

From water rock-interaction to methanogenesis: How climate induced raise of groundwater inputs might favor CH₄ fluxes in the mid latitude/altitude Frasnian peatland, Jura Mountains, France.

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Peatlands are socio-ecosystems that constitute an inherent part of the Critical Zone in which water quality and quantity are key components of biogeochemical functions that drive peat accumulation, carbon and vegetation dynamic. Because peatlands store a huge stock of carbon, shelter a specific biodiversity, and impact hydrological dynamics at the watershed scale, they gather the main environmental challenges of the 21st century. There is therefore an imperative need to evaluate their reactivity to ongoing climate change and human disturbances, especially as changes in water inputs and quality could alter their ecological equilibrium and biogeochemical dynamics.

In order to investigate the possible relationships between water origins and chemistry and biogeochemical processes affecting C (Carbon) exchanges between peatland and atmosphere, this study focused on a sphagnum dominated peatland. The site belongs to the French Observatory of Tourbières and the Zone Atelier Arc Jurassien (French Jura Mountains; 46.826 N, 6.1754 E; 850 m a.s.l), and is located in a karstified syncline overlain by fluvio-glacial deposits. Chemical and isotopic characterization combining $\delta^{13}\text{CDIC}$ (Dissolved Inorganic Carbon), $\delta^{18}\text{OH}_2\text{O}$, $\delta^2\text{HH}_2\text{O}$, $^{87}\text{Sr}/^{86}\text{Sr}$, Dissolved Organic Carbon (DOC) concentration and physico-chemical parameters (T, Eh, pH, O₂) has been performed in Feb 2021 over 10 piezometers tapping both surface and deep peat layers, rainwater, outlet and surrounding karstic springs. In addition, one complete (Feb 2020-2021) of monthly evaluation of $\delta^{18}\text{OH}_2\text{O}$, $\delta^2\text{HH}_2\text{O}$ DOC and physico-chemical parameters has been performed.

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