



HAL
open science

Small but essential in hydrogeochemical cycles: headwater mountain catchments

Gaël Le Roux, Marilen Haver, Thomas Rosset, Dirk Schmeller, Laure Gandois, Deonie Allen, Stéphane Binet, Anaëlle Simonneau, Youen Grusson, Thierry Camboulive, et al.

► To cite this version:

Gaël Le Roux, Marilen Haver, Thomas Rosset, Dirk Schmeller, Laure Gandois, et al.. Small but essential in hydrogeochemical cycles: headwater mountain catchments. EGU General Assembly 2020, May 2020, Online, France. 10.5194/egusphere-egu2020-20379 . hal-03554400

HAL Id: hal-03554400

<https://hal.science/hal-03554400v1>

Submitted on 4 Feb 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

EGU2020-20379

<https://doi.org/10.5194/egusphere-egu2020-20379>

EGU General Assembly 2020

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Small but essential in hydrogeochemical cycles: headwater mountain catchments

Gaël Le Roux¹, Marilen Haver¹, Thomas Rosset¹, Dirk Schmeller¹, **Laure Gandois**¹, Deonie Allen^{1,2}, Stéphane Binet³, Anaëlle Simonneau³, Youen Grusson¹, Thierry Camboulives¹, Sabine Sauvage¹, Didier Galop⁴, Simon Gascoin⁵, and José Miguel Sánchez Pérez¹

¹EcoLab, CNRS-University of Toulouse, Castanet-Tolosan, France (gael.leroux@ensat.fr)

²Department of Civil and Environmental Engineering, University of Strathclyde, Glasgow, UK.

³ISTO, CNRS UMR 7327, Université d'Orléans, BRGM, Orléans, France

⁴GEODE, UMR-CNRS 5602, Université Toulouse Jean Jaurès, Toulouse, France.

⁵CESBIO, Université de Toulouse, CNRS/CNES/INRA/IRD/UPS, Toulouse, France

Despite their small size, headwater catchments of European mountains are essential because they provide many ecosystem services (water quality, energy, tourism, ecological niches).

Based on the hydrological monitoring of a mountain catchment in the central Pyrenees and the extreme conditions encountered in the past and expected in the future, we present scenarios for the evolution of hydrological regimes that will potentially impact the socio-ecological services by high mountain mires, ponds and lakes. In particular, in view of the exacerbated climate change in the high mountains, the shortening of snow season will potentially impact the ecosystem services by the ponds, modifying the minimum water level and/or ecological flow in late spring and early summer. For example, these ponds play an essential role as ecological refuges compared to larger lakes, which are subject to invasions by non-native organisms. Peat pools also play an essential role in the cycling of chemical elements, including carbon. Their modification, their increased intermittency due to more frequent and intense climatic variability will deeply modify, for example, the export of dissolved organic carbon from peatlands.

While it is difficult to accurately predict the future of mountain watersheds, our study aims to identify the key factors for their current roles in biodiversity, water sustainability and in ecological services as well as to determine their future adaptability to other human pressures such as mini-hydroelectric power plants.