DOCTORAT ECOLOGIE
BRETAGNE GEOSCIENCES
LOIRE AGRONOMIE ALIMENTATION

PhD PROPOSAL FOR THE DOCTORAL SCHOOL « Ecologie, Géosciences, Agronomie, ALimentation »

GENERAL INFORMATION

Thesis title: Evaluation of interactions between fertilization strategies and cover crop canopy composition to optimize nutrient balance, carbon storage, and soil quality in potato-based cropping systems

Acronym: FERTICOVER

Disciplinary field 1: Agronomy

Disciplinary field 2: Ecology

Three keywords: cover crop, nutrient and carbon recycling, soil quality

Research unit : UMR SAS

Name of the thesis director HDR (Habilitation thesis to supervise research) required: Safya Menasseri-Aubry

Email address of the thesis director: Safya.Menasseri@agrocampus-ouest.fr

Name of the thesis co-director (if applicable): HDR (Habilitation thesis to supervise research) required: Samuel Abiven

Email address of the thesis co-director (if applicable): Samuel Abiven" <abiven@biotite.ens.fr

Name of the thesis co-supervisor 1 (if applicable): Anne Jaffrezic

Email address of the thesis co-supervisor 1 (if applicable): Anne.jaffrezic@agrocampus-ouest.fr

Name of the thesis co-supervisor 2 (if applicable): Christophe Naisse

Email address of the thesis co-supervisor 2 (if applicable): christophe.naisse@eliard-spcp.fr

Thesis grant (funding origin and amount): Cifre grant, 1960 euros (gross pay/per month)

Contact(s) (mailing address and E-mail):

Safya Menasseri-Aubry
L'Institut Agro Rennes Angers / UMR SAS
65 Rue de St Brieuc, 35042 Rennes Cedex

Samuel Abiven
Laboratoire de Géologie, Département de Géosciences
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Christophe Naisse
Société Eliard-SPCP
9 rue Lavoisier
56300 Pontivy

Recruitment process: Recruitment process depends on thesis funding. To select the corresponding recruitment process, please visit the EGAAL website here. This information is needed for proposal publication.

☐ **Doctoral school contest** ☒ **Interview** ☐ **Other (indicate) :**

All sections must be filled. Once filled, please save the proposal form in pdf format using the following naming: Supervisor Name_Unit_Subject Acronym_EN.pdf

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SCIENTIFIC DESCRIPTION OF THE PhD PROJECT

Socio-economic and scientific context : (10 lines)

The progressive degradation of soil quality can be observed in most agricultural lands, including temperate systems, which calls into question the sustainability of agricultural production. This is especially true for potato cultivation, one of the leading agricultural productions in France (3rd largest European producer on 164,000 ha), which is very demanding in terms of inputs and soil preparation. The addition of organic products and the introduction of plant cover in the rotation, made mandatory by the Nitrates Directive in vulnerable zones, are two levers that allow for better recycling of nutrients associated with carbon storage in the soil, and, as a result, savings in fertilizers and improved soil quality. While the first lever has been widely studied in France, the second is much less so, and the interactions between the two are not studied at all. Plant cover crops have a certain interest. During their growth, they cover the soil and form preferential infiltration zones for rainwater. During the degradation of the cover crops, once destroyed and mixed with the soil, they return mineral elements for the following crop, as well as organic matter. The effectiveness of such a combination of practices can be limited, however, by the difficulties of implantation or by the choice of species. Their introduction must also be adapted to changes in the climatic context, characterized by increasingly frequent alternations of drier periods and rainy periods inducing contrasting water availability. Improvements are proposed by the company Eliard SPCP: seed mixtures as well as UMR SASbiostimulants (micro-organisms, algae extracts,...) and must be tested, alone and combined with the other components of the cropping system.

Assumptions and questions (8 lines)

The diversity of species and varieties that make up plant cover can optimize their effectiveness with respect to the issues mentioned. This diversity implies complementarity in terms of root architecture, quantity and quality of rhizodeposition as well as water circulation regime. It has a direct effect on nutrient cycles, carbon storage and soil structure and an indirect effect by modulating the already well-characterized effects of organic fertilization.

