AI4SoilHealth

Estimate management impacts to soil carbon turnover

D4.4

Version 1.3

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HISTORY OF CHANGES		
Version	**Publication date**	**Changes**
1.0	15.09.2025	• Initial version
1.1	04.10.2025	Minor structural edits after comments project coordinator
1.2	25.11.2025	Integrated comments from two internal reviewers
1.3	02.12.2025	Final edits to lay-out and title page

Summary

The rhizosphere priming effect (RPE) is a plant-soil interaction that affects microbial decomposition of soil organic matter. Our limited understanding of this process adds uncertainty to estimates of soil carbon losses in cropland. We deliver a first pan-European spatially and depth-explicit estimate of absolute RPE-induced cropland carbon losses, as well as estimates of the contribution of RPE to soil heterotrophic respiration (Rh). We modified a broad-scale spatial model (PrimeSCale) to observation-based cropland data for heterotrophic respiration (Rh) and gross primary production (GPP) from literature and soil organic carbon (SOC) and bulk density from the AI4SoilHealth Soil Health DataCube (D5.2). We present mean annual estimates for European arable crops, for 2010–2020, including Monte-Carlo uncertainty analyses. We estimate RPE-induced carbon losses from European arable croplands up to 8.8 Mt C yr^{-1} (or 0.008 Gt C yr^{-1}, sum across all depth layers), representing ~ 3% of SOC-derived total Rh. Consistent with observed decreases with depth in Rh, root respiration, and SOC, we estimate the highest RPE in the top (0 - 10 cm) soil layer (10 ± 13 g C m^{-2} yr^{-1} mean ± SD, equivalent to 100 kg C ha^{-1} yr^{-1}), which represents ~ 5% of total top soil SOC-derived Rh. RPE declines with soil depth to less than 0.07% of the Rh in the 100 - 200 cm depth layer. Hotspots of RPE (up to ~ 25 g C m^{-2} yr^{-1}) are noted in high crop-productivity regions.

The modified PrimeSCale model allows users to assess the impacts of management practices leading to changes in rooting depth and plant-root carbon input. Different rooting depth scenarios can be created by reallocation of root carbon inputs towards deeper layers. Preliminary results show modest changes in total RPE but a shift to more respiration from deeper soil layers when more roots are present in deeper layers of cropland soil. Inversely, applying projected future GPP (year 2070-2099, RCP8.5) indicates strengthened near-surface RPE, with the RPE share of Rh, in the 0–10 cm layer, reaching up to 27±36 g C m^{-2} yr^{-1}, representing up to 14% of the SOC-derived Rh. The total RPE-induced SOC loss using future GPP is estimated at around 24.5 Mt C yr^{-1}, or 0.024 Gt C yr^{-1}, representing up to 8.5% of the total Rh. Additionally, we created a user-friendly single-grid-cell version of the model for educational purposes or to quickly assess the potential effect of the introduction of a perennial crop in a rotation. Lastly, we observed a cropland-specific mismatch between broad spatial scale Rh input data and relative RPE-contribution as estimated from experiments with isotopically labelled plants: while crop-residue respiration is included in broad spatial scale Rh-estimates, it is systematically ignored in pot experiments. We provide a method to estimate the RPE with and without crop residue respiration to illustrate this data gap. The estimates presented in this deliverable are based on Rh without residue respiration to avoid overestimating the impact of the RPE.

Together, these outputs give insight into the potential contribution of the RPE to Rh from European arable cropping systems and illustrate how management decisions might affect RPE-induced changes in carbon turnover. Source data, code, and model outputs are publicly available on Zenodo and GitHub.

General Introduction

Soil carbon exchanges with the atmosphere are central to understanding soil-carbon turnover. Among the fluxes involved, the rhizosphere priming effect (RPE) is a modification in the mineralisation of native soil organic matter by microorganisms caused by the addition of fresh organic matter, notably via root exudates. This mechanism is particularly susceptible to arising in croplands than in other environments (Wang and Kuzyakov, 2024). However, the RPE remains overlooked in broad-scale soil carbon losses in croplands assessments.

Plot-scale studies demonstrate that RPE can measurably increase heterotrophic respiration (Rh), and croplands represent the environment with the greatest potential to produce RPE. Yet, no spatially and depth-explicit estimate exists for agricultural land, and only one such assessment has been produced for natural ecosystems (Keuper et al., 2020). Within the AI4SoilHealth framework, we address this gap by delivering the first pan-European, depth-resolved estimate of RPE for croplands, with associated uncertainty, using a modified version of the PrimeScale model (Keuper et al., 2020).

We integrate observation-based inputs with Soil Health Data Cube layers to quantify how RPE contributes to SOC turnover in European croplands.

We provide

1. Spatial and depth-explicit RPE estimates for European croplands (0 to 200 cm).
2. Integration of maps observations-based from the Soil Health Data Cube.
3. Sensitivity of the RPE estimates to the inclusion of residue respiration in Rh.
4. A user-friendly Excel module to assess the impacts of carbon allocation by croptype on the magnitude and depth profile of RPE at single grid cell / location scale.
5. Rooting management: deeper-rooting variants with weighted distributions towards deeper layers (up to +200%).
6. Estimates of future root-C inputs based on projected GPP estimates for the year 2070-2099, under RCP8.5, and their potential impact on the depth distribution of the RPE.

All source data references, code, and model outputs are publicly available on Zenodo and GitHub. This deliverable provides a practical baseline for the spatial heterogeneity of potential RPE in European croplands and illustrates how management and crop productivity under a future climate may reshape SOC turnover via priming.

