

EFFECT OF THE HYDROGEOLOGICAL CONDITIONS ON THE MICROBIAL CHARACTERISTICS OF GROUNDWATER

Contexte et objectifs

Groundwater usually contains a considerable number of microorganisms. Microorganisms can impact the water quality. However, they are also essential for the self-cleaning of groundwater by degradation of contaminants and are part of the natural ecosystem. Our understanding of how the microbial characteristics of groundwater is related to hydrogeological conditions is incomplete. Traditional laboratory methods to detect microorganisms give only a partial picture of the microbial abundance and are difficult to implement at high temporal resolution. The development of new methods to quantify continuously the entire microbial population has opened new opportunities to understand the groundwater microbiology. The objective of the project is to compare the microbial characteristics of a series of springs and relate it to hydrogeological and meteorological conditions using these novel methods.

Méthodologie et approches

In order to be able to relate the microbial characteristics to hydrogeological conditions, the hydrogeology of the springs has to be thoroughly evaluated. This includes an analysis of the geology of the sites, the determination of the capture zones of the springs and the land use in the capture zone. In addition, continuously recorded discharge and hydrochemical data will be evaluated to understand the dynamics of the springs and how strongly they are influenced by meteorological conditions. Continuous records of microbial data are acquired with the latest instruments. The dataset includes total cell numbers and parameters related to characteristics of the microbial population. The student will then evaluate if springs originating from shallower and deeper flow paths, having a different land use in the capture zone and showing a varying temporal stability have different microbial characteristics. It will also be explored if the continuous recording of microbial parameter can be used to characterize the vulnerability of aquifers.

Partenaires et collaborations

The project will be carried out in close collaboration with a leading Swiss manufacturer of instruments for online water quality analysis and a mineral water producer, which exploits some of the springs. The project thus provides a unique opportunity to interact with various actor of the water industry, and put the hydrogeological knowledge into an applied context.

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