In this thesis work, we aim to:

(i) highlight and understand the processes generated by: the introduction of multi-species plant cover in the technical itinerary of potatoes by characterizing the interactions between organic fertilization strategy and plant cover, nitrogen and carbon dynamics and soil quality under limiting and non-limiting water conditions;

(ii) evaluate the advantages and problems related to these innovative strategies for formulating plant cover crops before and after a potato crop

The final objective is to propose innovative planting strategies allowing the best compromise between the recycling of nutrients and the rehabilitation of the physical, physico-chemical and biological quality of the soil

The main steps of the thesis and scientific procedure (10-12 lines)

In this thesis, we propose to study the potential of this type of mixture, both from an agronomic, soil quality and carbon storage point of view, on potato-based systems and to study the dynamics of these seed mixtures of different varieties with inocula both in the laboratory and in the field, in order to evaluate the potential of this type of plant material. The experimental sites will be located in Brittany in the Pontivy basin (Saint Nicolas du Pelem,...) on deep sandy-clay loam soils, as well as in the Haut-de-France region on loamy soil. The steps of the thesis are the following:

1. Bibliographic synthesis and inventory of the work done by the partners on pre- and post-cultivation plant cover

2. Screening in the laboratory of formulations (seed inoculations) of interest with regard to results obtained previously

3. Evaluation of innovative strategies of mixtures and formulations of plant cover in pre-planting of potatoes and in post-cultivation in order to optimize the use of the nutrients brought in according to the context of organic fertilization and to preserve the physical and physicochemical quality of the soils.

4. Drafting of the manuscript and scientific publications.

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Methodological and technical approaches considered (4-6 lines)

To carry out the questions treated in the thesis, two types of experimental devices will be mobilized:

- Agronomic trials on experimental stations, as well as on farms in large plots: 3 to 5 sites distributed in the two production basins in Brittany (Pontivy basin) and in the North of France (Pays de Caux) in collaboration with professional partners

- Trials in instrumented lysimeters and in climate simulators (Ile de France ecotron) allowing to individualize the studied modalities (cover crops x formulation x organic fertilization) and the processes, and to follow in a dynamic and rigorous way the variables allowing to explain them (temperature, water content, pH, ... of the soil)

The major processes that will be studied will be the aggregation and recycling of nutrients through

- 13C isotope labelling approaches to quantify the role of rhizodeposition according to the diversity of species in the canopy,

- chemical and physical fractionation of soil organic matter to monitor the different forms of nitrogen, phosphorus and carbon in the soil

- characterization of microbial communities in soils

Scientific and technical skills required by the candidate

The candidate must have a master's degree or equivalent in agronomy, biogeochemistry, soil science or environmental science related topics. He/she must be able to conduct different experimental setups involving field (soil sampling campaigns) and laboratory controlled experiments (biological, physical and chemical soil analysis), data analysis and laboratory analytical techniques. A good knowledge of isotopic tools will be appreciated. He/she should also have a strong experience and appetite for field work (winter and summer).

THESIS SUPERVISION[1]

Unit name:	**Team name:**
UMR Soil Agro and hydro systems and Spatialisation	Axis System and fluxes
Unit director name:	**Team director name:**
Christian Walter	Aurélia Michaud ans Chris Fléchard
Mailing address of the unit director:	**Mailing address of the team director:**
Christian.walter@agrocampus-ouest.fr	Aurelia.michaud@inrae.fr

Thesis director

Surname, first name: Menasseri-Aubry Safya

Position: Maitre de Conférences

Obtained date of the HDR (Habilitation thesis to supervise research):2015

Employer: L'Institut Agro Rennes Angers

Doctoral school affiliation: EGAAL

[1] In EGAAL Doctoral School, if only one scientist in thesis supervision = 100% of supervision rate; if 2 people involved in thesis supervision = from 50% to 70% of supervision rate for the director; if 3 people involved in thesis supervision = 40% / 30% / 30% of supervision rate distribution among supervisors.

