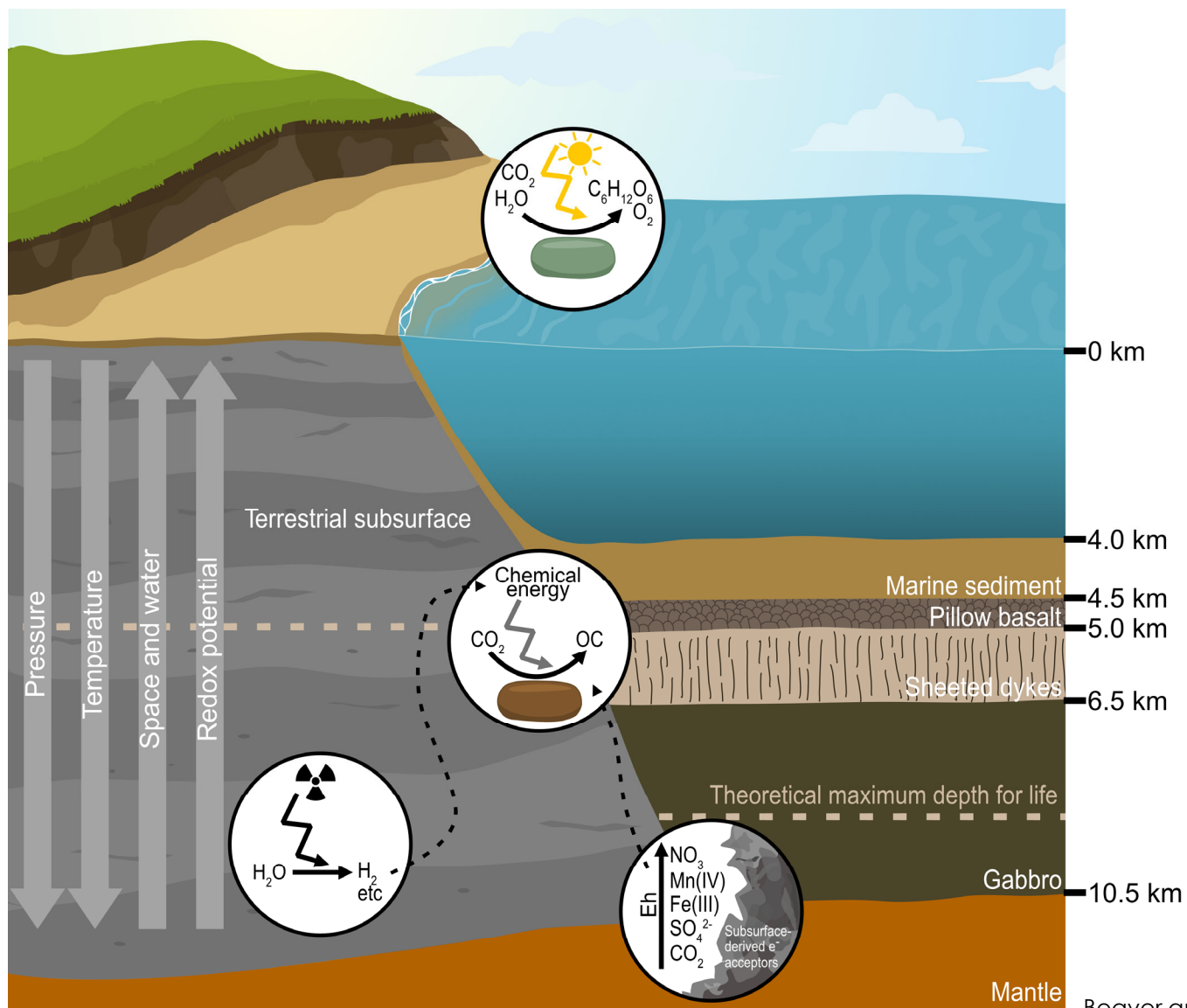




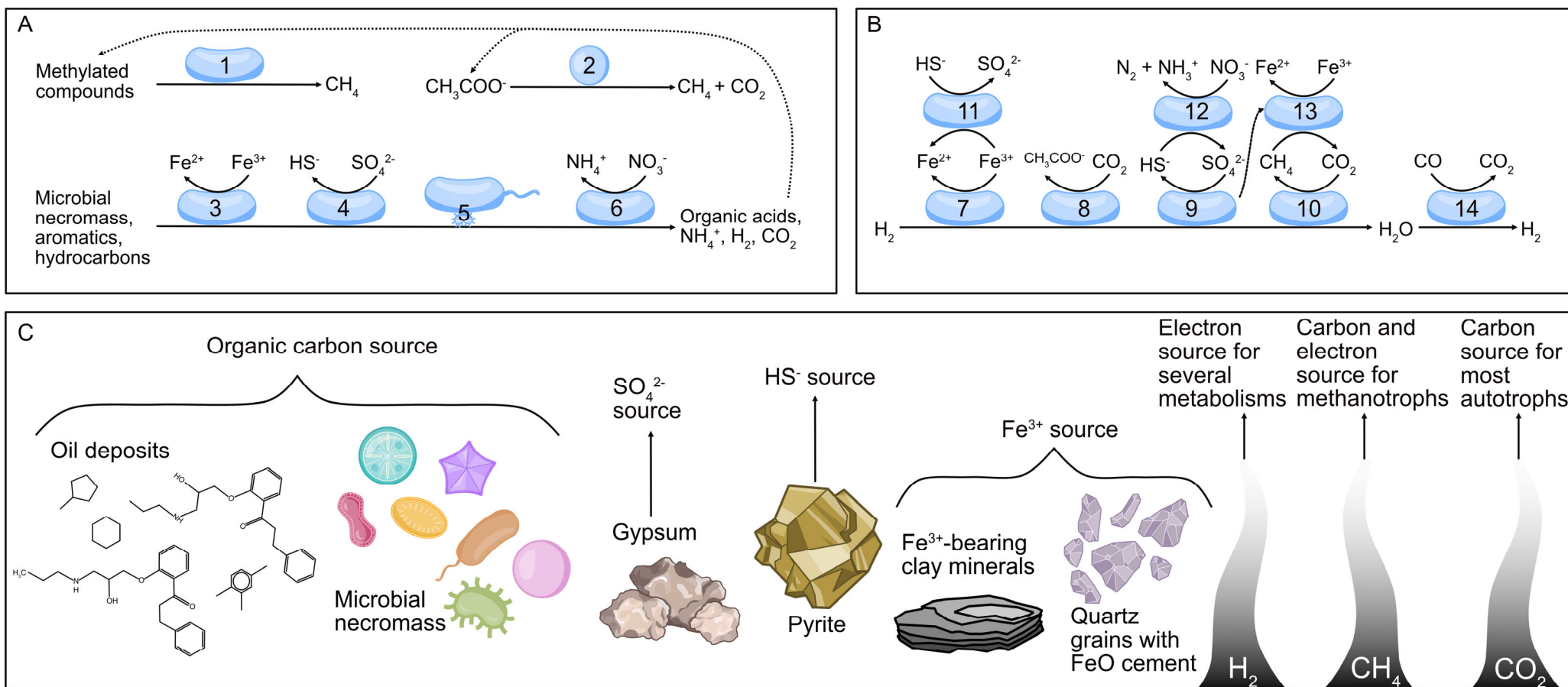
Microbial analysis of Tsukinuno bentonite samples

