

- Faculté des sciences
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### Hydrochemical and microbial processes (3GH2166)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
<b>Master en hydrogéologie et géothermie</b>	<b>Cours: 40 pg</b>	Voir ci-dessous	4

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

#### Période d'enseignement:

- Semestre Automne

#### Equipe enseignante:

Hunkeler Daniel  
Wirth Stefanie  
Junier Pillar

#### Objectifs:

At the end of the course students will

- know the most important chemical compounds found in groundwater
- be familiar with the sources and processes that control the concentration of these compounds
- be familiar with methods to sample groundwater and quantify the concentrations of these compounds
- be able to quantify important processes/reactions that control the concentrations for equilibrium conditions (e.g. acid-base reaction, solubility, gas-water exchange)
- be able to deduce information about the functioning of a groundwater flow system from hydrochemical data

#### Contenu:

Introduction

- Units, typical composition of natural waters

Processes that control chemical composition of groundwater

- Dissolution of gas
- Acid-base reactions
- Dissolution of minerals (carbonates, silicates)
- Surface processes: Sorption and ion exchange
- Interaction with natural organic compounds
- Redox processes

Methods to sample and analyze groundwater

Tools to evaluate hydrochemical data

- PHREEQC
- AQUACHEM

Case studies that illustrate factors that control chemistry of groundwater use of hydrochemistry to investigate function of groundwater flow systems

#### Forme de l'évaluation:

Written exam of 2h duration.

#### Documentation:

PPT handout  
Script describing the key hydrochemical processes

#### Forme de l'enseignement:

Lectures, case studies, computer labs.

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