Rate of thesis supervision in the present project (%): 40 %

Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%): 50 %

Number of current thesis supervisions/co-supervisions: 2

Thesis co-director

Surname, first name: Abiven Samuel

Position: Professeur

Obtained date of the HDR (Habilitation thesis to supervise research): 2014

Employer: Ecole Normale Supérieure

Doctoral school affiliation: STEP UP

Rate of thesis supervision in the present project (%): 30

Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%): 40

Number of current thesis supervisions/co-supervisions: 5

Thesis co-supervisor 1 (if applicable)

Surname, first name: Anne jaffrezic

Position: Maitre de Conférences

Habilitation thesis to supervise research ☒ yes ☐ no If yes, date diploma received: 2017

Employer: L'Instit Agro Rennes Angers

Doctoral school affiliation: EGAAL

Rate of thesis supervision in the present project (%): 30

Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%): 50

Number of current thesis supervisions/co-supervisions: 1

Thesis co-supervisor 2 (if applicable)

Surname, first name:

Position:

Habilitation thesis to supervise research ☐ yes ☐ no If yes, date diploma received:

Employer:

Doctoral school affiliation:

Rate of thesis supervision in the present project (%):

Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%):

Number of current thesis supervisions/co-supervisions:

Private partner (if CIFRE funding, private funding,…)

Surname, first name: Naisse Christophe

Position: Responsible R&D

Employer: Eliard SPCP

Rate of thesis supervision in the present project (%):

Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%):

Number of current thesis supervisions/co-supervisions:

International partner (if Cotutelle thesis)

Surname, first name:

Position:

Employer:

Rate of thesis supervision in the present project (%):

Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%):

Number of current thesis supervisions/co-supervisions:

Professional status of previous PhD students supervised by both director and co-supervisors (from 5 years)

Please provide the following information for each PhD students supervised

Surname, first name : Brami Claire

Date of PhD beginning and PhD defence: 01-06-2017 à 14-12-2020

Thesis supervision: Pérès Guénola, Lowe Chris, Menasseri-Aubry Safya

Professional status and location: Director of studies in terrestrial ecotoxicology at EUROFINS Mitox

Contract profile (post-doc, fixed-term, permanent): permanent

List of publications from the thesis work:

Brami C., Pérès G., Menasseri-Aubry S., Byers-Woods J.D., Jacquet T., Lowe C.N. 2021. Effect of *Miscanthus x giganteus* ash on survival, biomass, reproduction and avoidance behavioue of the endogenic earthworm *Aporrectodea caliginosa*. Ecotoxicology.

Brami C., Lowe C.N., Menasseri S., Jacquet T., Pérès G. 2020. Multiparameter assessment of soil quality under *Miscanthus x giganteus* crop at marginal sites in Ile-de-France. Biomass and Bioenergy, 142, 105793.

Brami C., Pérès G., Menasseri-Aubry S., Byers-Woods J.D., Jacquet T., Lowe C.N. 2021. Effect of *Miscanthus x giganteus* ash on survival, biomass, reproduction and avoidance behavioue of the endogenic earthworm *Aporrectodea caliginosa*. Ecotoxicology.

Brami C., Lowe C.N., Menasseri S., Jacquet T., Pérès G. 2020. Multiparameter assessment of soil quality under *Miscanthus x giganteus* crop at marginal sites in Ile-de-France. Biomass and Bioenergy, 142, 105793.

Surname, first name : Samson Marie-Elise

Date of PhD beginning and PhD defense : 01-10-2016 à 08-01-2021 (congés maternité)

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Thesis supervision : Anne Vanasse and Safya Menasseri-Aubry

Professional status and location : Associate Professor at Université Laval (Québec, Canada)

Contract profile (post-doc, fixed-term, permanent): permanent

List of publications from the thesis work:

Samson, M.E., Chantigny M.H., Vanasse A., Menasseri-Aubry S., Royer I., Angers D.A. 2021. Response of subsurface C and N stocks dominate the whole-soil profile response to agricultural management practices in a cool, humid climate, Agriculture, Ecosystems & Environment, 320: 107590.

Samson, M-E, Chantigny, M.H., Menasseri-Aubry, S., Vanasse, A., Angers, D.A. 2020. Management practices differently affect particulate and mineral-associated organic matter and their precursors in arable soils. *Soil biology and biochemistry*, 148: 107867.

