- Presentation sheet :

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Extracellular oxidative metabolisms (EXOMETs): from prebiotic chemistry to contemporary soil CO_2 emissions

Soils represent a larger carbon sink than the combined sinks supported by the atmosphere and the terrestrial vegetation. This carbon compartment directly affects the concentration of atmospheric CO_2 through the organic matter mineralization process. Predict the carbon fluxes between the soil and the atmosphere therefore require a complete understanding of the processes involved in the organic matter mineralization. Until 2013, it was commonly admitted that the respiration supported by heterotrophic microorganisms was the main process through which the soil organic matter mineralization was regulated. However, following the observations of CO_2 emissions from sterilized soils, we formulated the hypothesis that carbon organic matter can be mineralized by extracellular oxidative metabolisms (EXOMET). The studies conducted during this phD will aim at (i) understanding catalytic processes sustained by EXOMET, (ii) investigating the relative contribution of EXOMETs to soil CO_2 emissions in response to global warming, (iii) initiating a research to investigate the putative role of EXOMETs in the prebiotic chemistry reactions.

Kéraval B, **Lehours A-C**, (…), **Fontaine S** (2016) Soil carbon dioxide emissions controlled by an extracellular oxidative metabolism identifiable by its isotope signature. **Biogeosciences** 13, 6353-6362.
Kéraval B, **Fontaine S**, (…), **Lehours A-C** (2018) Cellular and non-cellular mineralization of organic carbon in soils with contrasted physicochemical properties. **Soil Biology and Biochemistry** 125:286-289.