92	0.42	0.55	0.42
	a	1.02	1.01	1.01	1.00	1.01	0.99	1.07	1.01	1.05
Alley	RMSE	1.07	0.95	1.10	1.42	1.29	1.47	0.55	0.37	0.51
	BIC	4.61	4.52	7.81	4.31	4.59	6.55	0.17	-0.86	1.99
	R^2	0.60	0.71	0.61	0.39	0.41	0.38	0.57	0.93	0.58
	a	0.97	0.96	0.96	0.94	0.96	0.94	1.02	0.97	1.00

RMSE is the root mean square error (kg C m^{-3}), BIC is the Bayesian information criterion, R^2 is the coefficient determination of the regression between modeled and observed SOC stocks, and *a* is the slope of this regression.

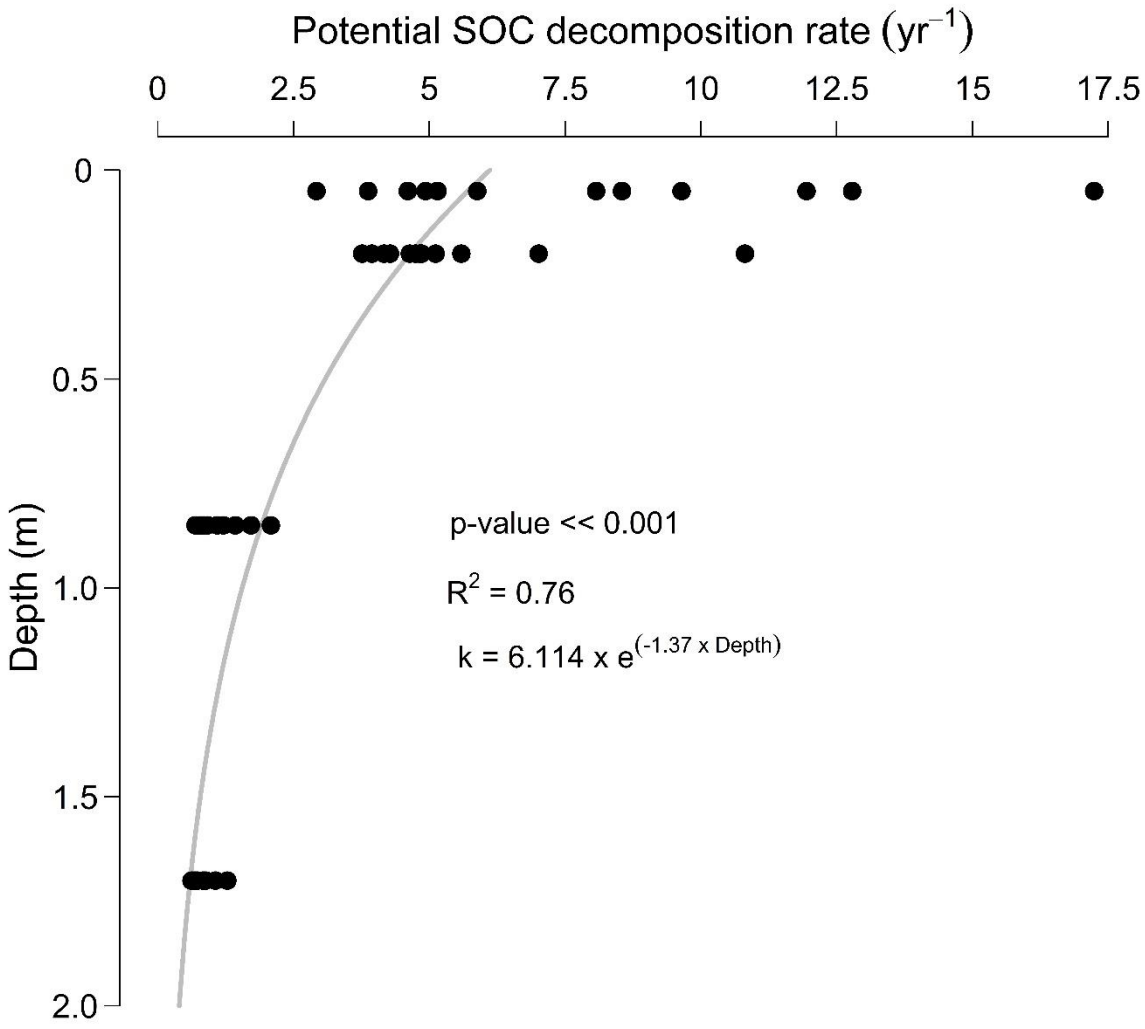

Fig. S1. Potential soil organic carbon (SOC) decomposition rate as a function of soil depth. For a given depth, four samples came from the control plot, the alley and the tree row.

