Hydrogeological characterization of a meso-scale artificial recharge experiment focused on emerging contaminants fate

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Water is essential for life, for industry, agricultural and supply purposes. Waste Water Treatment Plants treat huge volumes of waste water which are directly discharged into water bodies or unintentionally infiltrated through the river beds into underlying aquifers. The development and standardization of efficient, sustainable and cost-effective techniques for water treatment is imperative to deal with the scarcity of quality water. Managed aquifer recharge (MAR) is a very useful option to improve quality groundwater resources and to reduce direct discharges The use of reactive barriers or layers in MAR facilities has proved to be an efficient tool to enhance the degradation of emerging contaminants. An experimental MAR system using reactive barriers has been constructed in Palamós to study the degradation of potential contaminants that may be commonly present in WWTP effluents. This experiment consists of 6 independent scaled MAR boxes made of concrete, where multiple monitoring points have been implemented to control water flow and quality evolution. Numerical models have been used to understand the flow and conservative transport behaviour at every tanks, using pressure evolution during dry-wet periods as well as tracer tests to calibrate flow and conservative transport parameters. These results are the base to evaluate the degradation processes affecting contaminants in MAR systems.