



Linking redox processes and carbon cycling in a Managed Aquifer Recharge system

Albert Folch (1,2), Carme Barba (1,2), Albert Carles Brangarí (3), Xavier Sanchez-Vila (1,2), and Rafael Marcé (4)

(1) Department of Civil and Environmental Engineering, Universitat Politècnica de Catalunya (UPC), Jordi Girona 1-3, 08034 Barcelona, Spain, (2) Associated Unit: Hydrogeology Group (UPC-CSIC), (3) Microbial Ecology, Department of Biology, Lund University, Ecology building, SE-223 62 Lund, Sweden, (4) Catalan Institute for Water Research (ICRA), Emili Grahit 101, 17003 Girona, Spain

Nowadays, Managed Aquifer Recharge (MAR) is a wide-implemented technique used to recover impacted groundwater bodies. Especially in hydric-stressed zones and environmentally impacted basins, MAR activities may play a key role in water management. Due to their characteristics, infiltration ponds are facilities that allow accomplishing both quality and quantity targets.

Castellbisbal Recharge system (Castellbisbal, Barcelona, Catalonia) is a study site that feeds the overexploited Llobregat pre-delta aquifer, which sustains mainly industrial and agricultural uses. The system consists of two ponds. The first pond (15000m²) receives water directly from the Llobregat River and acts as a natural impermeable wetland. After few days of residence time, water is diverted to a second pond (1400m²) where it is filtered through 4m of vadose zone down to the aquifer. The system is monitored with piezometers upstream, downstream and in the middle of infiltration pond. Furthermore, 3 manual piezometers installed in the infiltration pond vadose zone allow sampling water along the first meter of depth. Lastly, a monitoring network of temperature and redox sensors was installed at the soil in order to test relevant changes on these parameters.

The aim of this study is to understand the carbon cycle behavior at field scale along the all system (sedimentation and recharge pond) and link it with changes observed by redox and temperature changes. Four field campaigns were carried out according to pond management (dry vs wet periods) and seasons. On them, major hydrochemistry and DOM characterization by fluorescence were analyzed.