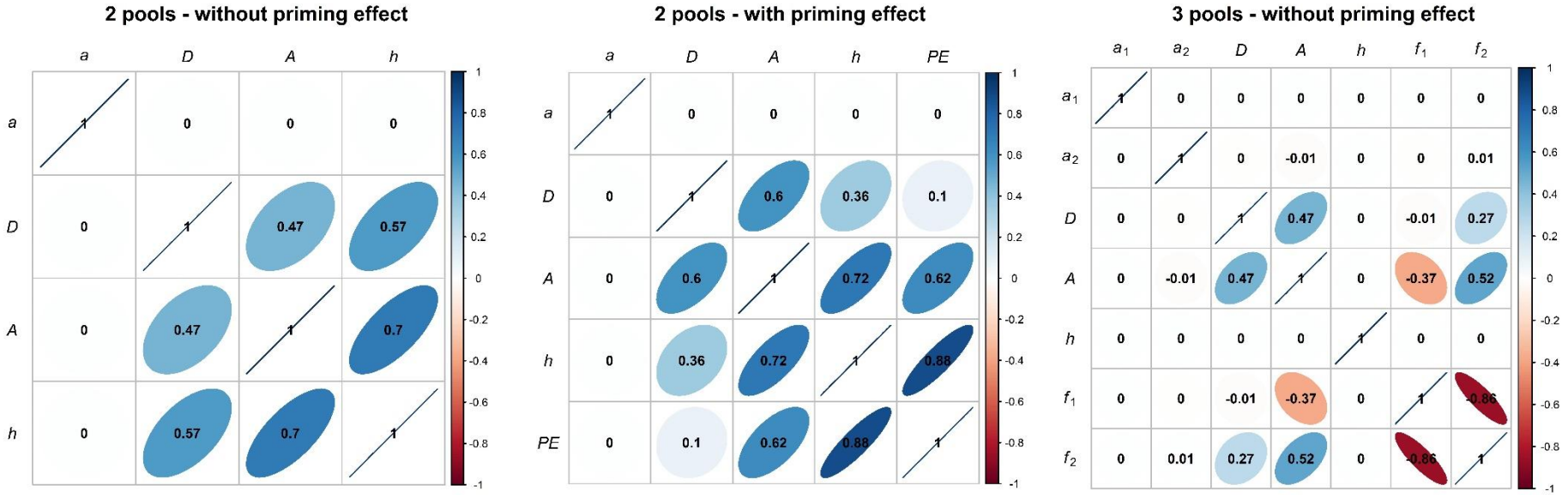

Fig. S2. Correlation matrix of optimized parameters. For the two pools model, *a* is the coefficient from the Eq. (8) for the HSOC decomposition rate, *h* is the humification yield, and *PE* is the priming coefficient. For the tree pools model, a_1 and a_2 are the coefficients from the Eq. (8) for the HSOC1 and HSOC2 decomposition rates, f_1 is the fraction of decomposed FOC entering the HSOC1 pool, and f_2 is the fraction of decomposed HSOC1 entering the FOC pool. For both models, *D* is the diffusion coefficient ($cm^2\ yr^{-1}$) and *A* is the advection rate ($mm\ yr^{-1}$).