Method - PrimeSCale for European Croplands

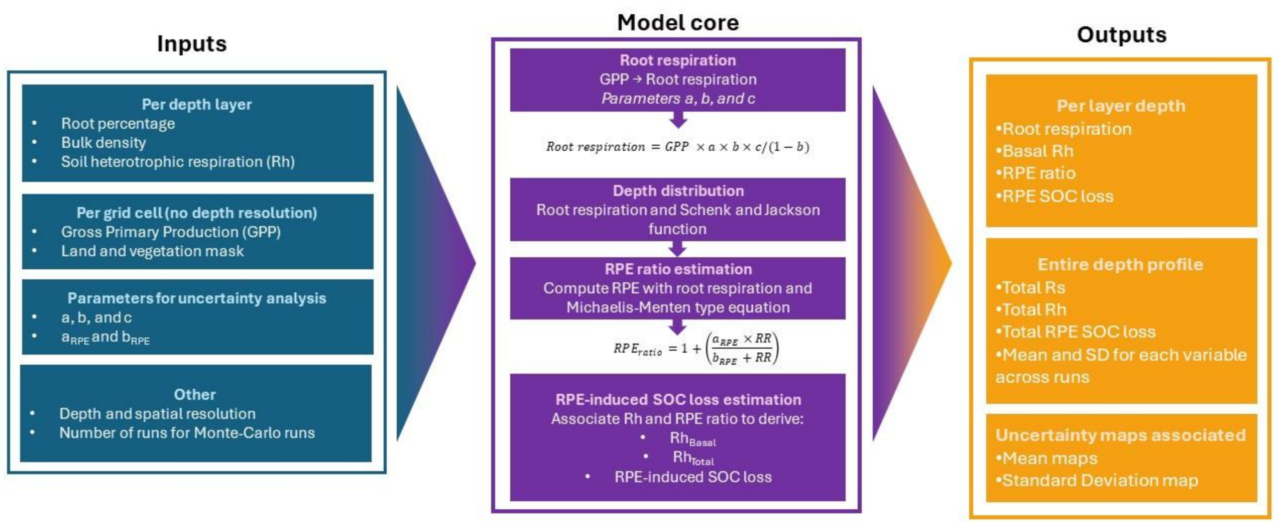
Our modified PrimeSCale model estimates the **rhizosphere priming effect (RPE)** and related carbon fluxes for **European croplands** on a **1 km grid** and **five soil depth layers** (0–10, 10–30, 30–60, 60–100, 100–200 cm). The code base is written in **R** and organized as an R Markdown workflow. This report summarizes what the `PrimeSCale_model.Rmd` does and how it produces the main outputs, in a form suitable for a project deliverable.

Scope of this document

- Provide a concise, implementation-focused description of the model workflow.
- Clarify required inputs, key computations (per step), uncertainty treatment, and outputs.
- Describe file naming and output organization for downstream use.

1. Model overview

Model flowchart that represents inputs, model core functions and the related outputs:



PrimeSCale transforms daily GPP and depth-resolved soil inputs into RPE metrics and respiration components. The workflow:

1. **Root respiration from GPP**
   Estimate surface root respiration (RR) from daily GPP using an equation based on literature meta-analysis (Keuper et al., 2020).
2. **Depth distribution**
   Allocate RR to five soil layers using the root depth distribution from a logistic dose-response curve (Schenk and Jackson, 2002).
3. **Unit conversion**
   Convert layer-wise RR to **mg C kg^{-1} d^{-1}** using bulk density.
4. **RPE ratio**
   Compute depth-wise **RPE ratio** with a Michaelis–Menten-type response to RR in mg C kg^{-1} d^{-1}.
5. **Heterotrophic respiration partition & RPE-induced SOC loss**
   Combine depth-wise RPE with a reference heterotrophic respiration stack to derive basal Rh, total Rh, and **RPE-induced SOC loss** per layer.

Outputs are returned as named lists and saved as GeoTIFF stacks for means and standard deviation estimation across the Monte Carlo runs.

2. Inputs

The model expects harmonized rasters and metadata prepared by the input pipeline. In the model code, inputs are loaded via paths contained in a metadata object.

Core data

- `veg_mask` — A land/vegetation mask applied to restrict computations to cropland cells, based on a cropland map (d'Andrimont et al., 2021) where original resolution was at field scale and was resampled at 1km resolution using the terra() package in R.
- `gpp_daily` — Daily GPP raster over the study period (1 km) from MODIS (Running et al., 2021), directly extracted from Google Earth Engine at 1km resolution.
- `root_pct_stack` — Root distribution (%) per depth layer (five layers), constructed based on the resolution of the vegetation map.
- `bd_stack` — Bulk density per depth layer from the Soil Health Data Cube (Hengl, 2024), originally at 250m resolution, and resampled at 1km resolution using the terra() package in R.
- `rs_stack` — Depth-wise soil respiration reference based on a soil respiration global map (Stell et al., 2021) originally at 1km resolution, used to produce `rh_stack` based on a transformation (Bond-Lamberty et al., 2004).
- `soc_stack` — SOC per depth layer from the Soil Health Data Cube (Hengl, 2024), originally at 250m resolution, and resampled at 1km resolution using the terra() package in R.

Spatial/temporal domain

- **Resolution:** 1 km grid.
- **Depth layers:** 0–10 / 10–30 / 30–60 / 60–100 / 100–200 cm.

- **Time window:** EU croplands, e.g., 2010–2020 (as prepared by the inputs pipeline).

3. Computation steps & equations

3.1. Root respiration from GPP

$$Root\ respiration\ (RR) = GPP_{daily} \times a \times b \times c/(1-b)$$

This equation is based on the meta-analysis presented in Keuper & Wild et al., 2020. Root respiration (RR) has the same time unit as GPP (per day) and inherits the cropland mask. If $GPP_{daily} = 0 \Rightarrow RR = 0$; thus, NA in GPP propagates to RR.