Samson, M.E., Menasseri-Aubry S., Chantigny M.H., Angers D.A., Royer I., Vanasse A. 2019. Interactive effects of conservation tillage practices and fertilizer sources on crop yield depend on crop species and soil type. Field Crops Research, 243: 107263.

Surname, first name : Mirjam Studer Bächli

Date of PhD beginning and PhD defense : 01.03.11 15.04.15

Thesis supervision : Samuel Abiven

Professional status and location: Scientist, Swiss Council For Accident Prevention

Contract profile (post-doc, fixed-term, permanent): permanent

List of publications from the thesis work:

Studer, M.S., Siegwolf, R.T.W., Abiven, S., 2014. Carbon transfer, partitioning and residence time in the plant-soil system: a comparison of two 13CO2 labelling techniques. *Biogeosciences* 11, 1637–1648.

Studer, M.S., Siegwolf, R.T.W., Leuenberger, M, Abiven, S. (2015). Multi-isotope labelling of organic matter by diffusion of 2H/18O-H2O vapour and 13C-CO2 into the leaves and its distribution within the plant. *Biogeosciences*, 12(6):1865-1879.

Studer, M. S., Siegwolf, R. T. W., and Abiven, S. (2016). Evidence for direct plant control on rhizosphere priming. *Rhizosphere*, 0–1. doi:10.1016/j.rhisph.2016.10.001

González-Domínguez, B., Studer, M. S., Hagedorn, F., Niklaus, P. A., and Abiven, S. (2017). Leaching of soils during laboratory incubations does not affect soil organic carbon mineralisation but solubilisation. *PLoS One* e0174725. doi:https://dx.doi.org/10.6084/m9.figshare.4508765.

González-Domínguez, B., Niklaus, P.A., Studer, M.S., Hagedorn, F., Wacker, L., Haghipour, N., Zimmermann, S., Walthert, L., McIntyre, C., Abiven, S., 2019. Temperature and moisture are minor drivers of regional-scale soil organic carbon dynamics. Scientific Reports 9, 6422. doi:10.1038/s41598-019-42629-5

O'Brien, M.J., Valtat, A., Abiven, S., Studer, M.S., Ong, R., Schmid, B., 2020. The role of soluble sugars during drought in tropical tree seedlings with contrasting tolerances. Journal of Plant Ecology 13, 389–397. doi:10.1093/jpe/rtaa017

Surname, name : Cordula Teschner Friedli

Date of PhD beginning and PhD defense : 01.04.13 to 12.12.17

Thesis supervision : Andreas Hund, Samuel Abiven

Professional status and location : Under writting insurance, Swiss Re, Zurich

Contract profile (post-doc, fixed-term, permanent): permanent

List of publications from the thesis work:

Friedli, C.N., Abiven, S., Fossati, D., Hund, A., 2019. Modern wheat semi-dwarfs root deep on demand: response of rooting depth to drought in a set of Swiss era wheats covering 100 years of breeding. Euphytica 215, 85. doi:10.1007/s10681-019-2404-7

Van de Broek, M., Ghiasi, S., Decock, C., Hund, A., Abiven, S., Friedli, C., Werner, R.A., Six, J., 2020. The soil organic carbon stabilization potential of old and new wheat cultivars: a 13CO2-labeling study. Biogeosciences 17, 2971–2986. doi:10.5194/bg-17-2971-2020

Surname, name : Juliane Hirte

Date of PhD beginning and PhD defense : 01.04.13 to 18.06.18

Thesis superivision : Jochen Mayer, Samuel Abiven

Professional status, location : Scientist, Agroscope Zurich

Contract profile (post-doc, fixed-term, permanent): permanent

List of publications from the thesis work:

Hirte, J., Leifeld, J., Abiven, S., Mayer, J., 2018a. Maize and wheat root biomass, vertical distribution, and size class as affected by fertilization intensity in two long-term field trials. Field Crops Research 216, 197–208. doi:10.1016/j.fcr.2017.11.023

Hirte, J., Leifeld, J., Abiven, S., Oberholzer, H.-R., Hammelehle, A., Mayer, J., 2017. Overestimation of Crop Root Biomass in Field Experiments Due to Extraneous Organic Matter. Frontiers in Plant Science 8. doi:10.3389/fpls.2017.00284

