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Mobility of arsenic in fiberbanks outside the costline of Västernorrland

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Analytical chemistry



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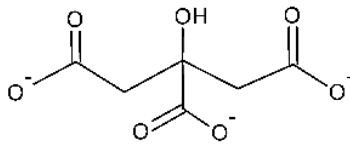
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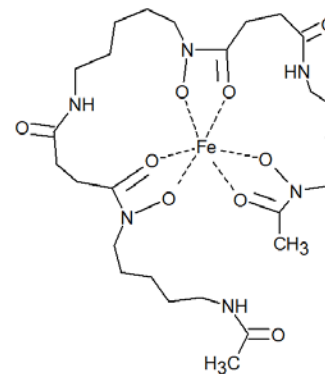
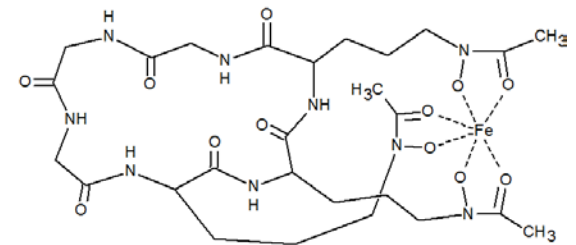
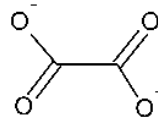
What are fiberbanks?

- Contaminated sediments rich in cellulose fibers
- “Old sins” from wood based product industries
- Contains toxic metal compounds and organic pollutants

Are there naturally produced compounds with metal complexing ability in the fiberbank material?



Organic acids



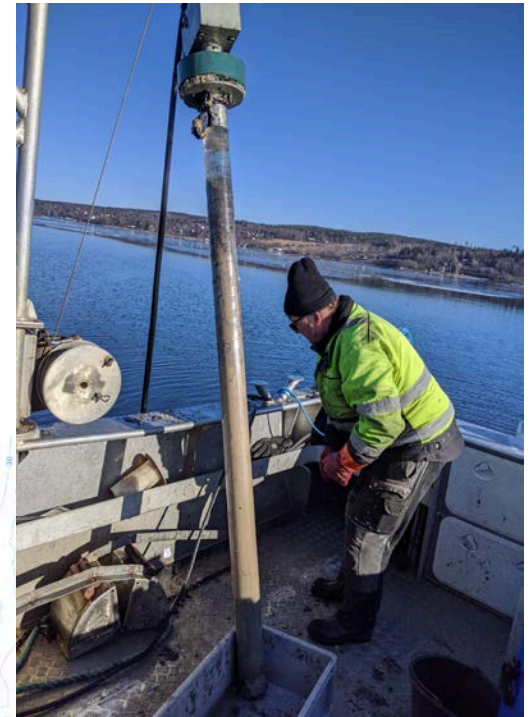
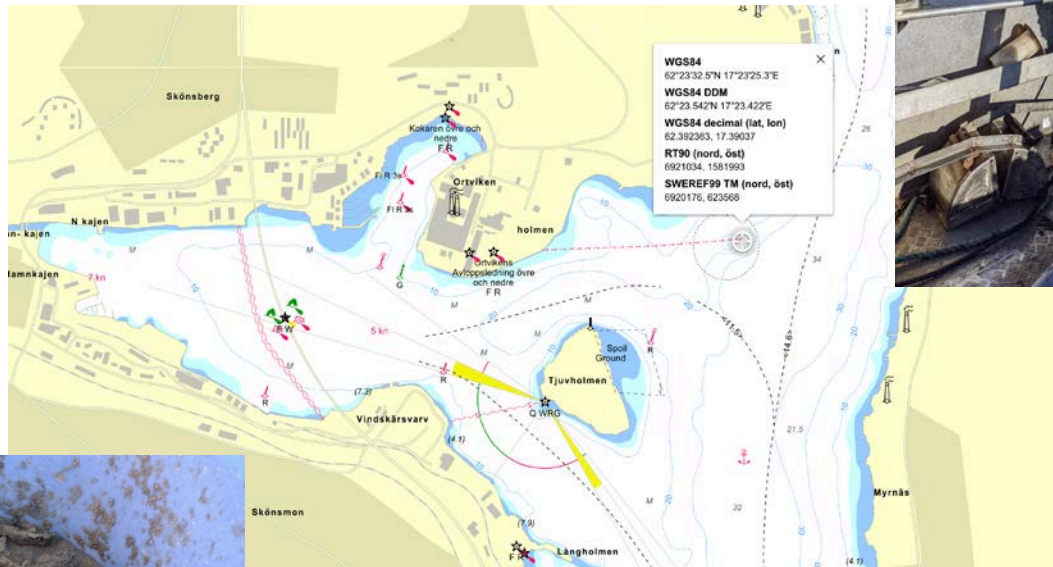
Siderophores

Arsenic-tolerating bacteria can produce compounds able to bind arsenic

- Mobilize arsenic in depositions?
- Bioremediation of contaminated material?

- Drewniak, L., A. Styczek, et al. (2008). "Bacteria, hypertolerant to arsenic in the rocks of an ancient gold mine, and their potential role in dissemination of arsenic pollution." *Environmental Pollution* 156(3): 1069-1074.
- Nair, A., A. A. Juwarkar, et al. (2007). "Production and Characterization of Siderophores and its Application in Arsenic Removal from Contaminated Soil." *Water, Air, and Soil Pollution* 180(1): 199-212.
- Retamal-Morales, G., M. Mehnert, et al. (2018). "Detection of arsenic-binding siderophores in arsenic-tolerating Actinobacteria by a modified CAS assay." *Ecotoxicology and Environmental Safety* 157: 176-181.

Sampling



Coordinated with other EU and SGU funded project

Analysis

- Of known siderophores and organic acids using LC-MS/MS
- Screening for siderophore and siderophore like compounds using FIA-MS
 - Exchanging iron for gallium
- Investigation of siderophore ability to complex arsenic
- Complementary analysis of metal content using ICP-AES/MS

Screening for siderophore and siderophore like compounds using FIA-MS – by applying gallium exchange

- One part is left in its original form, for a second part of the sample iron is exchanged with gallium
- Both samples are analyzed by MS scanning mode and siderophores or siderofor like compounds are present a distinct mass spectra will be seen, thanks to the mass difference of Fe and Ga and the isotopic pattern of Ga



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Thank you!



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