UNIVERSITÉ DE NEUCHÂTEL

CHYN
Centre d'hydrogéologie et de géothermie

M.Sc. in Hydrogeology and Geothermics

Thesis topic proposal 2021

USE OF ARTIFICIAL RECHARGE TO IMPROVE GROUNDWATER QUALITY IMPACTED BY AGRICULTURE

Context and objectives

On the Swiss Plateau, recharge areas of major drinking water aquifers often overlap with zones of intense agriculture. This has led to the widespread contamination of groundwater with pesticide metabolites and nitrate leading to a challenging situation for water works. An increasingly discussed strategy to improve the water quality is artificial recharge. In Switzerland, this option is potentially feasible in numerous locations due to the presence of rivers originating from the Jura or Alpes with less intense land-use. While the strategy has been implemented in some urban areas (Basel, Geneva), it has not been used yet to address diffuse source pollution from agriculture. The main objective of the project is to explore the feasibility of artificial recharge to improve groundwater quality focussing on the Seeland as a case study area.

Research approach and methodology

The project will strongly rely on numerical modeling building on an existing model for the aquifer. Additional field data will be acquired for the zone of main interest around pumping wells to characterize groundwater flow patterns and the spatial distribution of nitrate and pesticide metabolites. Conceptual schemes for artificial recharge will be developed and implemented in the numerical model. It will be evaluate which configuration is most promising to decrease metabolite concentrations below target levels rapidly.

Partners and collaboration

The project will be carried out in collaboration with cantonal and federal authorities that currently explore different strategies to address the widespread groundwater pollution by pesticide metabolites.

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