Hirte, J., Leifeld, J., Abiven, S., Oberholzer, H.-R., Mayer, J., 2018b. Below ground carbon inputs to soil via root biomass and rhizodeposition of field-grown maize and wheat at harvest are

independent of net primary productivity. Agriculture, Ecosystems & Environment 265, 556–566. doi:10.1016/j.agee.2018.07.010

Surname, name : Reisser Moritz

Date of PhD beginning and PhD defense : 01.02.15 to 10.06.18

Thesis supervision : Samuel Abiven

Professional status, location : Sustainability Analyst, Inrate SA, Zurich

Contract profile (post-doc, fixed-term, permanent): permanent

List of publications from the thesis work:

Coppola, A.I., Wiedemeier, D.B., Galy, V., Haghipour, N., Hanke, U.M., Nascimento, G.S., Usman, M., Blattmann, T.M., Reisser, M., Freymond, C.V., Zhao, M., Voss, B., Wacker, L., Schefuß, E., Peucker-Ehrenbrink, B., Abiven, S., Schmidt, M.W.I., Eglinton, T.I., 2018. Global-scale evidence for the refractory nature of riverine black carbon. Nature Geoscience 11, 584–588. doi:10.1038/s41561-018-0159-8

Cotrufo, M.F., Boot, C., Abiven, S., Foster, E.J., Haddix, M., Reisser, M., Wurster, C.M., Bird, M.I., Schmidt, M.W.I., 2016. Quantification of pyrogenic carbon in the environment: An integration of analytical approaches. Organic Geochemistry 100, 42–50. doi:10.1016/j.orggeochem.2016.07.007

Reisser, M., Purves, R.S., Schmidt, M.W.I., Abiven, S., 2016. Pyrogenic Carbon in Soils: A Literature-Based Inventory and a Global Estimation of Its Content in Soil Organic Carbon and Stocks. Frontiers in Earth Science 4. doi:10.3389/feart.2016.00080

Soucémarianadin, L., Reisser, M., Cécillon, L., Barré, P., Nicolas, M., Abiven, S., 2019. Pyrogenic carbon content and dynamics in top and subsoil of French forests. Soil Biology and Biochemistry 133, 12–15. doi:10.1016/j.soilbio.2019.02.013

Surname, name : Beatriz Gonzalez Dominguez

Date of PhD beginning and PhD defense : 01.06.13 to 14.07.18

Thesis supervision : Samuel Abiven, Pascal Niklaus

Professional status, location : Carbon budget analyst, GESTION Y PLANEAMIENTO TERRITORIAL Y MEDIOAMBIENTAL, S.A., Las Palmas, Espagne

Contract profile (post-doc, fixed-term, permanent): fixed-term

List of publications from the thesis work

González-Domínguez, B., Niklaus, P.A., Studer, M.S., Hagedorn, F., Wacker, L., Haghipour, N., Zimmermann, S., Walthert, L., McIntyre, C., Abiven, S., 2019. Temperature and moisture are minor drivers of regional-scale soil organic carbon dynamics. Scientific Reports 9, 6422. doi:10.1038/s41598-019-42629-5

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González-Domínguez, B., Studer, M.S., Hagedorn, F., Niklaus, P.A., Abiven, S., 2017. Leaching of soils during laboratory incubations does not affect soil organic carbon mineralisation but solubilisation. PLOS ONE 12, e0174725. doi:10.1371/journal.pone.0174725

Surname, name : Pierre Stevenel

Date of PhD beginning and PhD defense : 01.002.14 to 10.07.19

Thesis supervision : Astrid Oberson, Emmanuel Frossard, Samuel Abiven

Professional status, location : Scientist, Agroscope Changins, Suisse

Contract profile (post-doc, fixed-term, permanent): fixed-term

Liste des publications issues de ce travail de thèse :
Stevenel, P., Frossard, E., Abiven, S., Rao, I.M., Tamburini, F., Oberson, A., 2019. Using a Tri-Isotope (13C, 15N, 33P) Labelling Method to Quantify Rhizodeposition, in: Reinhardt, D., Sharma, A.K. (Eds.), Methods in Rhizosphere Biology Research, Rhizosphere Biology. Springer

Five main recent publications of the supervisors on thesis subject:

Brami C., Lowe C.N., **Menasseri S**., Jacquet T., Pérès G. 2020. Multiparameter assessment of soil quality under *Miscanthus x giganteus* crop at marginal sites in Ile-de-France. Biomass and Bioenergy, 142, 105793.