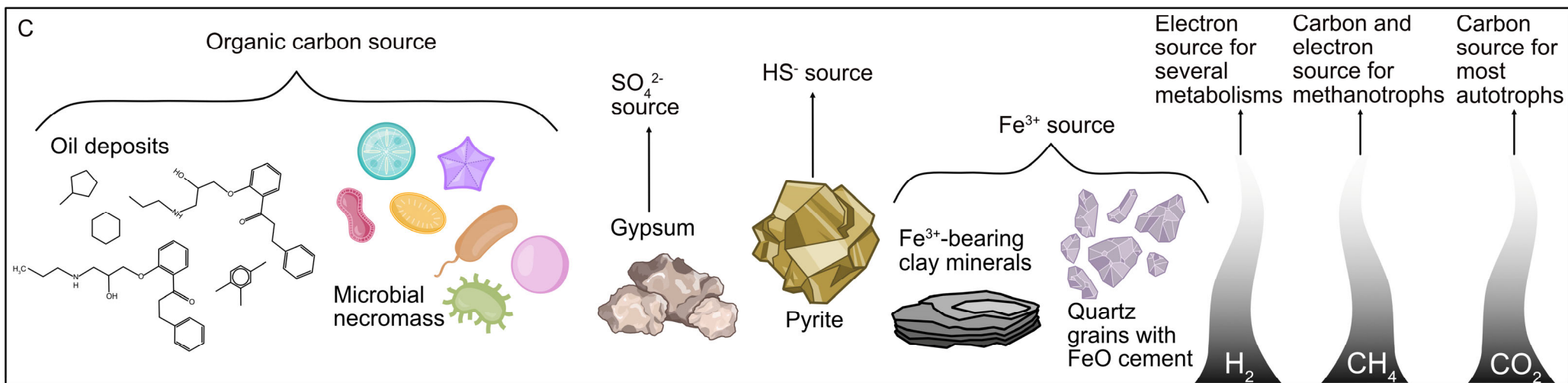
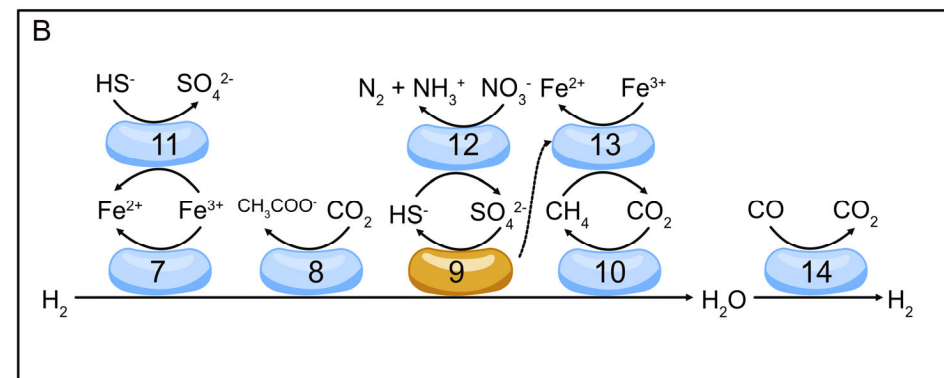
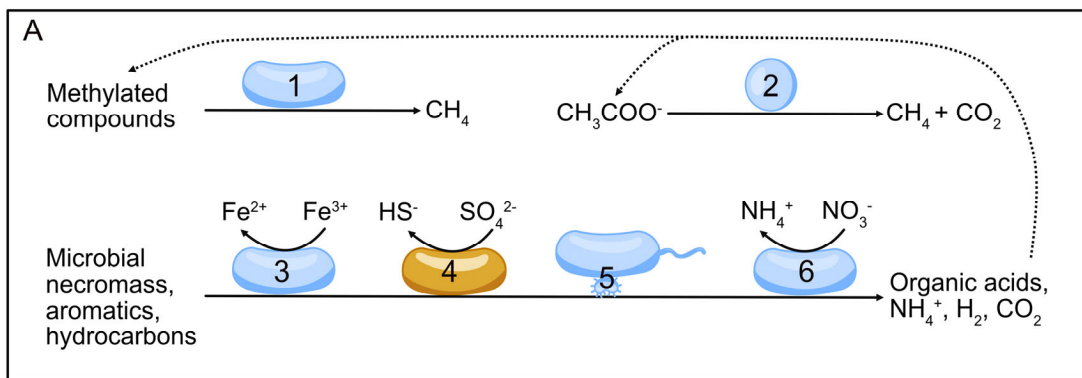
Rachel Beaver
June 9, 2026

