Foraminifera as indicators of late Holocene sediment contamination in the Bay of Sept-Iles

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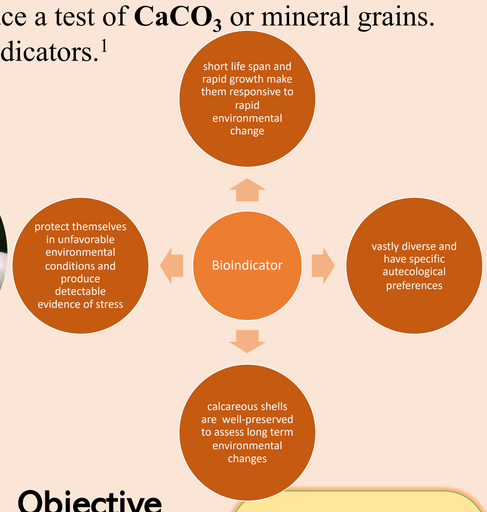
Foraminifera

Foraminifera are **amoeba-like, single-celled protists.** They are chambered, produce a test of **$CaCO_3$** or mineral grains. Excellent pollution indicators.[1]



Objective

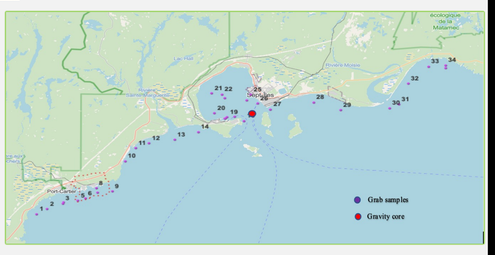
Determine the anthropogenic factors that affect the distribution of Foraminifera in the region.

Evaluate the links between communities and abiotic variables (including heavy metals).

Describe coastal habitats and microbenthic communities at Sept-Îles, Quebec.

Study area

- ❑The Bay of Sept-Îles (BSI) area is located in the NW Gulf of St. Lawrence
- ❑Located at the convergence of the Appalachian and Grenville orogens
- ❑Geomorphic settings include sand beaches, mudflats, saltmarshes and cliff beaches.



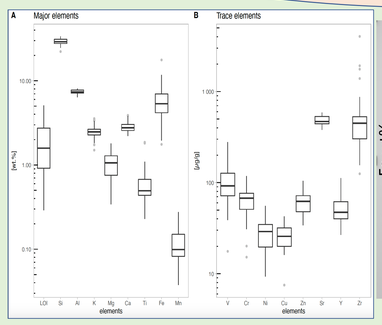
Why Sept Iles?

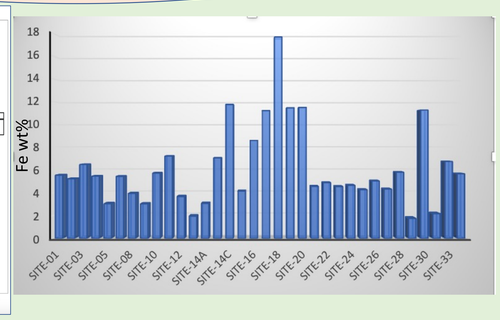
- ❖ Anthropogenic activities increased in past few centuries.[2]
- ❖ Largest mineral port of North America[2]
- ❖ Fisheries Hub[2]

Hypothesis and Results (in progress)

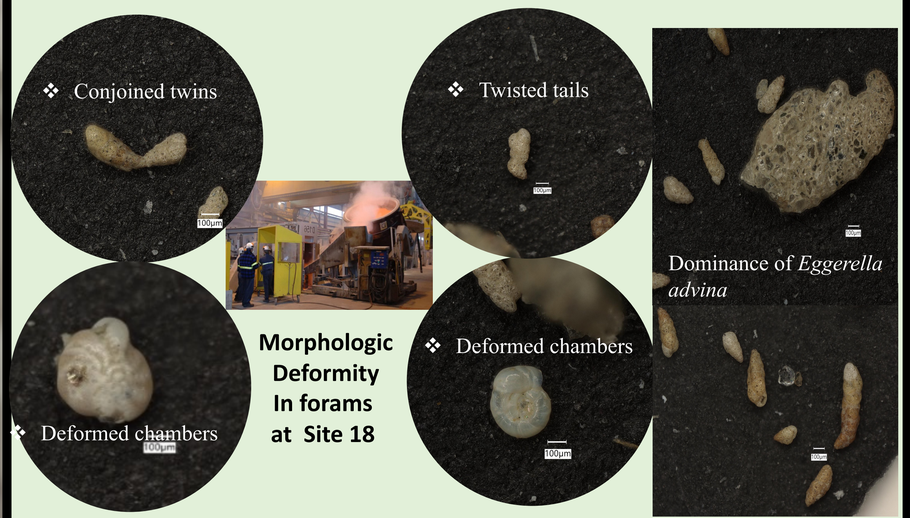
Hypothesis

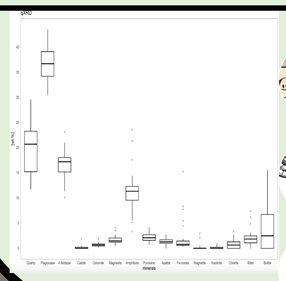
We hypothesize that human activities in the region will have a discernable influence on the foraminiferal community structure, morphology and some characteristics of the sediments, such as accumulation rates and heavy metal content.

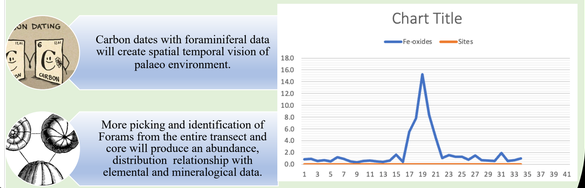




XRF RESULTS







Carbon dates with foraminiferal data will create spatial temporal vision of palaeo environment.

More picking and identification of Forams from the entire transect and core will produce an abundance, distribution relationship with elemental and mineralogical data.

Further XRD, XRF data will help determine the the hypothesis and will relate to the abnormal behavior of forams

XRD RESULTS

Expected outcome

- Fundamental knowledge on the long-term environmental variability of the BSI.
- Assemblage will reveal the effect of anthropogenic contaminants, organic matter and chemicals .
- Data produced will inform science-based management strategies for conservation of port ecosystem.

FORAMINIFERA + OSTRACODA + DIATOMS = MULTIPROXY ANALYSIS

Methodology

Sample collection

Surface sampling

- ➢Collected from Port Cartier to Matamec transect in summer 2021 and 2022.
- ➢45 samples were collected using a grab.

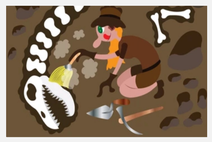
Core sampling

- ➢Collected onboard research vessel Amundsen during March 2020 expedition.
- ➢Box corer and piston corer were used

Lab Analysis

Wet weight 20 ml H2O+10ml sample → Drying at room temperature → Dry weight → sieving → picking → identification

- Xray Fluorescence
- Xray Diffraction
- Grain size analysis



Radiocarbon Dating

Acknowledgement

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References

1. Frontalini, F., Coccioni, R., 2012.
2. INREST 2018.