UNIL | Université de Lausanne
Faculté des géosciences et de l'environnement
Secrétariat du master en biogéosciences
bâtiment Géopolis
CH-1015 Lausanne

UNIVERSITÉ DE NEUCHÂTEL

Projet de travail de Masters

Iron-driven anaerobic oxidation of methane (Fe-AOM) in lake sediments

Context :
Methane is twenty-five times more efficient than CO_2 as a greenhouse gas and has contributed to as much as 0.5°C of warming since pre-industrial times . Methanogenesis, or microbial methane production, is the main natural source of methane on Earth but <1% is released to the atmosphere and the rest is mainly consumed through aerobic and anaerobic microbial methane oxidation. Iron-based anaerobic methane oxidation (Fe-AOM) likely played a key role in regulating methane emissions on early earth and in freshwater sediments today, but it has been only poorly studied so far.

Scope of the study:
This study aims to quantify the importance of Fe-AOM in several lakes under contrasting geochemical conditions. Each Masters' project will focus on one lake in Switzerland or in France. Sediment cores will be obtained in the field and sampled for solid compound and porewater analyses. Analyses of methane and iron compounds will be performed using a combination of techniques including mass spectrometry, ICP-OES, XRD, SEM-EDX. Molecular sequencing of microbial communities involved in Fe-AOM can also be performed 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 English is mandatory.

Collaboration:
Prof. Jasmine Berg
Institute of Earth Surface Dynamics (IDYST)
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Mots clé: isotope geochemistry, methane cycling, iron cycling, mineralogy

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Place de travail: UNIL-Geopolis

Références:

Schubert CJ, Vazquez F, Lösekann-Behrens T *et al.* Evidence for anaerobic oxidation of methane in sediments of a freshwater system (Lago di Cadagno). *FEMS Microbiology Ecology* 2011;**76**:26–38.

Sivan O, Adler M, Pearson A *et al.* Geochemical evidence for iron-mediated anaerobic oxidation of methane. *Limnology and Oceanography* 2011;**56**:1536–44.

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