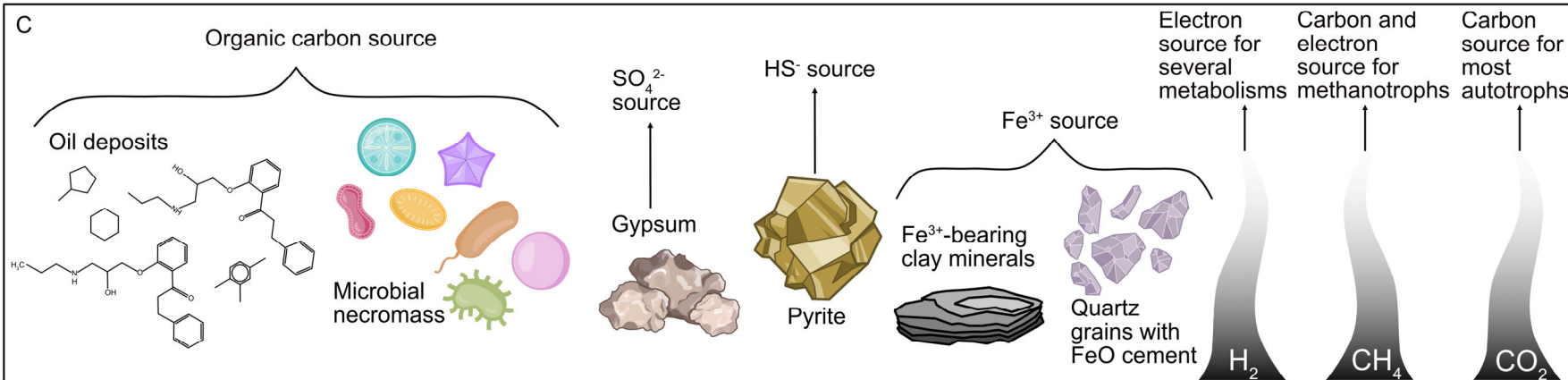
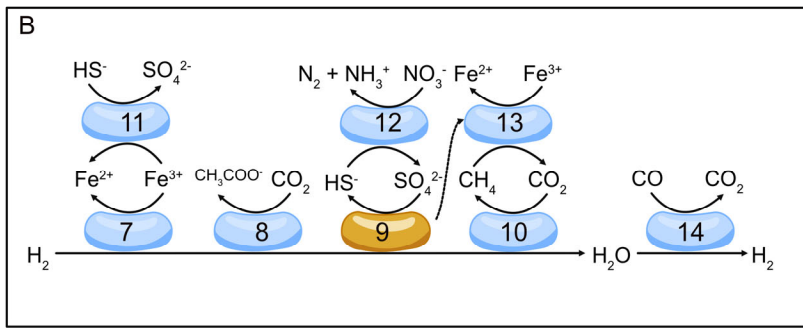
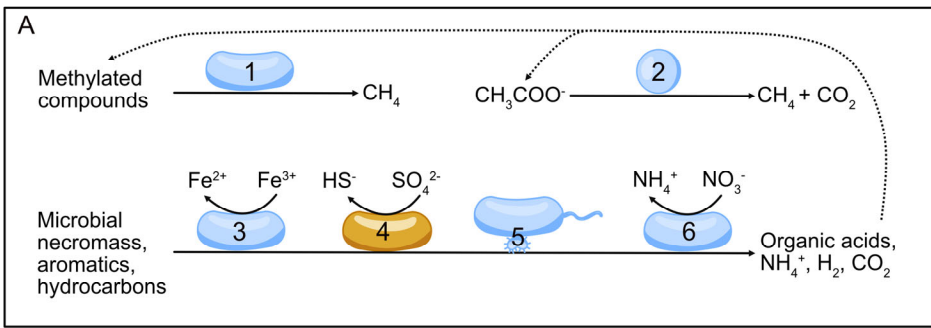
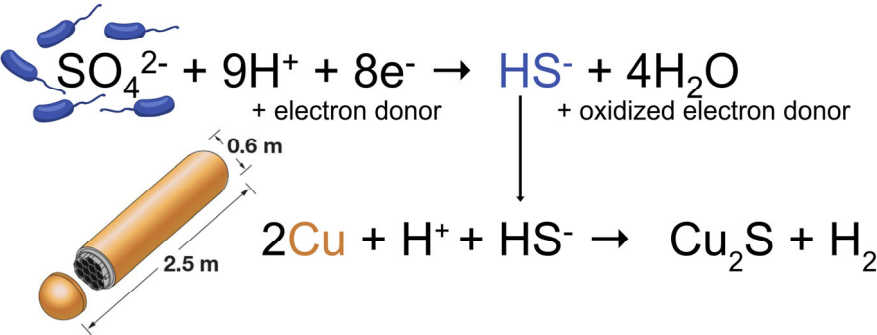