3.2. Depth-wise allocation

$$RR_i = RR \times root\_pct$$

Where *i* is the layer (0–10, 10–30, 30–60, 60–100, 100–200 cm), and *root_pct* is the percentage of roots in layer *i*. If percentages do not sum to 100% they are normalized upstream. RR_i is the layer-specific root respiration used in later steps.

3.3. Convert RR to mg C kg^{-1} d^{-1}

$$RR_{mg} = (RR_i/BD_i) \times 1000$$

Where BD_i is bulk density in the same units expected by the code (g cm^{-3}). This converts root respiration to mass-specific per kilogram of soil per day. If BD_i is 0 (lakes, rivers or sea) or NA $\Rightarrow RR_{mg}$ becomes NA (infinite values are set to NA).

3.4. RPE ratio (response to root respiration)

$$RPE_{ratio} = 1 + \frac{a_{RPE} \times RR_{mg}}{b_{RPE} + RR_{mg}}$$

If $RR_{mg} = 0 \Rightarrow RPE_{ratio} = 1$ (no priming), by construction, $RPE_{ratio} \geq 1$; thus, this construction does not consider negative priming in this model. Parameters a_{RPE} and b_{RPE} can be fixed or sampled in uncertainty runs. In the provided code, they are both sampled.

4. Uncertainty propagation

4.1. What is propagated

We treat key parameters as uncertain and re-run the full model *n_runs* times. The sampled parameters are: *a, b, c,* a_{RPE}, b_{RPE}. Each run uses the same inputs (*GPP, root_pct, BD, Rh*), but a new set of parameter values is sampled from their mean and standard deviation.

4.2. Propagation through the model

$$PrimeSCale = f(\ GPP, SOC, BD, Rh, root\ pct)$$

Here, *f()* is the full pipeline from Sections 4.1–4.3 applied per grid-cell and layer. Runs are independent and can be executed in parallel.

4.3. Aggregation of results

$$Mean = \left(\frac{1}{N}\right) \times \sum PrimeSCale()$$

$$Standard\ deviation = \sqrt{\left(\left(\frac{1}{N-1}\right) \times \sum (PrimeSCale - mean)^2\right)}$$

These are computed per grid-cell and per depth layer for each output of interest.

5. Outputs & file organization

Final GeoTIFF stacks are saved under `output/final_rasters/` with a **prefix** encoding the configuration:

Prefix convention
`m<METHOD>_<RESIDUE>_root<ROOTING>_<N_RUNS>runs`
Example: `m1_res_out_rootbase_5runs`

Files written (each is a 5-layer stack ordered by depth)

- `<prefix>_rpe_mean.tif` — Mean **RPE-induced SOC loss** (Method-dependent)
- `<prefix>_rpe_sd.tif` — SD of RPE-induced SOC loss
- `<prefix>_rpe_ratio_mean.tif` — Mean **RPE ratio**
- `<prefix>_rpe_ratio_sd.tif` — SD of RPE ratio
- `<prefix>_rr_mean.tif`, `<prefix>_rr_sd.tif` — Mean/SD **root respiration** per layer
- `<prefix>_rh_mean.tif`, `<prefix>_rh_sd.tif` — Mean/SD **heterotrophic respiration** per layer

Layer order enforcement
Layers are saved after explicit name-based sorting to preserve the intended depth order: `0010`, `1030`, `3060`, `60100`, `100200`.

6. Configuration tool

- **Method selection:** `method_option ∈ {"1","2","both"}`, see the User Guide for more details on the methods.
- **Residue mode:** e.g., `res_out` (reference Rh excludes 1/3 residue effect), or `classic`.

- **Rooting scenario:** e.g., `rootbase` or alternative depth shifts prepared in the inputs stage.
- **Monte Carlo runs:** `n_runs` (e.g., 5, 50, 1000).
- **Parallelization:** `parallel = TRUE/FALSE`, `n_cores`.
- **Intermediate path:** OS-specific path where per-run GeoTIFFs are stored and later aggregated.

7. Assumptions, limitations, and good practices

- **Method choice matters:** Method 1 vs 2 yields different partitions of basal vs total Rh. See the User Guide for more details.
- **Units:** Ensure GPP and Rh units are consistent with the transfer and conversion steps. The RR conversion into mg C kg^{-1} d^{-1} assumes BD is in **g cm^{-3}** (or equivalent consistent unit); verify before running.
- **Masks & alignment:** All rasters must be co-registered (extent, CRS, resolution) and masked to croplands before the model stage.
- **Pointer safety:** Always reload rasters inside workers during parallel runs to avoid external pointer issues when using `terra`.
- **NA handling:** Infinite values after division by BD are set to `NA`; downstream statistics skip `NA`.

8. Reproducibility checklist

- Record the **input metadata RDS** (paths, CRS, period).
- Save the **parameter seeds** and the sampled vectors for auditability.
- Archive the **intermediate GeoTIFFs** for a subset of runs to allow independent re-aggregation.
- Keep an export of the **R session info** (package versions, OS).

Results – Estimate of the management impact on soil carbon turnover

The results reported here come from a continent-wide simulation for European arable croplands. We use the crop-type map of d'Andrimont et al. (2021), aggregated to 1 km resolution, and analyse only grid-cells with ≥ 50% cropland cover. We defined arable crops by selecting the following crop groups: cereals (wheat, maize, oat, barley), oilseeds (sunflower, soybean), and root crops (sugar beet, potato). Grasslands, forests, and pastures are excluded to keep the focus on arable systems.

A concise overview of the modelling approach is provided in Section 1 ("PrimeSCale for European Croplands"); full methodological details and workflow are documented in the publically available PrimeSCale User Guide (in Zenodo or GitHub) specifically designed within the framework of the AI4SoilHealth project.

