

FROM MICROBIOLOGICAL TO ECOSYSTEMIC SCALE EVALUATION OF CARBON-BASED (CO₂, CH₄) GREENHOUSE GAS SOURCES, PRODUCTION, AND TRANSFERS IN TEMPERATE PEATLANDS: A PLURIDISCIPLINARY WEEK AT THE PLAYGROUND FOR CRITICALZONISTS IN FRASNE, JURA MOUNTAINS

A. Lhosmot, A. Jacotot, C. Bouchez, E. Chation, S. Coffinet, P. Binet, R. Calisti, E. A. D. Mitchell, D. Gilbert, M-L. Toussaint, M. Steinmann, T. Meador, C. Loup, D. Combaz, L. Joly, F. Parent, N. Dumelle, G. Albora, Jean-Louis Bonne, C. Abdallah, T. Lauvaux, J. Burgalat, N-M. Hoang, L. Longuevergne, O. Mathieu, P. Amiotie-Suchet, V. Lavastre, M-N. Pons, A. Elger, R. Walcker, V. Essert, L. Millet, H. Masclaux, V. Verneaux, A. Boetsch, J. Ducasse, C. Hazard, H. Wang, V. Jassey, L. Gandois, J-S. Moquet, S. Gogo, V. Milesi and G. Bertrand

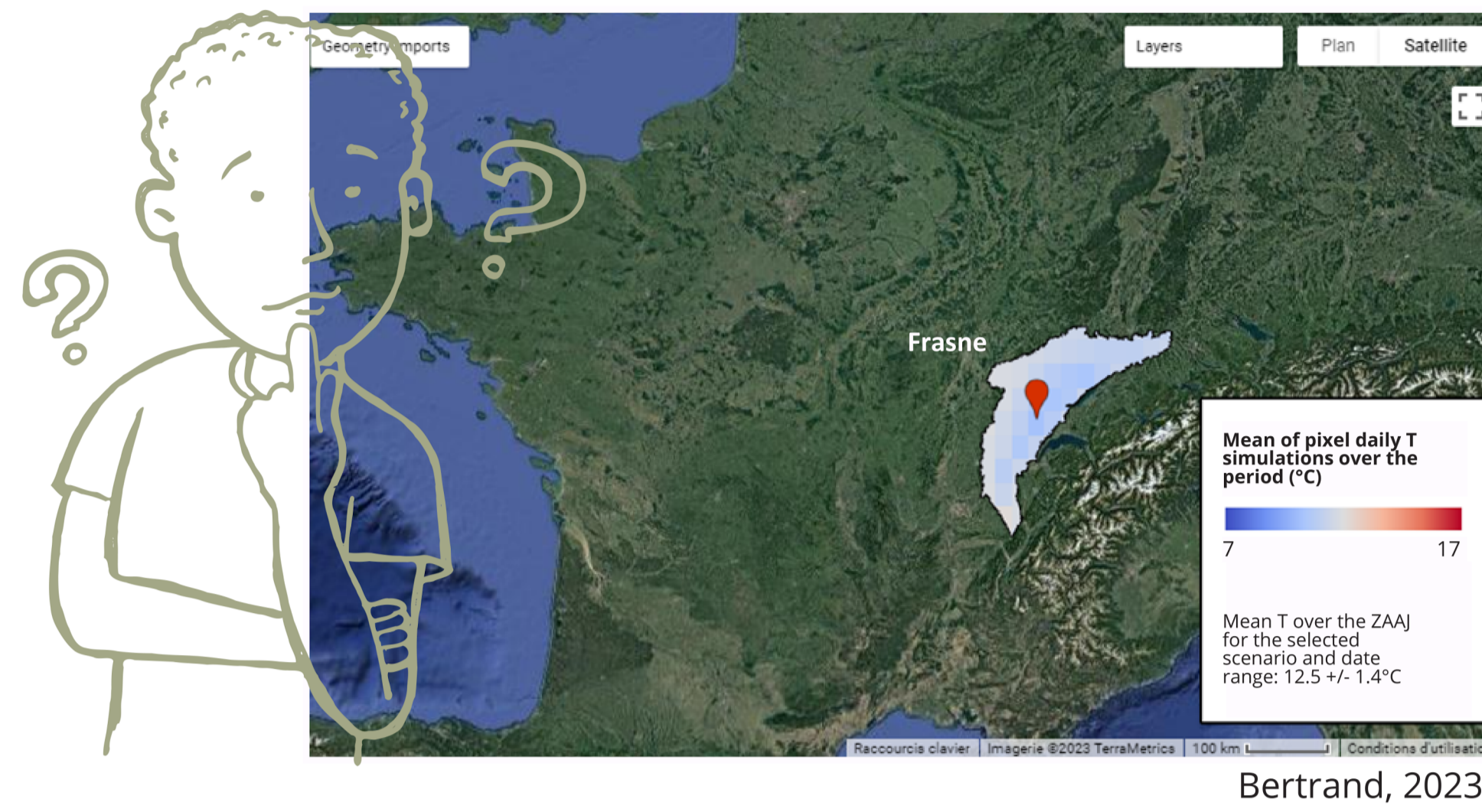
Contact: alexandre.lhosmot@univ-fcomte.fr guillaume.bertrand2@univ-fcomte.fr laurent.longuevergne@univ-rennes1.fr. Website : www.sno-tourbières.cnrs.fr