Beaver and Neufeld, 2026 (in press)







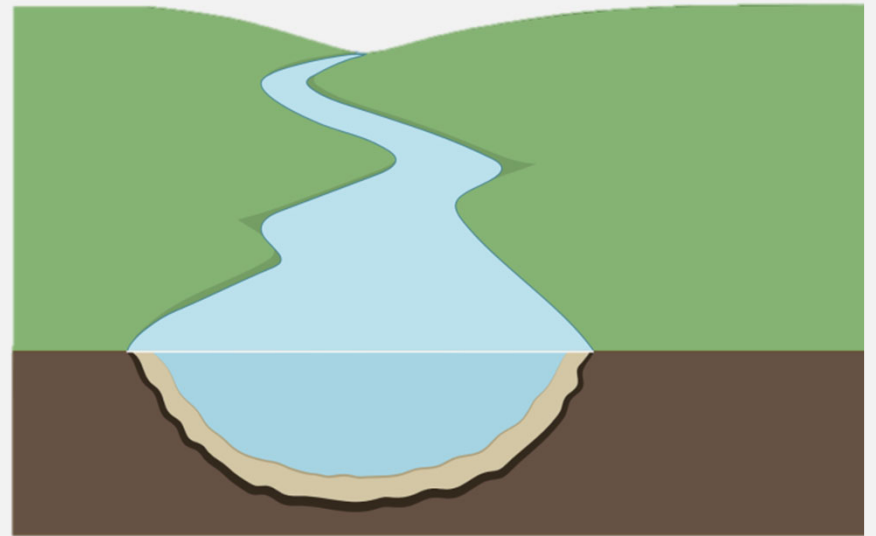
Short-term microcosms



✓ Can test specific conditions

x Challenging to make long-term predictions based on short-term experiments

Natural analogue samples

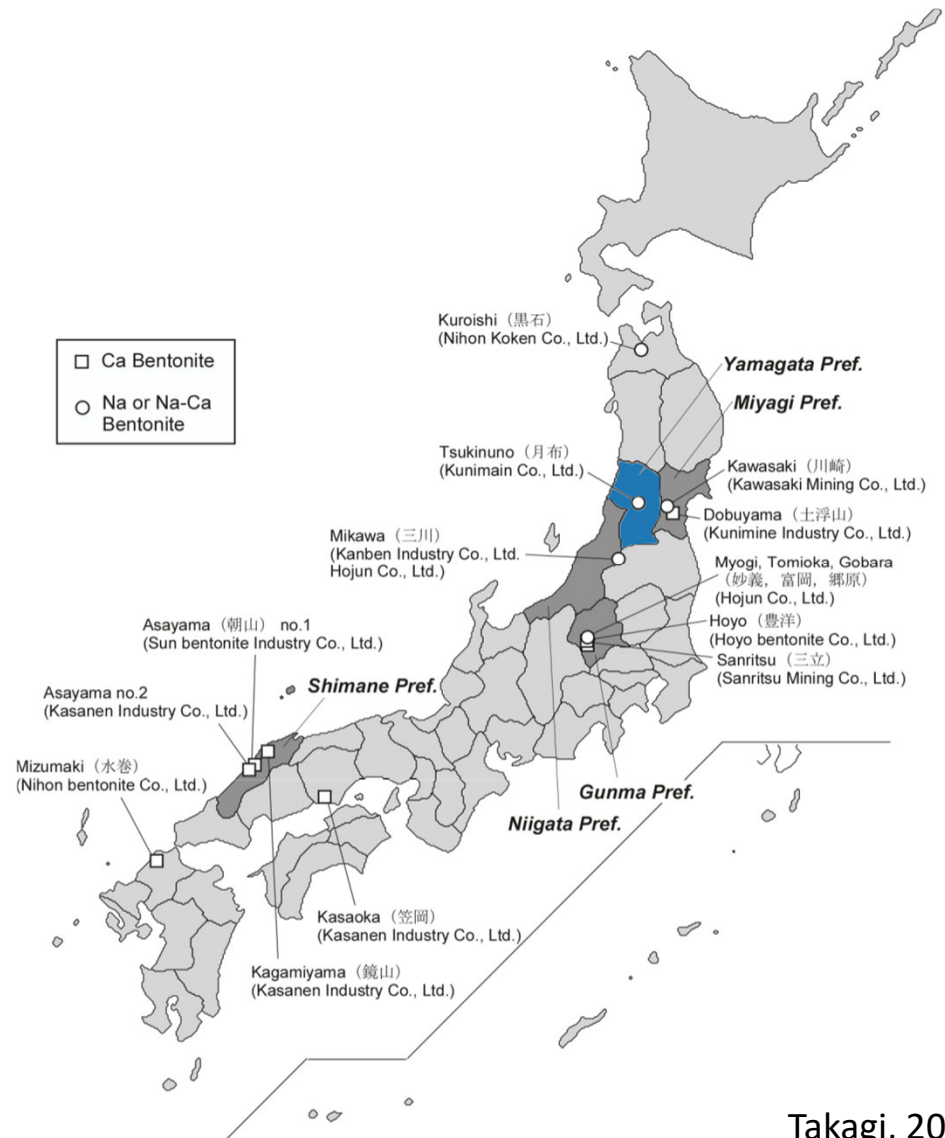


✓ Clay/rock analogues have existed for millennia

x Challenging to find analogues that mimic all conditions of a DGR

Objective

Examine microbial community composition and abundance in ancient, natural bentonite clay deposits taken from an anoxic, DGR-relevant location to make predictions about the potential microbiology of bentonite in a future DGR site.

