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Two-years of Eddy-covariance CO_2 and CH4 measurements in a French peatland dominated by Molinia caerulea

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Peatlands act as a powerful carbon (C) sink. This specificity notably results from their particular environment, composed of Shagnum mosses, and the acidic state of the soil combined with a high water saturation that strongly limit organic matter decomposition. Future natural and anthropogenic global changes are expected to modify peatlands functioning and notably their species composition, which could reverse their valuable role in C sequestration and thus in climate change mitigation. However, the response of peatlands to these biotic changes, and thus the variability of greenhouse gas fluxes, remains poorly characterized and understood. We investigated CO_2 and CH4 emissions in the La Guette peatland, an acidic fen located in the center of France, thanks to an Eddy-covariance station that was installed in the ecosystem in early 2017. In addition, this site is applying for the ICOS network labelling as an associated site, and follows the ICOS recommendations. Our main concern is that La Guette peatland is submitted to a strong domination by a grass plant, Molinia caerulea, which is suspected to modify the C dynamic of the ecosystem. From January 2017 to date, CO_2 and CH4 fluxes to the atmosphere ranged from to -19.46 to 19.73 μmol m-2 s-1 and from -0.10 to 0.10 μmol m-2 s-1, respectively. Mean CO_2 flux for 2017 and 2018 were respectively $\sim$ -0.21 and $\sim$ -0.89 μmol m-2 s-1, showing that La Guette peatland acted as a sink of C over these two years. This result suggests that Molinia caerulea did not reverse the C sequestration potential of the fen. In a larger scale, this Eddy-covariance station is a part of a French Peatland Observatory Service, and is included in a network of three tower fluxes deployed in three contrasted French peatlands. This Eddy-covariance network will provide important data that will help to understand the evolution of the C balance in temperate peatlands with global changes.