For the figures presented here, PrimeSCale was run with the following baseline configuration:

- `n_runs` = 100 (Monte Carlo uncertainty)
- `rooting_scenario` = "base" (no deeper-rooting shift),
- `residue_mode` = "res_out" (crop-residue respiration excluded from heterotrophic respiration),
- `method_option` = "1" (see User Guide for method definitions).

This setup delivers a robust baseline estimate of RPE with quantified uncertainty under standard rooting assumptions. The framework remains fully configurable to explore alternative rooting scenarios, residue handling, and methodological options. For reproducibility and further guidance, please refer to the PrimeSCale User Guide on Zenodo or GitHub.

1. The spatial heterogeneity of the rhizosphere priming effect for European arable cropping systems

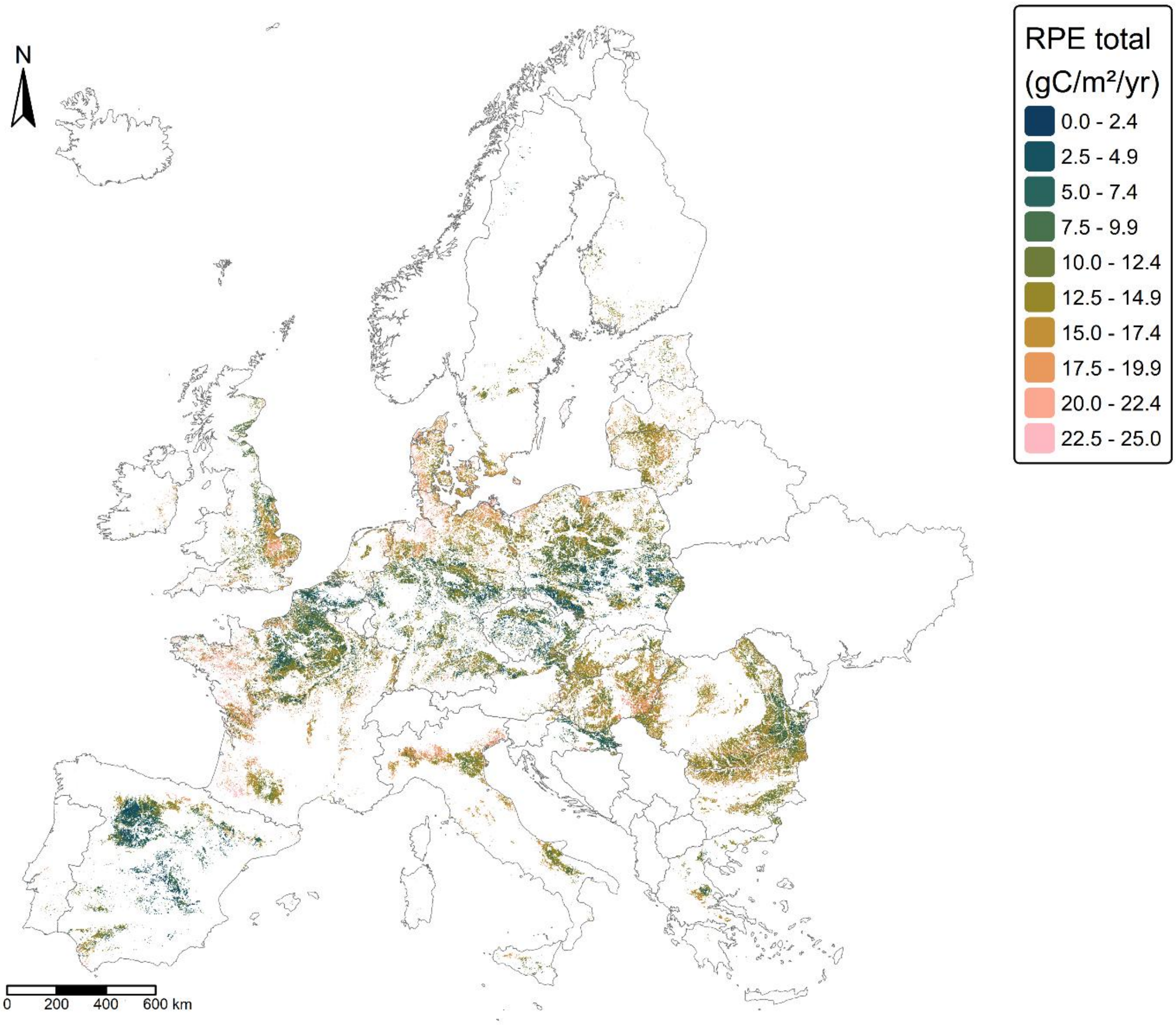


Figure 1 – Spatial distribution of the rhizosphere priming effect (RPE) for European croplands (cereals, oilseeds, and rooting crops) average over the 2010-2020 decade. Each grid cell contains at least 50% of croplands.

