

EGU22-5011

<https://doi.org/10.5194/egusphere-egu22-5011>

EGU General Assembly 2022

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Dealing with a PFAS-polluted aquifer: from modelling to in-situ remediation treatment

Carme Bosch¹, **Lidia Fernandez-Rojo**¹, Leonidas Perez-Estrada¹, Mireia Plà-Castellana¹, Nicolas Devau², Hans Groot³, Annemieke Marsman³, Marinel·la Farré⁴, Miren López de Alda⁴, Víctor Matamoros⁴, Hector de Buen⁵, and Ricard Mora⁵

¹EURECAT, Water Air Soil Unit, Manresa, Spain (carme.bosch@eurecat.org; lidia.fernandez@eurecat.org)

²French Geological Survey (BRGM), Orléans, France

³DELTAES, Delft, Netherlands

⁴Institute of Environmental Assessment and Water Research (IDAEA-CSIC), Barcelona, Spain

⁵ESOLVE, Barcelona, Spain

PFAS (per- and polyfluoroalkyl substances) are anthropogenic pollutants which are persistent in the environment and toxic for the human health. The H2020 PROMISCES project (GA-101036449), funded through the European Green Deal call, aims to understand the origins, routes and fates of these pollutants with the goal of moving forward a zero-pollution circular economy. One of the considered routes is the soil-groundwater continuum. Here, this route is studied within a case study located in Tordera aquifer (Spain) affected by PFAS from aqueous film forming foams used in fire-fighting activities.

Modelling the fate and transport of PFAS in a real aquifer is one of the objectives of PROMISCES. The proposed model train will be built by coupling a 1D-2D variably-saturated flow reactive model, developed using a modified version of HYDRUS/PHREEQC, for the vadose zone, and a 2D-fully saturated flow and reactive transport model based on Modflow/MT3D software, for the saturated zone. Thus, it will provide information about the fluxes from contaminated soil to groundwater in the investigated case study. The models produced within PROMISCES can be used to predict the PFAS plume evolution in similar polluted aquifers.

Another goal of the project is to develop novel remediation technologies to degrade PFAS in groundwater. Alternative oxidation processes (e.g. persulfate activated with Fe(II), H₂O₂, or (n)ZVI) will be tested at bench-scale. Based on degradation rate, by-product formation, reagent consumption and associated costs, the most efficient treatment will be chosen for up-scaling and applied within the investigated polluted aquifer.

In this conference, it will be presented how the PROMISCES project address the PFAS-polluted aquifer problem in a dedicated site with modelling tools and with the implementation of in situ advanced oxidation treatments to depollute groundwater.