Several interdisciplinary teams met on the Frasne peatland observatory to study key mechanisms for greenhouse gas (GHG) emissions at different scales. It's an important work for both developers (testing their sensor, intercomparison), researchers and managers (acquisition of original data).

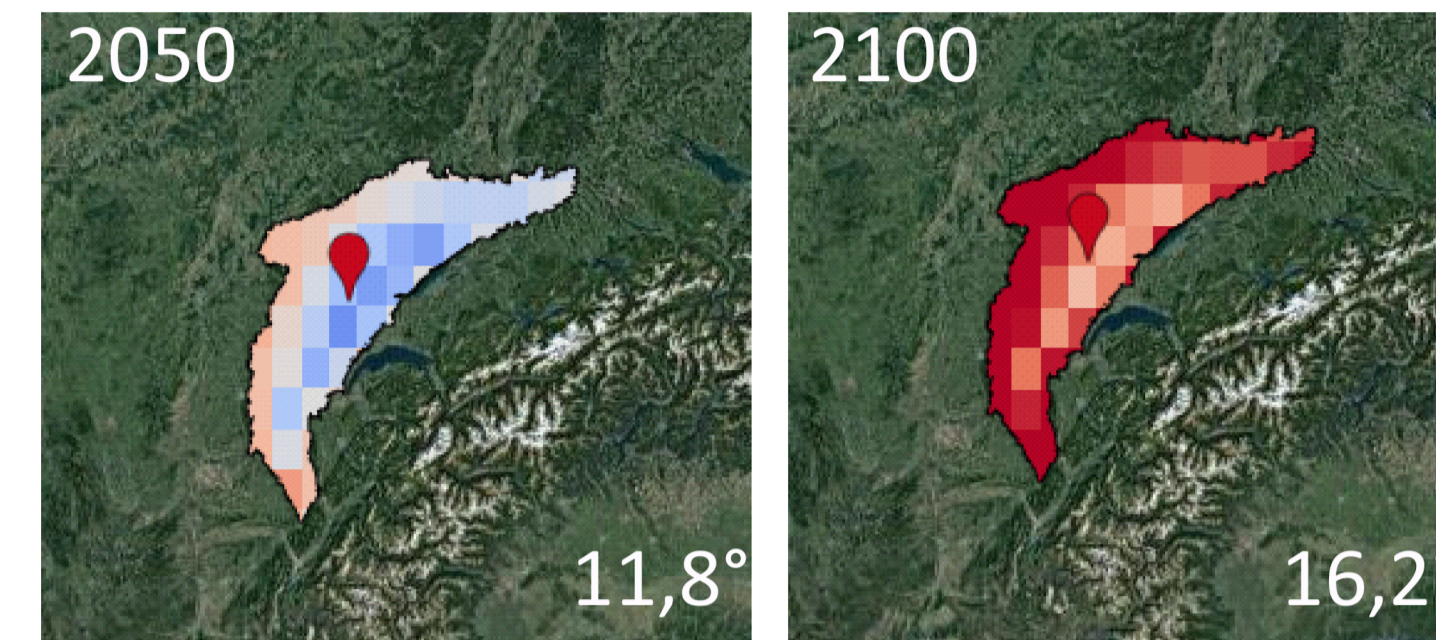
KEY FIGURES

- 1** week in June 2023
- 15** laboratories
- 17** researchers in the field
total 43 researchers
- 12 K€** budget for analyses
+ logistics
- 33** indicators/parameters

HOW PEATLAND ARE FACING CLIMATE CHANGE?



and how it can impacts carbon exchanges with atmosphere, lithosphere and hydrosphere?