Samson, M-E, Chantigny, M.H., **Menasseri-Aubry, S.,** Vanasse, A., Angers, D.A. 2020. Management practices differently affect particulate and mineral-associated organic matter and their precursors in arable soils. *Soil biology and biochemistry*, 148: 107867.

Samson, M.E., **Menasseri-Aubry S.,** Chantigny M.H., Angers D.A., Royer I., Vanasse A. 2019. Interactive effects of conservation tillage practices and fertilizer sources on crop yield depend on crop species and soil type. Field Crops Research, 243: 107263.

Viaud V., Santillan-Carvantes P., Akkal-Corfini N., Le Guillou C., Chemidlin Prevost-Bouré N., Ranjard L., **Menasseri-Aubry S.** 2018. Landscape-scale analysis of cropping system effects on soil quality in a context of crop-livestock farming. Agriculture, Ecosystem and Environment, 265, 166-177.

Bottinelli N., D.A. Angers, V. Hallaire, D. Michot, C. Le Guillou, D. Cluzeau, D. Heddadj, **S. Menasseri-Aubry.** 2017. Tillage and fertilization practices affect soil aggregate stability in a humic cambisol of Northwest France. Soil and Tillage Research, 170, 14-17

Friedli, C.N., Abiven, S., Fossati, D., Hund, A., 2019. Modern wheat semi-dwarfs root deep on demand: response of rooting depth to drought in a set of Swiss era wheats covering 100 years of breeding. Euphytica 215, 85. doi:10.1007/s10681-019-2404-7

Hirte, J., Leifeld, J., Abiven, S., Mayer, J., 2018a. Maize and wheat root biomass, vertical distribution, and size class as affected by fertilization intensity in two long-term field trials. Field Crops Research 216, 197–208. doi:10.1016/j.fcr.2017.11.023

Hirte, J., Leifeld, J., Abiven, S., Oberholzer, H.-R., Hammelehle, A., Mayer, J., 2017. Overestimation of Crop Root Biomass in Field Experiments Due to Extraneous Organic Matter. Frontiers in Plant Science 8. doi:10.3389/fpls.2017.00284

Hirte, J., Leifeld, J., Abiven, S., Oberholzer, H.-R., Mayer, J., 2018b. Below ground carbon inputs to soil via root biomass and rhizodeposition of field-grown maize and wheat at harvest are independent of net primary productivity. Agriculture, Ecosystems & Environment 265, 556–566. doi:10.1016/j.agee.2018.07.010

Stevenel, P., Frossard, E., Abiven, S., Rao, I.M., Tamburini, F., Oberson, A., 2019. Using a Tri-Isotope (13C, 15N, 33P) Labelling Method to Quantify Rhizodeposition, in: Reinhardt, D., Sharma, A.K. (Eds.), Methods in Rhizosphere Biology Research, Rhizosphere Biology. Springer Singapore, Singapore, pp. 169–195. doi:10.1007/978-981-13-5767-1_10

Studer, M.S., Künzli, R., Maier, R., Schmidt, M.W.I., Siegwolf, R.T.W., Woodhatch, I., Abiven, S., 2017. The MICE facility – a new tool to study plant–soil C cycling with a holistic approach. Isotopes in Environmental and Health Studies 53, 286–297. doi:10.1080/10256016.2016.1254209

Studer, M.S., Siegwolf, R.T.W., Abiven, S., 2016. Evidence for direct plant control on rhizosphere priming. Rhizosphere 2, 1–4. doi:10.1016/j.rhisph.2016.10.001