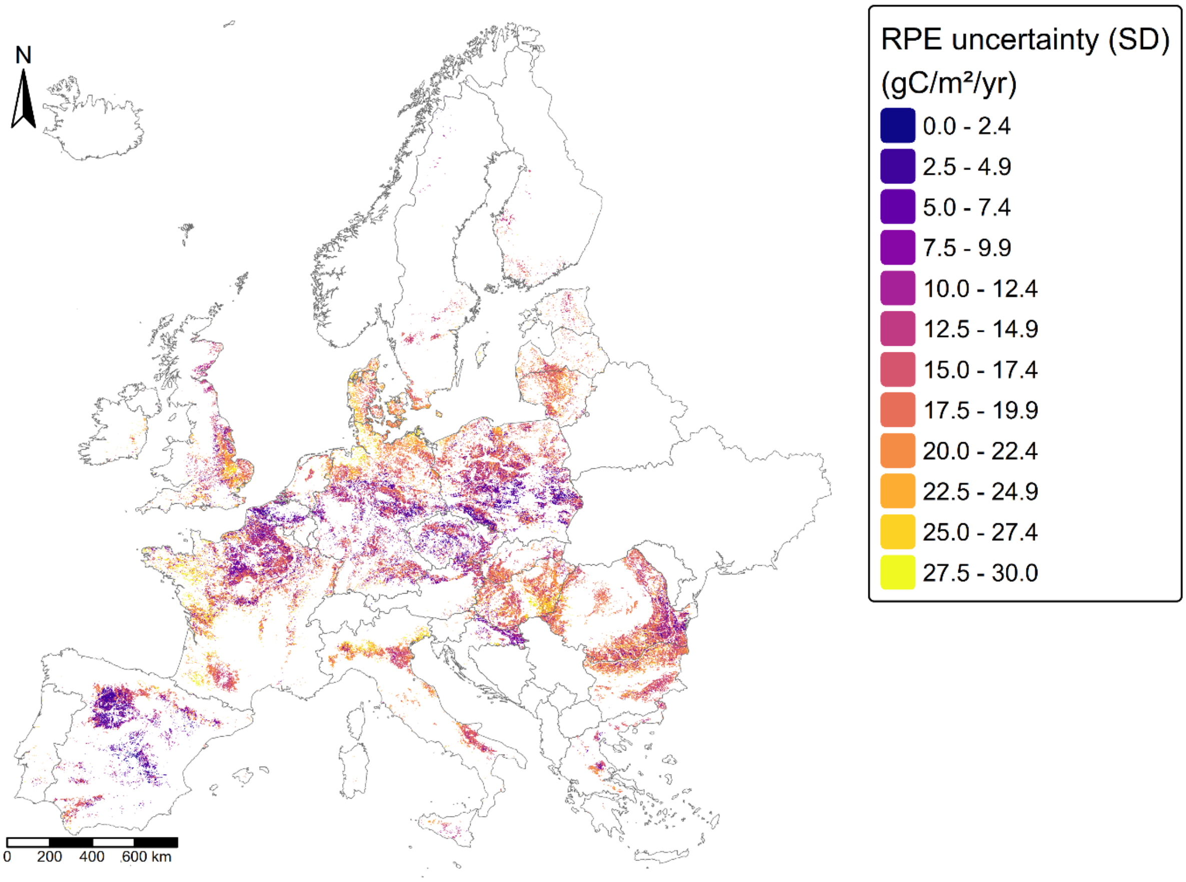


Figure 2 - Spatial distribution of the rhizosphere priming effect (RPE) uncertainty in standard deviation for European croplands (cereals, oilseeds, and rooting crops) averaged over the 2010-2020 decade. Each grid-cell contains at least 50% of croplands.

The maps represented in figure 1 and 2 show the mean rhizosphere priming effect (RPE) and its uncertainty across European croplands for the 2010–2020 mean year period. Values range from ~0 to ~25 g C m^{-2} yr^{-1} (≈250 kg C ha^{-1} yr^{-1}). Hotspots—such as north-west France and Denmark—highlight areas where soil organic carbon (SOC), active roots, and Rh co-occur and interact most strongly. In the PrimeSCale framework, by construction, the RPE and its relative uncertainty emerge where all three components overlap within the same soil layer; regions missing any one component exhibit low or near-zero RPE.

2. Depth distribution of SOC turnover due to RPE

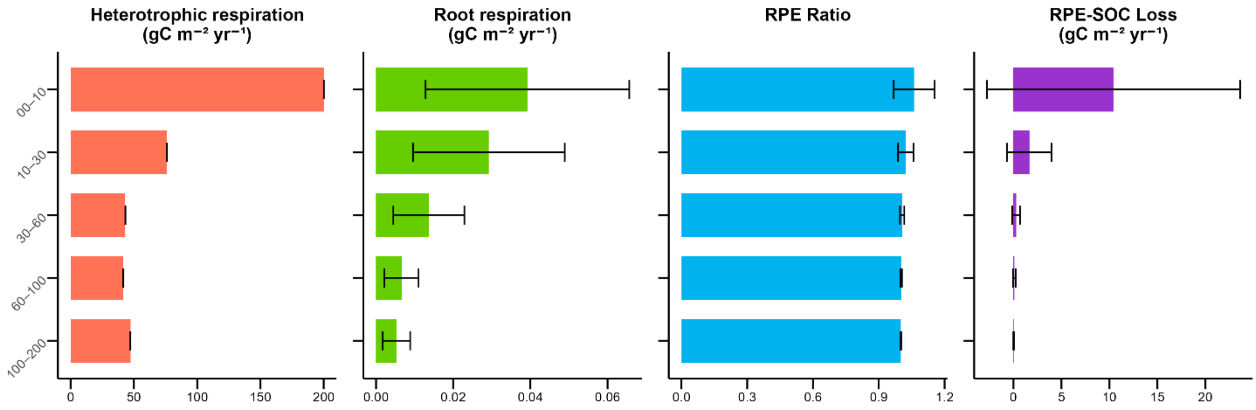


Figure 3 – Depth distribution of the mean heterotrophic respiration, root respiration, RPE ratio, and RPE-induced SOC loss for European croplands averaged over the 2010-2020 decade.

Figure 3 reports, for each layer, the depth-wise mean and associated uncertainty (from the Monte Carlo) for the key inputs and outputs used to derive RPE-induced SOC loss. This view helps evaluate both the magnitude of RPE and its relative uncertainty, and highlights how variables relate across depth. Consistently, RPE is strongest in the upper soil horizons and decreases with depth, reflecting the co-location of roots, accessible SOC, and heterotrophic respiration near the surface.

3. Summary table

Table 1: Depth-wise means (±SD) and ratios of the main variable of the PrimeSCale outputs. Rhizosphere priming induced (RPE-ind.) SOC loss represent the SOC loss lost through priming.