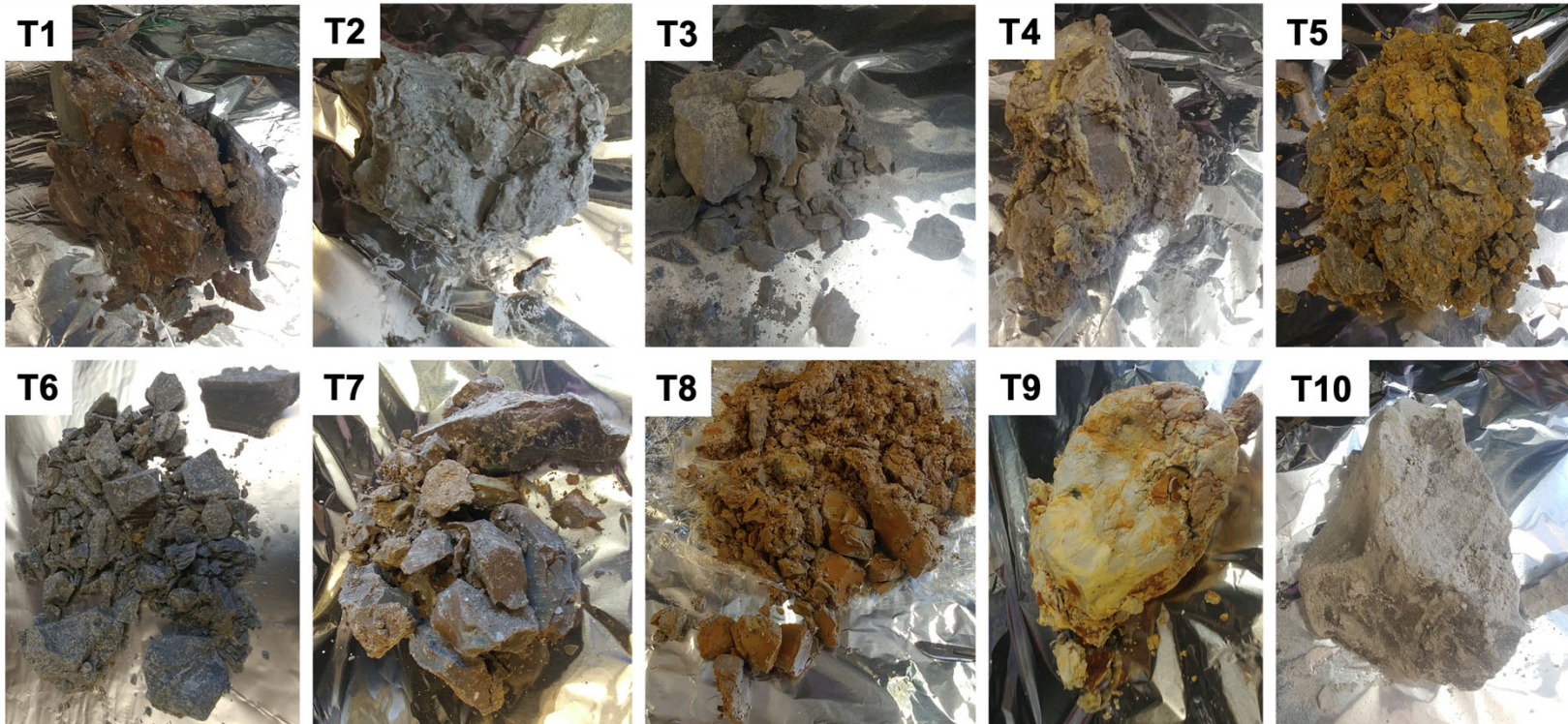


Takagi, 2005

Microbiology of barrier component analogues of a deep geological repository

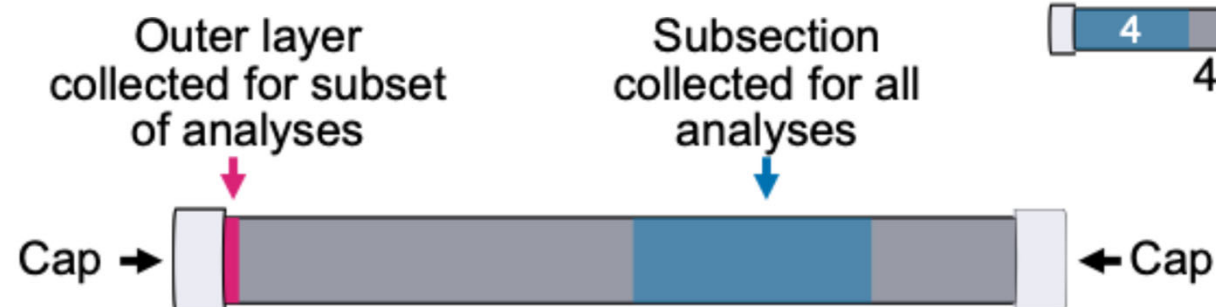
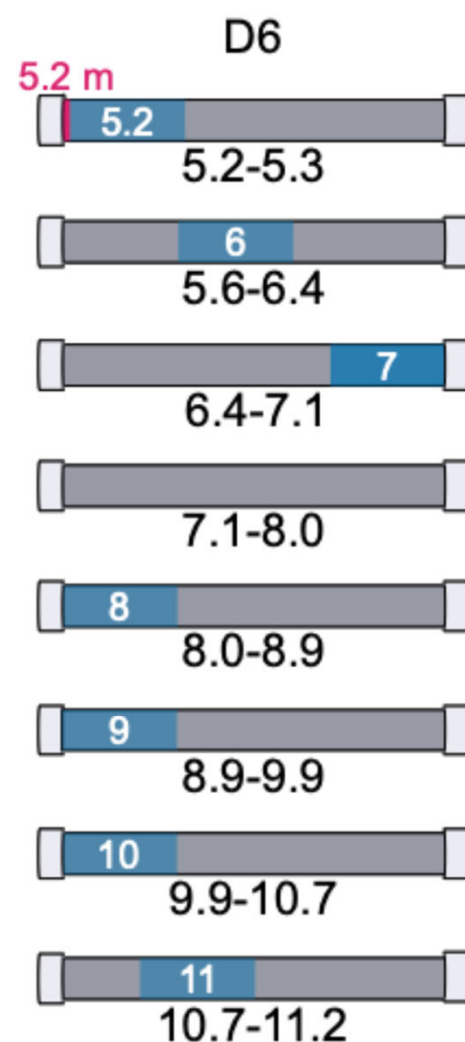
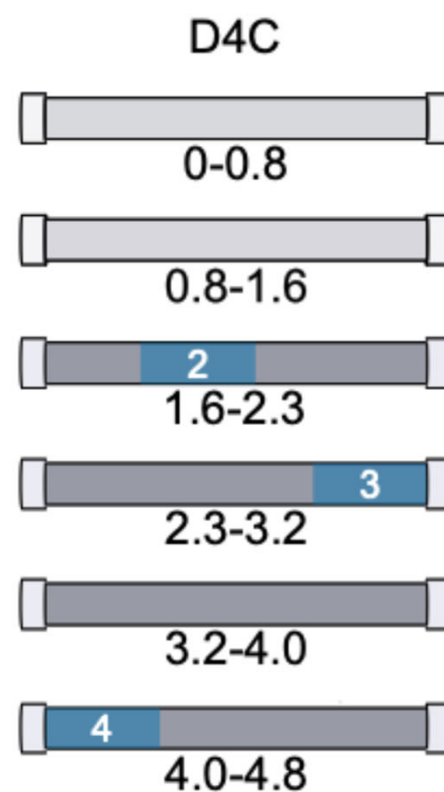
