



UNIL | Université de Lausanne  
Faculté des géosciences et de l'environnement  
Secrétariat du master en biogéosciences  
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## Projet de travail de Masters

### Microbial cycling of sulfurized organic matter in freshwater sediments

#### Context :

Sedimentary organic sulfur (S) is of great interest due to its important influence on petroleum formation, organic carbon preservation, and atmospheric oxygen (O<sub>2</sub>) concentrations. Though many microorganisms are likely to be involved in the formation and utilization of organic sulfur, these interactions are not well understood, even though high rates of microbial sulfur cycling have been observed in lake and marine sediments. This project will focus on the isotopic signatures of microbial processes which are preserved in different sulfur compounds and can thus be used as tracers of microbial activity.

#### Scope of the study:

Organic and inorganic sulfur cycling will be studied in the low-sulfate, high-iron Lake Pavin, France. Sediment cores will be obtained in the field and sampled anoxically for porewater and solid-phase analyses. Different sulfur phases will be separated by mechanical and chemical (distillation) techniques and analyzed by photometry, ion chromatography, mass spectrometry. Isotopes of each phase will be analyzed in parallel as indicators of the degree of microbial utilization of different sulfur compounds. Molecular sequencing analyses targeting sulfate-reduction genes are also possible if time permits.

#### Required skills and working methods:

The ideal candidate is motivated to participate in field work and collaborates well in an international team. He/She is highly interested in geochemistry, microbiology, and multi-disciplinary approaches. Good knowledge of French is a plus.

#### Collaboration:

Prof. Jasmine Berg  
Institute of Earth Surface Dynamics (IDYST)  
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**Mots clé:** lake sediments, isotope geochemistry, mass spectrometry, sulfur cycling



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**Place de travail:** UNIL-Geopolis

**Références:**

Hansel CM, Lentini CJ, Tang Y *et al.* Dominance of sulfur-fueled iron oxide reduction in low-sulfate freshwater sediments. *ISME J* 2015;**9**:2400–12.

Werne JP, Lyons TW, Hollander DJ *et al.* Reduced sulfur in euxinic sediments of the Cariaco Basin: sulfur isotope constraints on organic sulfur formation. *Chemical Geology* 2003;**195**:159–79.

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