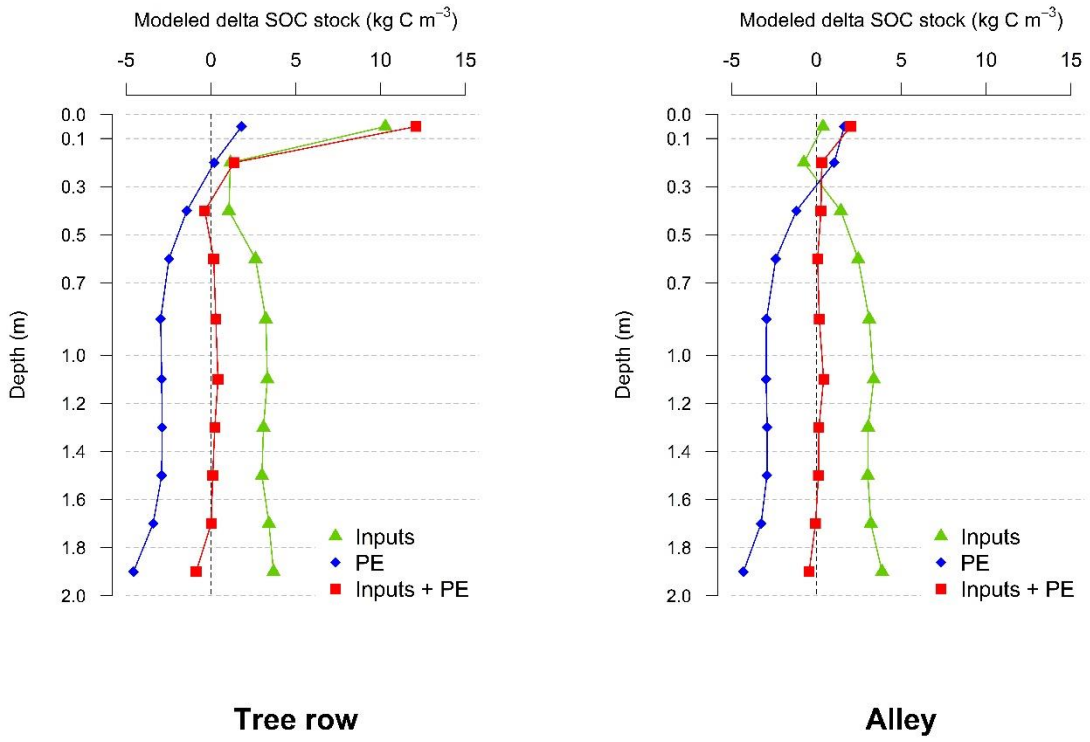

Fig. S3. Decoupling the role of C inputs and priming effect (*PE*) on SOC storage in an 18-year-old silvoarable system as a function of soil depth. Inputs: only the input effect is modeled; *PE*: only the priming effect is modeled; Inputs + *PE*: model prediction with both processes taken into account.

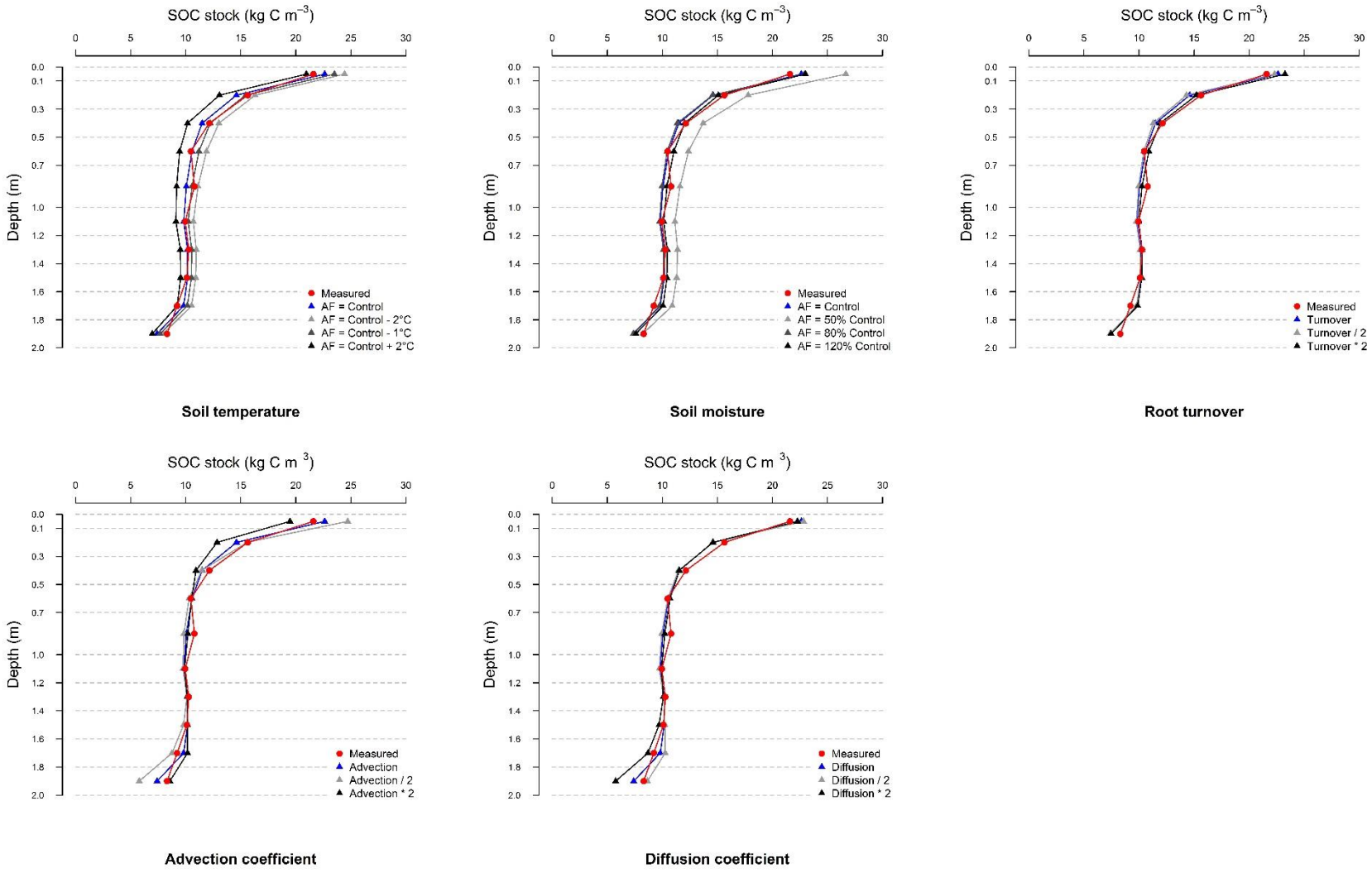

Fig. S4. Sensitivity analysis of the model concerning soil temperature, soil moisture, tree root turnover, advection and diffusion coefficients. This analysis was performed using the two pools model with priming effect, using the tree row SOC stocks.