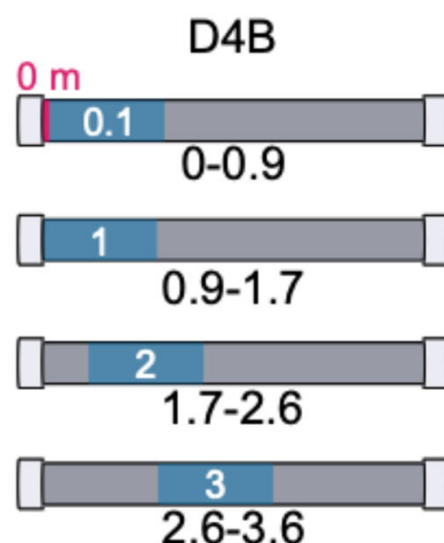
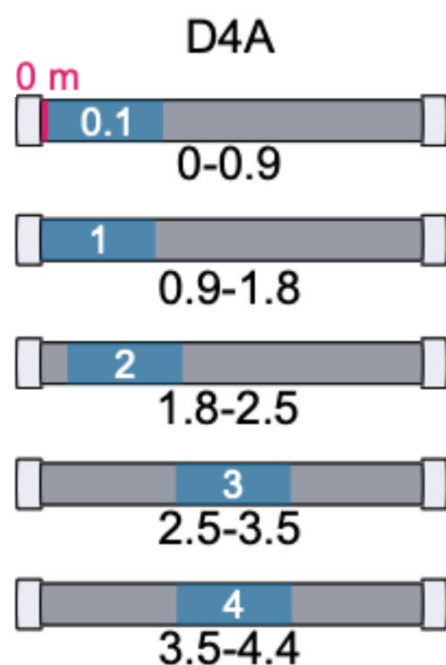
Authors: [Rachel C. Beaver](#), [Katja Engel](#), [W. Jeffrey Binns](#), and [Josh D. Neufeld](#)  | [AUTHORS INFO & AFFILIATIONS](#)