IPCC's shared socioeconomic pathways (ssp 585)



SUPPORT FUNDING



SPECIFIC GOALS AND SET-UP

BALANCE AND FLOWS

Characterisation of the spatial heterogeneity of production and transfers of carbon

METHODOLOGICAL DEVELOPMENT

Calibration: CO₂/CH₄ concentration measurements taken by drone vs chambers and flux tower ; optical DOC (Dissolved Organic Carbon) measurements

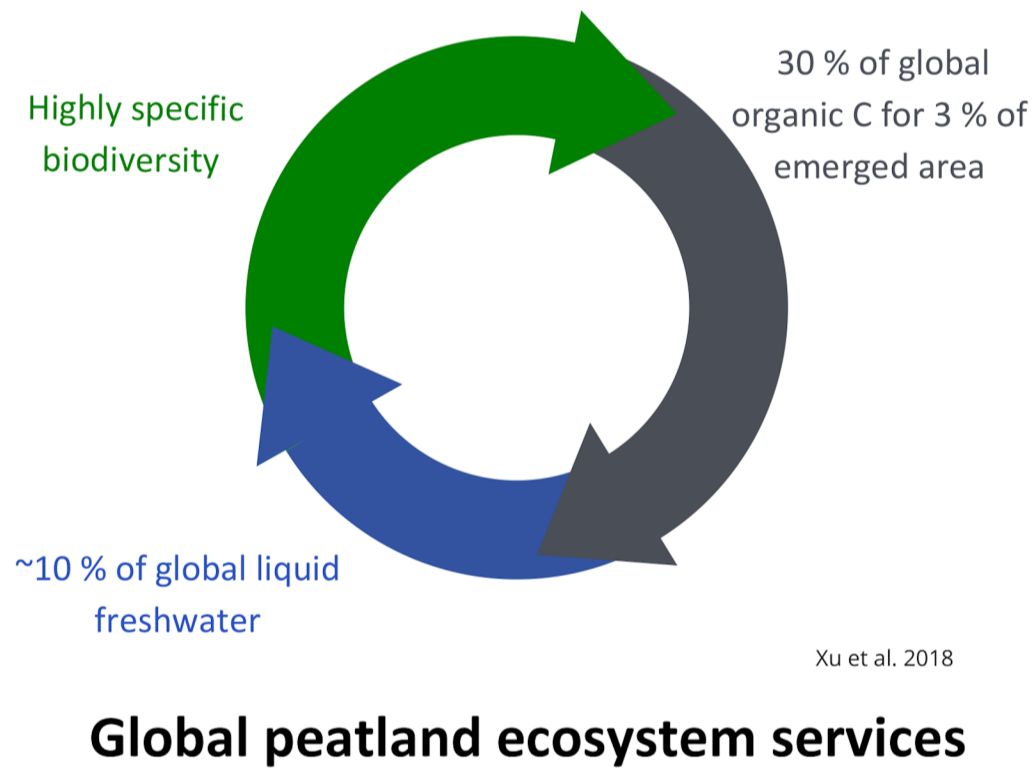
MECHANISMS

Characterisation of aerobic respiration, methanogenesis and methanotrophy through a combination of geochemical measurements

OUTLOOKS

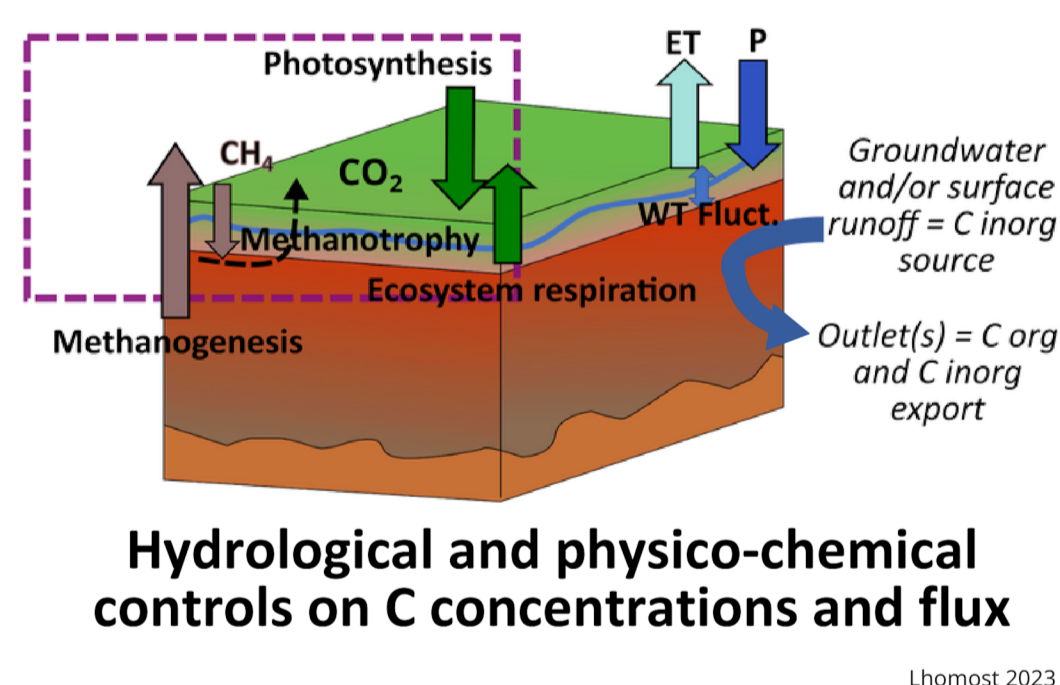
Laboratory work, modelling, data analysis and management, publication

