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In-situ adsorption of per- and polyfluorinated alkyl substances (PFAS) for remediation of contaminated groundwater

Fritjof Fagerlund (1), Lutz Ahrens (2), Mattias Sörengård (2), Erik Östblom (2), Dan Berggren Kleja (3), Jonny Bergman (4), Henning Persson (5), Lijana Gottby (5), Marko Filipovic (6), and Johan Edvinsson (6)

(1) Department of Earth Sciences, Uppsala University, 75236 Uppsala, Sweden, (2) Swedish Agricultural University, Aquatic Sciences and Assessment, Box 7050, 75007 Uppsala, Sweden, (3) Swedish Agricultural University, Soil and Environment, Box 7014, 75007 Uppsala, Sweden, (4) RGS Nordic, Fannys väg 3, 13154 Nacka, Sweden, (5) Swedish Geological Survey, Villavägen 18, 75236 Uppsala, Sweden, (6) NIRAS Sweden AB, Fleminggatan 14, 11226 Stockholm, Sweden

Poly- and perfluoroalkyl substances (PFASs) are highly fluorinated compounds, many of which are widespread, extremely persistent in the environment, bioaccumulate, and are potentially toxic to wildlife and humans. Because conventional in-situ remediation methods for soil and groundwater are inefficient for most PFASs, there are currently no established methods for PFAS in-situ remediation. Instead, long-term pumping with treatment of contaminated water is common. Robust methods to remediate PFASs in situ and stop PFAS plumes in groundwater from reaching drinking water resources are urgently needed.

In this study, we present the newly started StopPFAS project and our preliminary results aimed at developing in-situ methods to efficiently sorb and immobilize PFASs in plumes in groundwater originating from hot spot areas. Different sorbents were tested in the laboratory for their ability to adsorb PFASs under various conditions relevant to field sites. In parallel, we work with a PFAS contaminated field site where a pilot test of an in-situ sorbent barrier for PFASs will be performed.

Preliminary results from the laboratory indicate that activated carbon (AC) sorbents are promising candidates for in-situ adsorption of PFASs in groundwater. The site investigations indicate that local hydrological and geological conditions (e.g. soil characteristics) are important for the application of sorbents in the field and pose challenges for efficient implementation of sorbent-based, in-situ PFAS remediation.