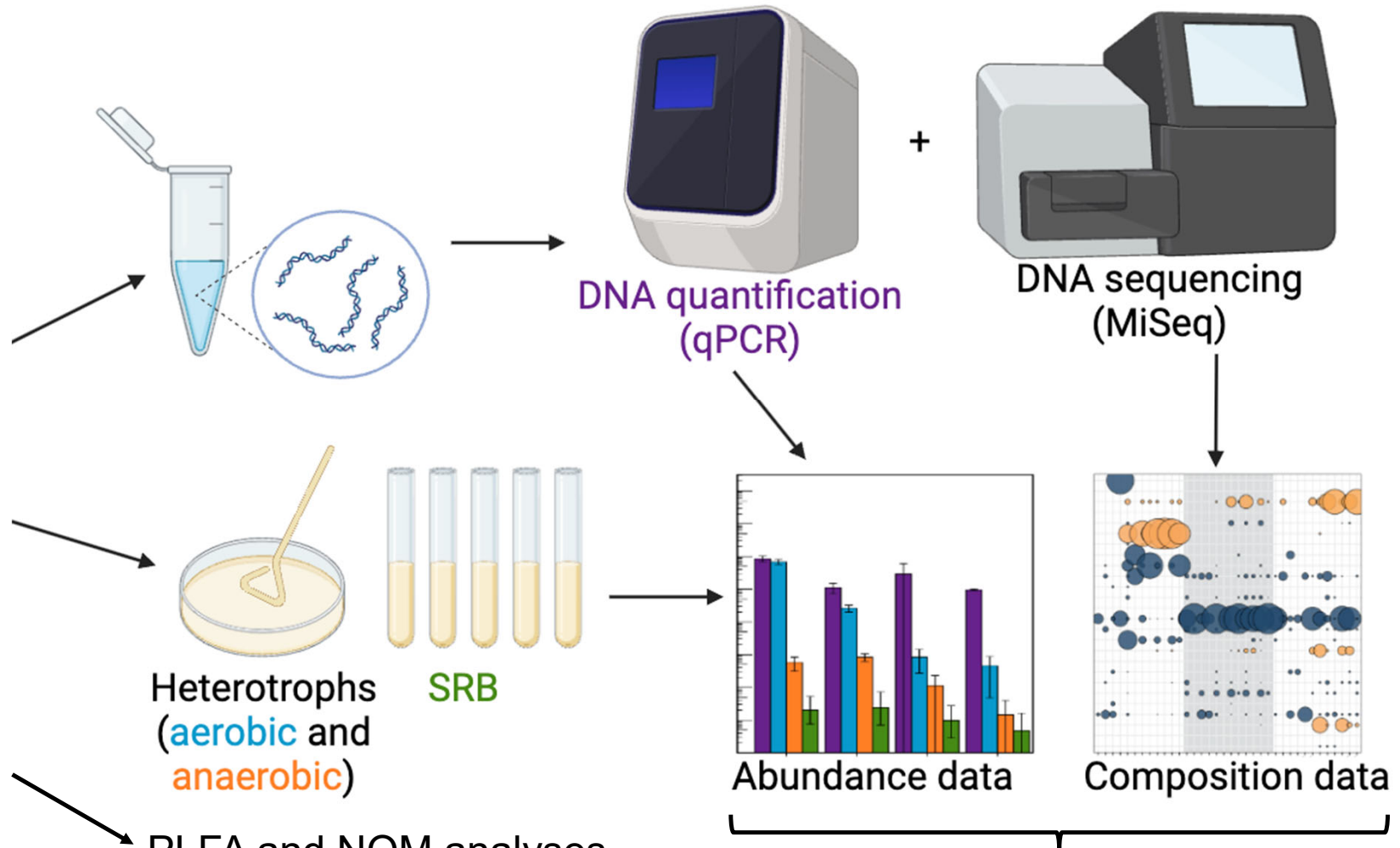
Publication: Canadian Journal of Microbiology • 14 October 2021 • <https://doi.org/10.1139/cjm-2021-0225>



