

PhD opportunity in Oceanography

The Canada Research Chair in Coastal Hydrogeosystem Geochemistry at UQAR/ISMER is recruiting a PhD student for research in marine geochemistry. **Early diagenesis and sedimentary records in the hypoxic sediments of the Laurentian Channel**

Context

Hypoxia developed in the bottom waters of the Lower St. Lawrence Estuary over the 20th century and directly impacts ecosystem functions. Minimum dissolved oxygen concentrations decreased from $\sim 125 \mu\text{M}$ in the 1930s to $\sim 65 \mu\text{M}$ in 1984. While they remained stable ($\sim 62.5 \mu\text{M}$) between 1984 and 2019 they suddenly dropped to $\sim 35 \mu\text{M}$ in 2020 and $\sim 30 \mu\text{M}$ in 2022. At the same time, bottom water temperatures have gradually increased from $\sim 3^\circ\text{C}$ in the 1930s to nearly 7°C in 2021. These changes directly impact benthic metabolic rates, early diagenesis and organic matter mineralization processes. While oxygen demands were relatively constant over the last few decades, oxygen was mostly consumed by the oxidation of reduced products formed below the oxic zone. Recently, mats of large sulfur bacteria (LSB) have been observed indicating a change in the redox state of the sediment. **The objective of the proposed project is to provide a portrait of early diagenetic processes with a particular interest in i) alternative reactions involving metal-oxides (iron and manganese), nitrogen and sulphides; ii) speciation and sedimentary record of redox-sensitive trace metals; and iii) the role of LSB mats in nutrient turnover.**



The methodology includes sample collection (sediment cores, pore water, and water column), sediment core incubation experiments, and geochemical analyses (diagenetic species, trace metal speciation, solid and dissolved fraction). The candidate will benefit from a state-of-the-art geochemistry lab and the support of competent professionals for analysis.

The candidate will be based at ISMER (UQAR), under the supervision of Gwénaëlle Chaillou and the co-supervision of André Pellerin (UQAR) and Sean Crowe (UBC). This project is also in collaboration with Alfonso Mucci (Professor emeritus, McGill University). We are an inclusive workplace dedicated to attracting retaining and developing our people to inclusive principles. We celebrate the range of diverse assets that gender identity, ethnicity, sexual orientation, disability, and age bring. Applications are encouraged from all sectors of the community.

How to apply: If you are interested, send your application including a cover letter, CV, last available transcripts and two faculty reference letters to Gwénaëlle Chaillou gwenaelle.chaillou@uqar.ca ([site web](#))