Depth	Heterotrophic respiration	RPE ratio	RPE-ind. SOC loss	Root respiration	RPE proportion to Rh
cm	*gC m⁻² yr⁻¹*		*gC m⁻² yr⁻¹*	*gC m⁻² yr⁻¹*	
0-10	200.10	1.06±0.09	10.42±13.19	0.4±0.03	0.05
10-30	76.14	1.02±0.04	1.62±2.33	0.3±0.02	0.02
30-60	43.27	1.01±0.01	0.28±0.041	0±0.01	0.01
60-100	41.53	1±0	0.09±0.014	0.01±0	0.00
100-200	47.28	1±0	0.03±0.05	0.1±0	0.00

Using the same ensemble runs, we compile a summary table (Table 1) that complements the figures. Among other metrics, it reports the fraction of heterotrophic respiration attributable to RPE (RPE/Rh). In the 0–10 cm layer, the mean fraction reaches ~5%, consistent with the RPE ratio estimated for that layer, while deeper horizons show progressively smaller shares. The table 1 provides a view of magnitude and depth patterns with their associated uncertainty.

4. Deeper rooting depth scenario

To assess how management could influence RPE, we explored rooting-depth management as a factor, reflecting scenarios where deeper-rooting varieties are selected for climate resilience or other benefits. We created a reweighting function that conserves total root mass while shifting allocation toward deeper layers, testing increments for the 0-10, 30-60, 60-100, and 100-200 cm depth, from +50% up to +200%.

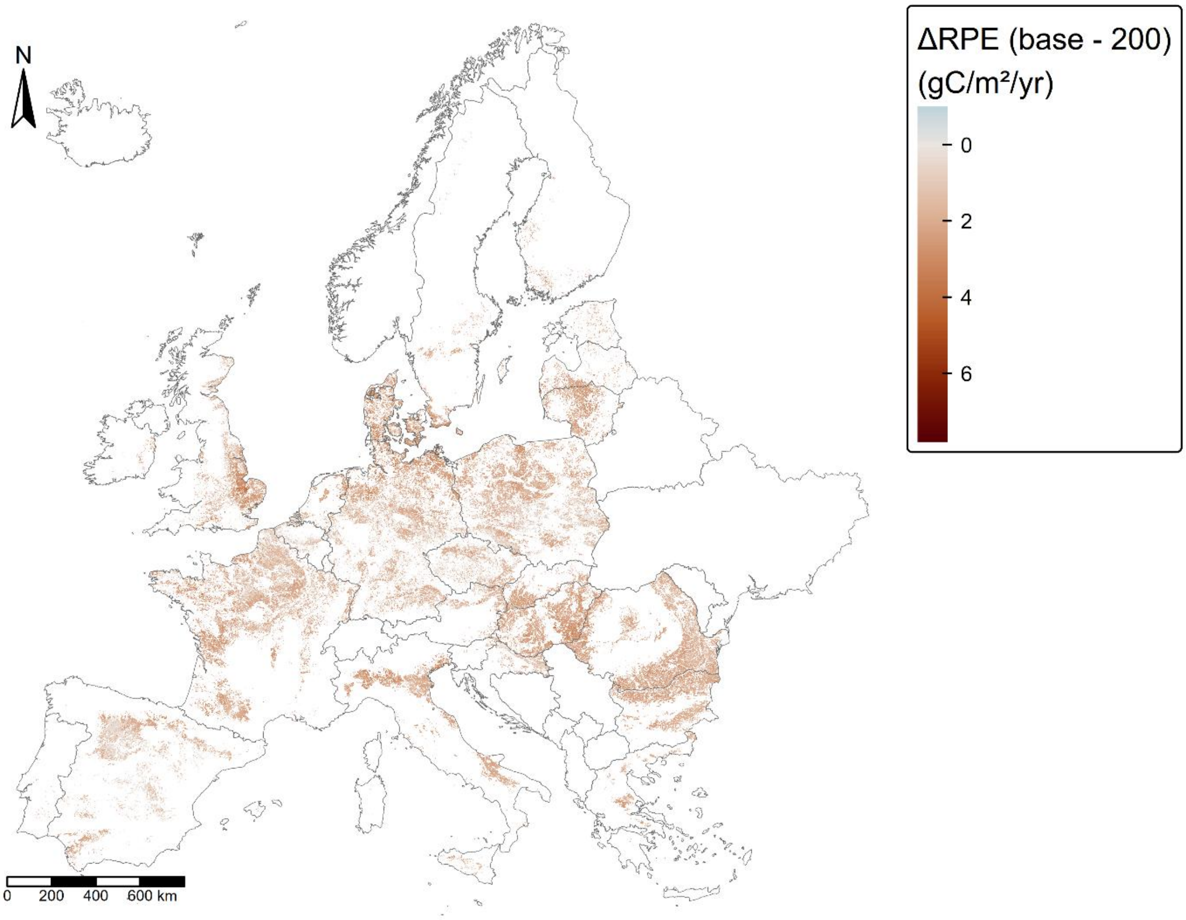


Figure 4: Map of the difference between RPE under the basic rooting depth scenario and the "+200" rooting depth scenario, for European croplands.

Overall, the model behaves consistently with expectations: when shallow roots are reduced, total RPE decreases slightly (Table 1, Table 2) because near-surface layers drive much of the interaction among roots, SOC, and Rh. The absolute differences are modest, and the main effect is a subtle shift in the depth profile rather than a wholesale change in magnitude.

