

Proposition de stage

Parcours Master 2 « Microbiologie, Environnement, Santé »

1. Laboratoire / Entreprise d'accueil :

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2. Titre, description du sujet, approches utilisées, références (1 page maximum) :

Nitrate reduction (denitrification) in intertidal mudflats

Intertidal mudflats along an estuary can play a key role in purification of pollutants with respect to nutrients, metals and organic pollutants. The Seine Estuary, which is characterized by strong anthropic pressure, has been largely altered by human activities over the last decades.

The objective of this internship will be to study the transformation and fluxes of nitrogen in and from mudflat sediments. Several microbial processes transform nitrogen within sediments such as nitrification, denitrification, nitrate reduction to ammonium (DNRA), anaerobic ammonium oxidation (anammox). Their combined activities determine the flux of N and the capacity of sediments to be a source or sink of N. The objective of this internship is to determine the rates of nitrate reduction, one of the key processes determining the N fluxes at the sediment-water interface as well as the microorganisms involved in this processes in mudflats mostly of the Seine Estuary and potentially compared to other estuaries.

The goal is to couple field measurements, laboratory experiments and molecular biology. To this end the vertical distribution of the different nitrogen forms will be determined in the sediments (fieldwork). In parallel to this, nitrate reduction rates will be measured under controlled laboratory conditions in these sediments. In order to relate nitrate reduction to the involved microorganisms their presence will be established via DNA extraction, qPCR and possibly sequencing.

The ultimate goal is to better understand the nitrogen cycle in this complex environment and their role in mitigating nitrogen pollution in the coastal zone.

This work is part of the PHARE SEE project (GIP Seine Aval 2017-2020) investigating the role of mud flats in the functioning of the Seine estuary.