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Stable (O, H) and strontium isotope tracing of the Narces de la Sauvetat peatland (Massif Central, France) water fluxes

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Increasing efforts were engaged to restore degraded or lost wetlands and to manage wetlands sustainably in order to assess their multiple benefits during the past decades. In this context, important knowledge on the water cycle in the wetlands is required to manage specific actions to restore and preserve these areas. In this study, we propose to use chemical and multi-isotopic approaches combined with hydrological measurements (piezometric level and stream flow measurements) to trace the fluxes of water and dissolved element involved in the “Narces de la Sauvetat” peatland (France) and for the stream draining the area. Aims are to evaluate the water status of this ecosystem as well as the origin of dissolved elements and possible anthropogenic impacts. These approaches clearly demonstrated their effectiveness to improve the knowledge on the hydrological functioning of wetlands ecosystems.

Main results are (1) at least three fluxes with distinct chemical and isotopic signatures are providing water supplies to peatland, (2) water flow that comes out of the peatland through the stream is certainly negligible and (3) water within the peat land exhibits isotopes values consistent with carbonate amendments inputs used in local agriculture.

The outcomes of this study are that peatland ecosystem water balance is poorly affected by its outlet but are strongly controlled by groundwater replenishment. This could lead to a better adjustment of decision maker choices to maintain the water balance of the peatland, which is essential for the preservation of this fragile ecosystem.