GLOBAL SCALE



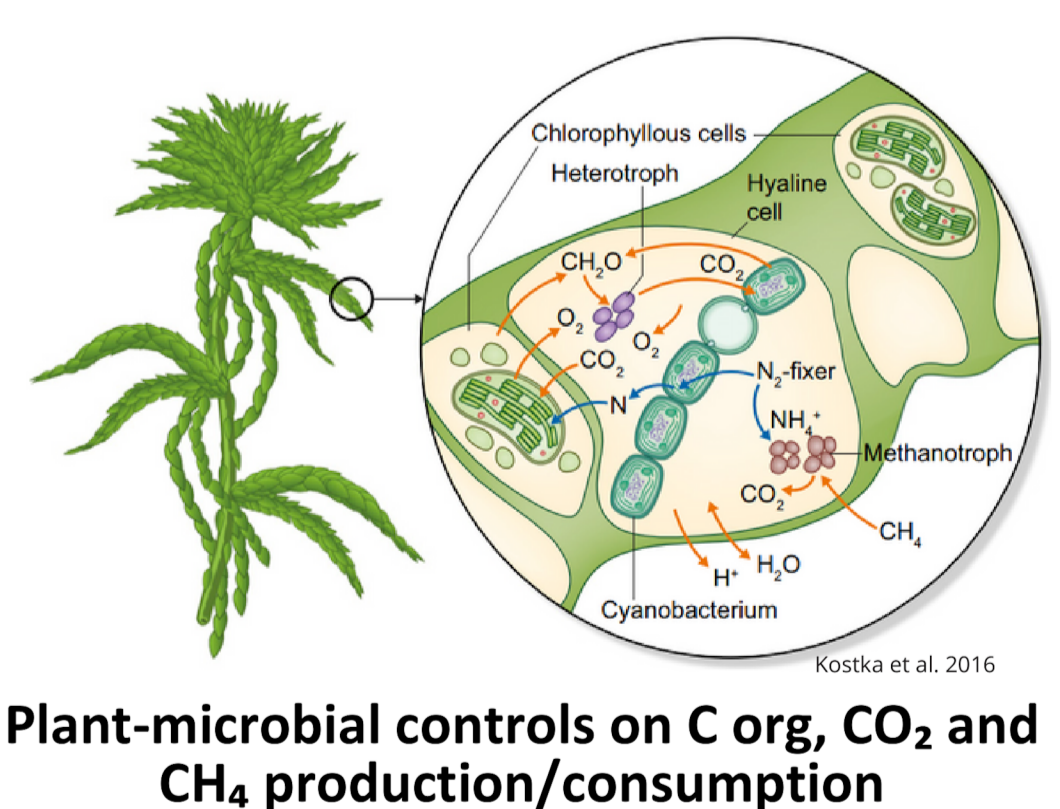
Global peatland ecosystem services

ECOSYSTEM SCALE

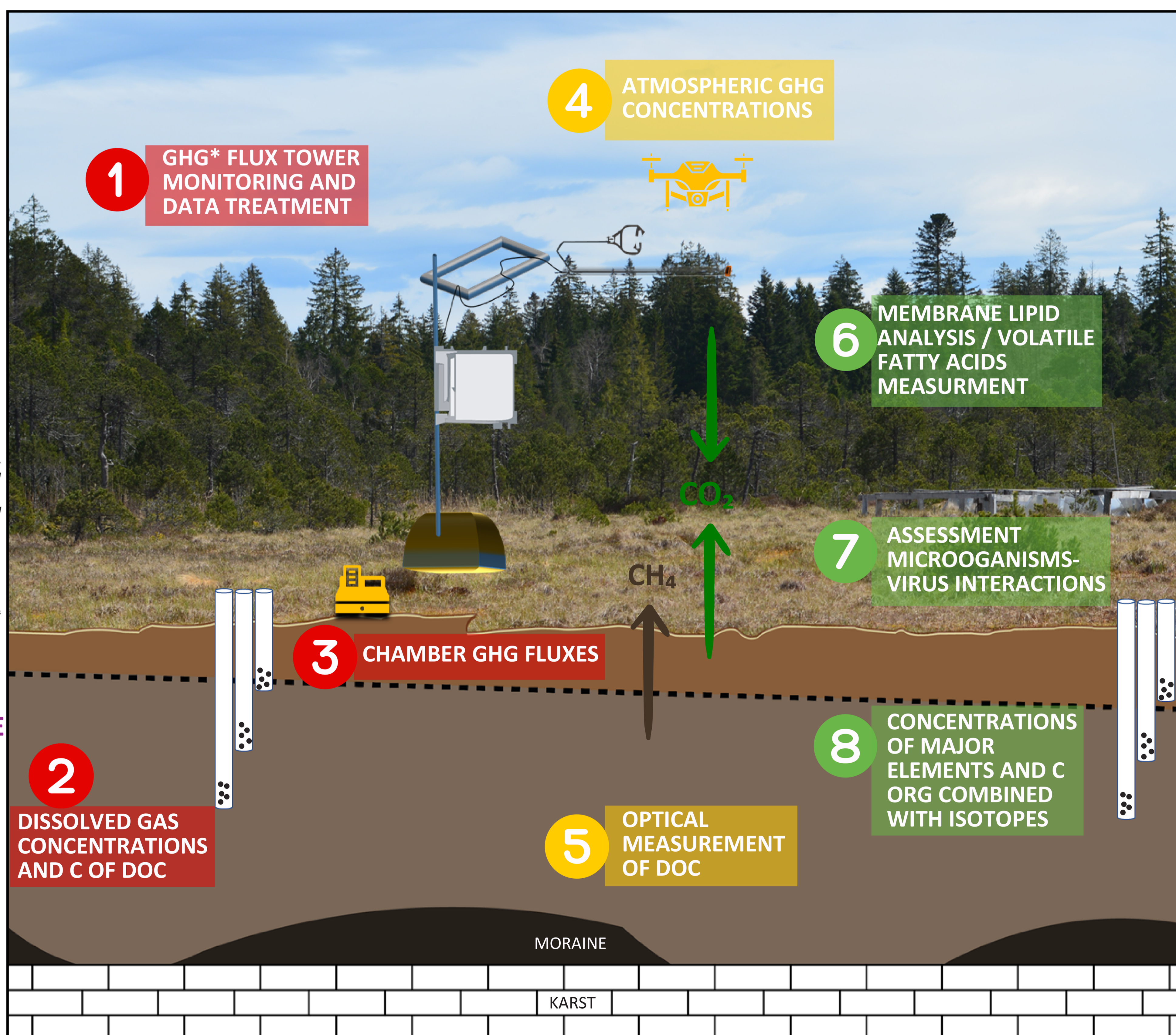


Hydrological and physico-chemical controls on C concentrations and flux

MICROBIOLOGICAL SCALE



Plant-microbial controls on C org, CO₂ and CH₄ production/consumption



Schema: Alex Ponçot

- 1 CHRONO ENVIRONNEMENT
- 2 SAS
- 3 GEOSCIENCES Rennes
- 4 Faculty of Science Institute of biology Laboratory of Soil Biodiversity
- 5 GSMA
- 6 LRP
- 7 ECOBIO Rennes
- 8 ISTO
- 9 ECOLE CENTRALE LYON
- 10 Laboratoire de Géologie de Lyon Terre planètes Environnement
- 11 BIOGEOSCIENCES
- 12 SOWA Research Infrastructure
- 13 CHRONO ENVIRONNEMENT



REFERENCES

Bertrand G. (2023). CLIMAAJ_Sim application. https://guillaume353.users.earthengine.app/view/climaa_jv0
 Kostka et al. (2016). The Sphagnum microbiome: new insights from an ancient plant lineage. *New Phytol* 211:57–64.
 Lhosmot A. (2023). Transferts d'eau et de carbone entre les tourbières, l'atmosphère et les aquifères. Modèles hydrologiques, géochimiques et de flux de gaz à effet de serre de la tourbière active de Frasne (Massif du Jura, France). PhD, Université de Bourgogne Franche-Comté, 404 p.
 Xu et al. (2018). PEATMAP: Refining estimates of global peatland distribution based on a metaanalysis. *CATENA* 160:134–140.



INFORMATIONS ABOUT WEBINAR, TERRA FORMA AND SNO TOURBIÈRES



PICS H. RAGUET
CNRS
BY ND

Poster designed by M.Poulain-Jamilloux