



Denitrification in a hyporheic riparian zone controlled by river regulation

F. Curie (1), A. Ducharne (1), M. Sebilo (2) and H. Bendjoudi (1)

(1) Université Pierre et Marie Curie, CNRS, UMR Sisyphe, Paris, France, (2) Université Pierre et Marie Curie, UMR BIOEMCO, Paris, France

(florence.curie@ccr.jussieu.fr)

The purpose of this paper is to study the denitrification and the conditions for its development in a hyporheic zone. The study site is the riparian zone of a former branch of the Seine River where the river stage is kept almost constant during the year by hydraulic regulation. Hydrological and geochemical surveys were performed by monitoring four wells, ten shorter piezometers and the river over a 15-month period. The water fluxes originating from the calcareous cuesta and the river converge to a zone parallel to the river which can play the role of drain. The riparian zone between this drain and the river shows an important depletion of nitrate during the summer and autumn period which cannot be explained by a simple mixing of waters coming from the river and the cuesta. It can be attributed to denitrification as it occurs when oxygen concentration is below 2 mg/l, with a consumption of dissolved organic carbon and a decrease of redox potential. The river totally controls these hydro-geochemical conditions. It also keeps the wetness of the riparian zone almost constant, which allowed us to isolate the high temperatures in summer and autumn as an important triggering factor to denitrification, by its influence on the reaction rate and oxygen deficits. We also showed a small isotopic enrichment of nitrate, suggesting that denitrification occurs after diffusion of nitrate through the sediment and riparian zone matrix, which is consistent with the hyporheic functioning of the study site.