

IMPROVING GROUNDWATER QUALITY IN AREAS WITH INTENSE AGRICULTURE

Contexte et objectifs

In Switzerland, groundwater contaminated by pesticide metabolites is currently the biggest challenge for drinking water production affecting more than 1 Mio consumers. In the next two years, water works have to develop and implement strategies to produce drinking water that respects the quality criteria. Currently, the metabolites of the fungicide chlorothalonil pose the largest problem. Although the use of this fungicide was banned at the beginning of this year, it is uncertain how long the metabolites will still occur at levels above the quality criteria, which makes it challenging for waterworks to plan their measures. The objective of the MSc thesis is to investigate the main factors that control the long-term evolution of the metabolite concentrations at a drinking water pumping well in close collaboration with the water supplier and cantonal authority.

Méthodologie et approches

The project provides a unique opportunity to make use of a broad range of field, laboratory and modeling methods to address a major groundwater challenge. Although the project focuses on a water quality issue, it will be indispensable to develop a solid understanding of the hydrogeology and hydrodynamics of the study site. A conceptual hydrogeological model will be established and overlapped with land-use patterns to understand the origin of the substances. Hydrochemical and stable isotope methods will be used to evaluate recharge mechanisms. Groundwater dating will be an important tool to estimate the travel time of the substances to the pumping well and thus to evaluate how quickly the water quality will improve after the ban of the substance. Depending on the advancement of the work, some modeling methods might be used as well.

Partenaires et collaborations

Groundwater dating by environment tracer methods will be carried out in close collaboration with the Physics Institute of the University of Berne (Dr Roland Purtschert). The students will use different techniques partly developed by a former CHYN student that is now doing a PhD at UNIBE. A major objective of the project is also that students become familiar with the role of different actors when groundwater problems are addressed in a practical context. Therefore, the student will also interact with members of cantonal authorities, which manage water resources, a consulting company, which provides advice to water works, and the water work.

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