Table 2: Depth-wise means (±SD) and ratios of the main variable for the rooting depth scenario "+200%"

Depth	Heterotrophic respiration	RPE ratio	RPE-ind. SOC loss	Root respiration	RPE proportion to Rh
cm	*gC m^{-2} yr^{-1}*		*gC m^{-2} yr^{-1}*	*gC m^{-2} yr^{-1}*	
0-10	200.10	1.05±0.07	8.5±11.2	0.03±0.02	0.04
10-30	76.14	1.02±0.04	1.6±2.3	0.03±0.02	0.02
30-60	43.27	1.01±0.01	0.3±0.5	0.01±0.01	0.01
60-100	41.53	1±0	0.1±0.2	0±0	0.00
100-200	47.28	1±0	0.1±0.1	0±0	0.00

This lays the basework for further assessment of shifts in agricultural management related to crop-specific rooting shifts and how such shifts may affect both the spatial patterns and the depth distribution of RPE-induced SOC-losses.

5. Estimate of the RPE using GPP under the RCP8.5 (2070-2099)

Climate change deeply modifies the land–atmosphere carbon exchanges and croplands play a central role in that balance. To anticipate management needs, it is important to build a projection of the potential rhizosphere priming effect (RPE) under future climate scenarios.

For this first projection, we built a future scenario for PrimeSCale with future plant carbon inputs using recent GPP estimates under RCP8.5, adapted from Knauer et al. (2023). This delivers an initial view of how RPE could evolve as productivity shifts. At this stage, bulk density, SOC stocks, and heterotrophic respiration (Rh) are held at present-day conditions, so the results intentionally isolate the sensitivity to changing GPP. As updated datasets become available, we will extend the framework to incorporate evolving soil properties and Rh responses and to explore additional scenarios.

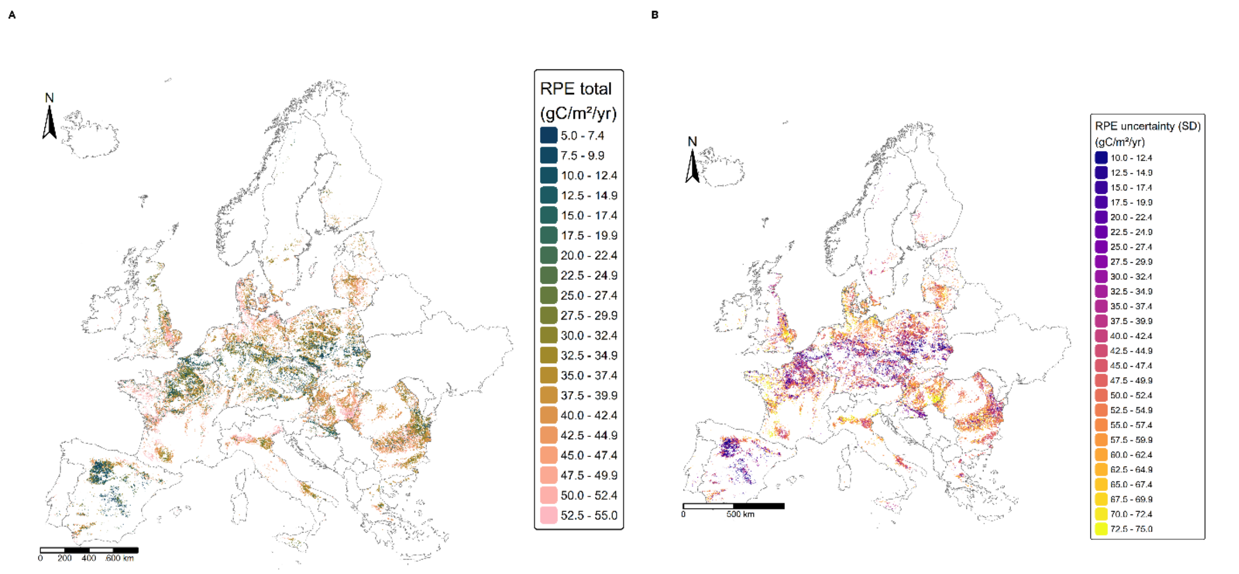


Figure 5: Spatial distribution of the RPE (A) and its relative uncertainty (B) for European croplands according to future climate projection (RCP8.5), based on future GPP estimation adapted from Knauer et al., 2023

These first results show that the spatial distribution of the RPE is not changing with future GPP, but its intensity does (Table 3).

Table 3: Depth-wise means (±SD) and ratios of the main variable for the future climate projection (RCP8.5)

Depth	Heterotrophic respiration	RPE ratio	RPE-ind. SOC loss	Root respiration	RPE proportion to Rh
cm	*$gC\ m^{-2}\ yr^{-1}$*		*$gC\ m^{-2}\ yr^{-1}$*	*$gC\ m^{-2}\ yr^{-1}$*	
0-10	200.10	1.24±0.38	27.8±36.18	0.05±0.02	0.14
10-30	76.14	1.09±0.14	5.39±7.84	0.04±0.02	0.07
30-60	43.27	1.03±0.04	1.03±1.59	0.02±0.01	0.02
60-100	41.53	1.01±0.01	0.36±0.56	0.01±0	0.01
100-200	47.28	1±0	0.13±0.2	0±0	0.00

Preliminary projections show that building a future scenario for PrimeSCale with future GPP under RCP8.5 (Europe-wide mean ≈ +60% relative to today; Knauer et al., 2023) increases below-ground carbon inputs, elevating root respiration and, in turn, RPE-induced SOC mineralization. Compared with the 2010–2020 baseline, RPE increases most in the upper horizons and decreases with depth, consistent with where roots, accessible SOC, and Rh most strongly co-occur. The RPE proportion of heterotrophic respiration (RPE/Rh) reaches up to ~14% for the first soil layer (0-10cm).

Single grid cell version

The PrimeSCale model was developed to estimate the rhizosphere priming effect, with uncertainty, at a large spatial scale. A non-modeller user-friendly single- grid-cell version (Excel) was created as a quick “laboratory” to test hypotheses, verify the scale of values expected, or run the PrimeSCale model quickly for a set of specific conditions. The single- grid-cell version is publicly available in our Zenodo or GitHub.