Van de Broek, M., Ghiasi, S., Decock, C., Hund, A., Abiven, S., Friedli, C., Werner, R.A., Six, J., 2020. The soil organic carbon stabilization potential of old and new wheat cultivars: a 13CO2-labeling study. Biogeosciences 17, 2971–2986. doi:10.5194/bg-17-2971-2020

Coppola, A.I., Wiedemeier, D.B., Galy, V., Haghipour, N., Hanke, U.M., Nascimento, G.S., Usman, M., Blattmann, T.M., Reisser, M., Freymond, C.V., Zhao, M., Voss, B., Wacker, L., Schefuß, E., Peucker-Ehrenbrink, B., Abiven, S., Schmidt, M.W.I., Eglinton, T.I., 2018. Global-scale evidence for the refractory nature of riverine black carbon. Nature Geoscience 11, 584–588. doi:10.1038/s41561-018-0159-8
Cotrufo, M.F., Boot, C., Abiven, S., Foster, E.J., Haddix, M., Reisser, M., Wurster, C.M., Bird, M.I., Schmidt, M.W.I., 2016. Quantification of pyrogenic carbon in the environment: An integration of analytical approaches. Organic Geochemistry 100, 42–50. doi:10.1016/j.orggeochem.2016.07.007
Reisser, M., Purves, R.S., Schmidt, M.W.I., Abiven, S., 2016. Pyrogenic Carbon in Soils: A Literature-Based Inventory and a Global Estimation of Its Content in Soil Organic Carbon and Stocks. Frontiers in Earth Science 4. doi:10.3389/feart.2016.00080

Soucémarianadin, L., Reisser, M., Cécillon, L., Barré, P., Nicolas, M., Abiven, S., 2019. Pyrogenic carbon content and dynamics in top and subsoil of French forests. Soil Biology and Biochemistry 133, 12–15. doi:10.1016/j.soilbio.2019.02.013
González-Domínguez, B., Niklaus, P.A., Studer, M.S., Hagedorn, F., Wacker, L., Haghipour, N., Zimmermann, S., Walthert, L., McIntyre, C., Abiven, S., 2019. Temperature and moisture are minor drivers of regional-scale soil organic carbon dynamics. Scientific Reports 9, 6422. doi:10.1038/s41598-019-42629-5

González-Domínguez, B., Studer, M.S., Hagedorn, F., Niklaus, P.A., Abiven, S., 2017. Leaching of soils during laboratory incubations does not affect soil organic carbon mineralisation but solubilisation. PLOS ONE 12, e0174725. doi:10.1371/journal.pone.0174725

Morvan T., Lemoine C., Gaillard F., Hamelin G., Trinkler B., Carteaux L., Petitjean P., **Jaffrezic A**. 2020. A comprehensive dataset on nitrate, Nitrite and dissolved organic carbon leaching losses from a 4-year Lysimeter study. *Data in Brief.* 32,8,2352-3459

Humbert, G., Parr, T.B., Jeanneau, L., Dupas, R., Petitjean, P., Akkal-Corfini, N., Viaud, V., Pierson-Wickmann, A.-C., Denis, M., Inamdar, S., Gruau, G., Durand, P., **Jaffrezic, A**. 2019. Agricultural Practices and Hydrologic Conditions Shape the Temporal Pattern of Soil and Stream Water Dissolved Organic Matter. *Ecosystems*, 10.1007/s10021-019-00471-w

Jaffrezic A., Soulier A., Carrera L., Le Bot B, Jardé E. 2017. Veterinary pharmaceutical contamination in mixed land use watersheds : from agricultural headwater to water monitoring watershed. *Science of the Total Environment*, 609, 992-1000

Dupas R., Gruau G., Sen Gu, Humbert G., **Jaffrézic A**., Gascuel-Odoux C., 2015. Groundwater control of biogeochemical processes causing phosphorus release from riparian wetlands. Water Research, , 84, 307-31http://dx.doi.org/10.1016/j.watres.2015.07.048

Humbert G., **Jaffrézic A.,** Fovet O., Gruau G., Durand P., 2015. Dry season length and runoff control annual variability in stream DOC dynamics in a small, shallow groundwater-dominated agricultural watershed., *Water Resources Research* 5110.1002/2015WR017336.

THESIS FUNDING

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