1. Inputs

As for the complete PrimeSCale model, the single- grid-cell version needs inputs that are defined at the beginning of the file.

Table 4: Inputs for the single grid-cell version

Inputs					
Inputs by depth	Bulk Density (BD)	Rh over depth	Soil respiration over depth	Root percentage	SOC
Units	kg/m^2	gC/m^2/yr	gC/m^2/yr	%	gC/m2/yr
Value for the 0-10cm layer	101	212	372	40	4600
Value for the 10-30cm layer	202	80	140	30	7700
Value for the 30-60cm layer	333	52	91	14	19000
Value for the 60-100cm layer	455	25	43	7	7700
Value for the 100-200cm layer	1186	36	64	5	8500
Inputs total		GPP daily	GPP yearly		
		g/m^2/j	g/m^2/yr		
		2.55	933		

Table 4 (representing the easy-access Excel file interface) is used to define the bulk density (BD), the heterotrophic respiration (Rh), soil respiration (Rs), root percentage, and soil organic carbon (SOC) for the different soil layers, and the gross primary production (GPP) daily and for the entire year.

The values can be modified at will, but should be representative of a realistic situation.

2. Parameters

Parameters are available to modify the setting of the PrimeSCale function. You can choose to work with different values, to be selected within the range of expected values.

Table 5: Parameter for the single grid-cell version

Parameters					
		Min	Max	Mean	Standard deviation
RPE function	a_rpe	0.45	92	**8.88**	13.32
	b_rpe	0.038	828.8	**67.41**	112.3
GPP to root respiration function	a	0.49	0.64	0.55	0.1
	b	0	0.29	0.12	0.09
	c	0.23	0.81	0.48	0.05

These parameters control the transformation from GPP to root respiration and the estimation of the RPE ratio.

3. Results

The last part of the file takes the results of the previous part to make a summary table and a set of figures showing the distribution of inputs and outputs over depth.

Table 6 : Summary table

Mean results table (including the respiration of residues in Rh)			
RPE ratio	Rh (gC/m2/yr)	RPE (gC/m2/yr)	Proportion of Rh that is RPE (%)
1.22	81.00	17.35	21.43
Mean results table (not including the respiration of residues in Rh)			
RPE ratio	Rh (gC/m2/yr)	RPE (gC/m2/yr)	Proportion of Rh that is RPE (%)
1.22	27.00	5.78	21.43
Sum results table			
Rh (gC/m2/yr)	RPE (gC/m2/yr)		
405	86.77		

Note: the values proposed here are representative of an uncertainty run with a number of runs = 1. Thus, no uncertainties can be estimated here.

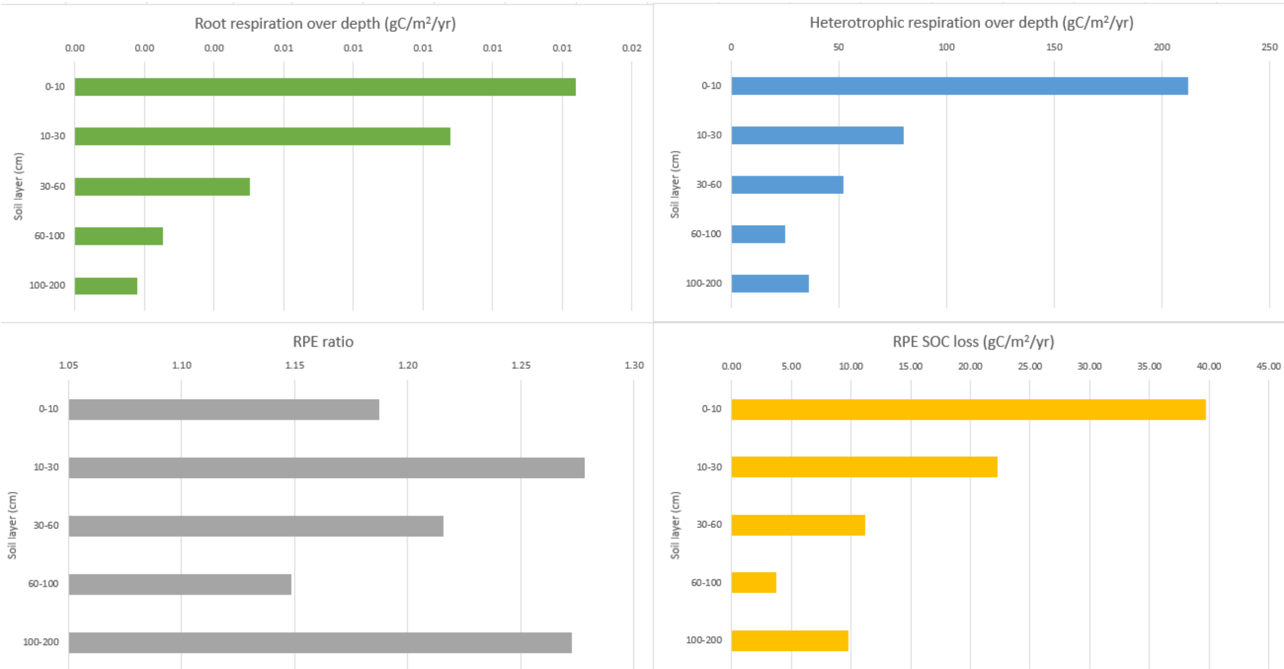


Figure 6: Depth distribution of the root respiration, heterotrophic respiration, RPE ratio, and RPE SOC loss.

This file can be used to test new settings before running an entire uncertainty run on a large scale. It can also be used to test hypotheses on future GPP or deeper rooting depth of various crop and plant types according to their GPP.

Cited references

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