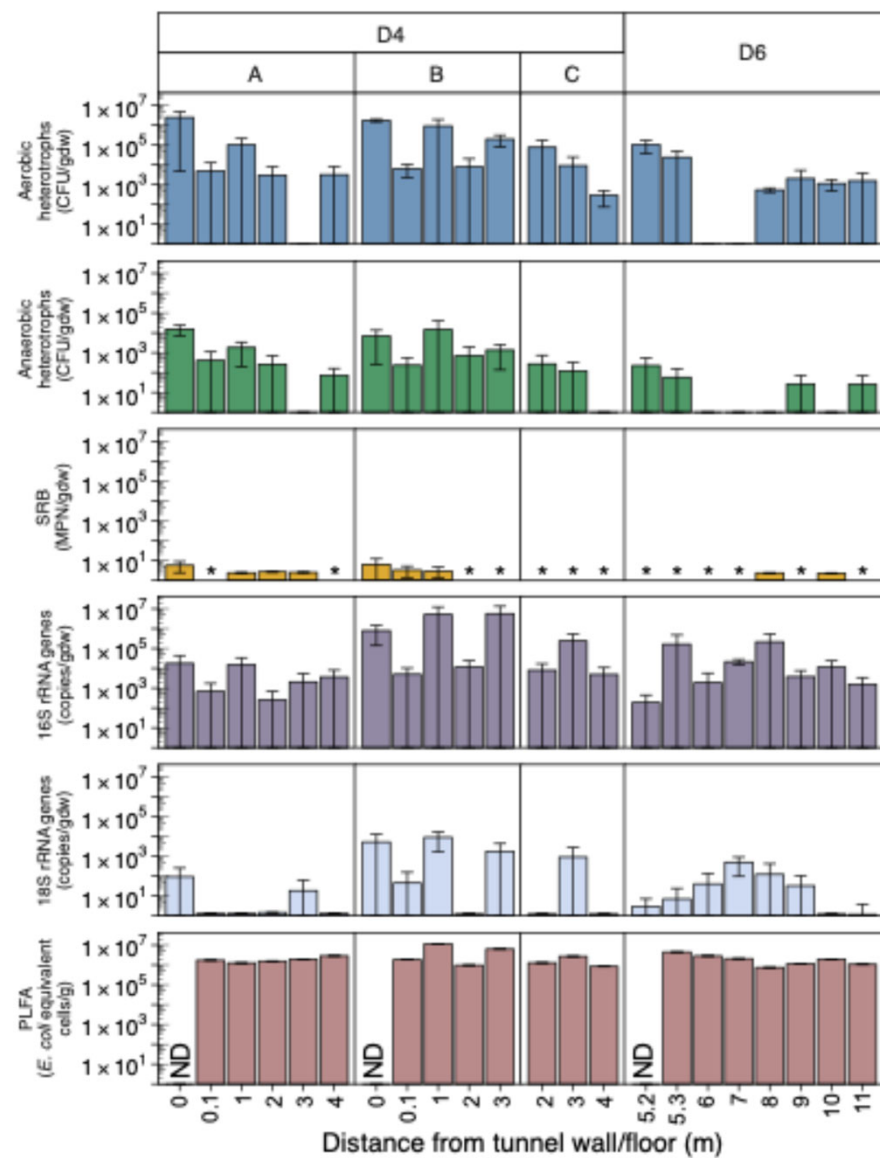


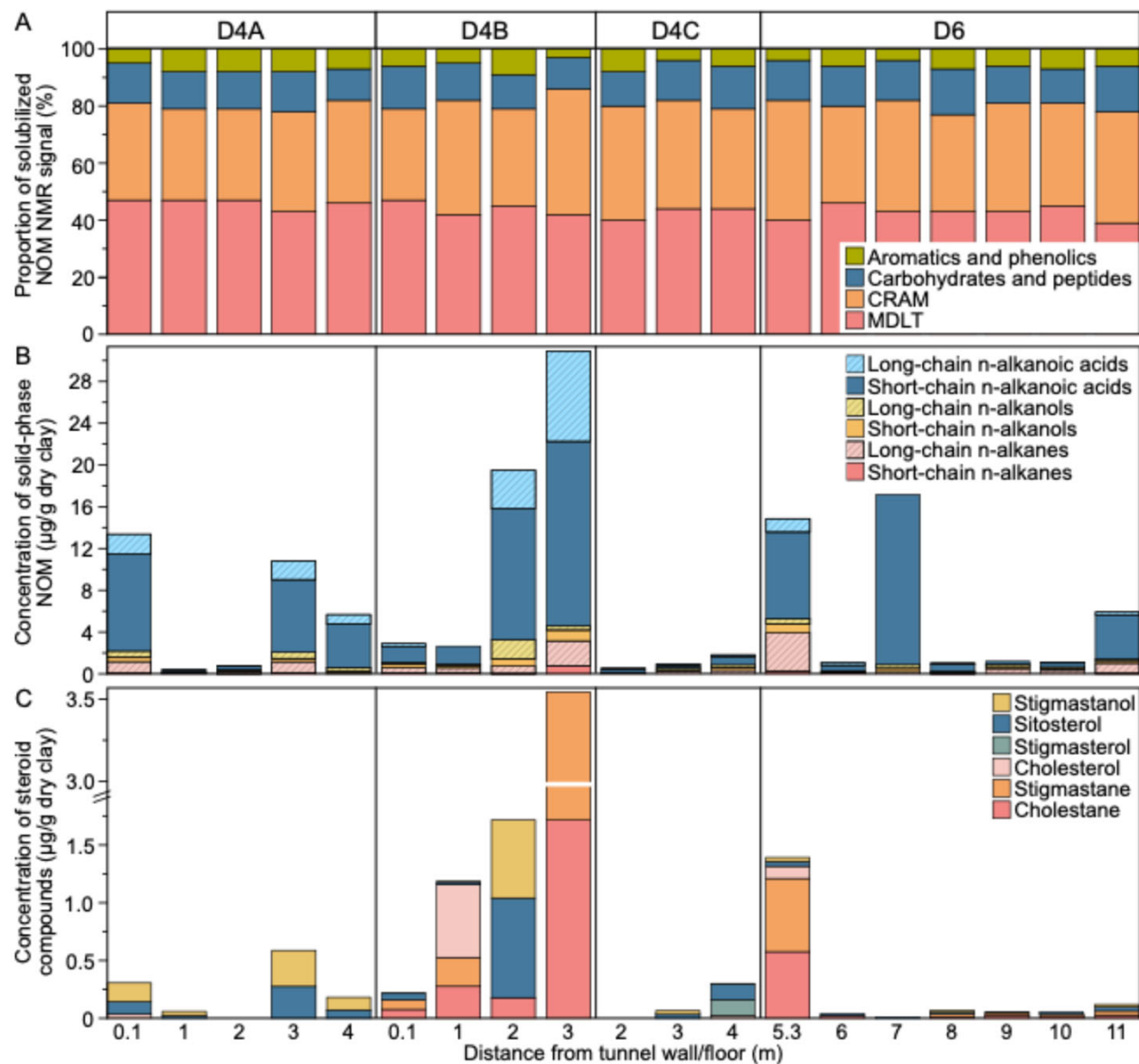


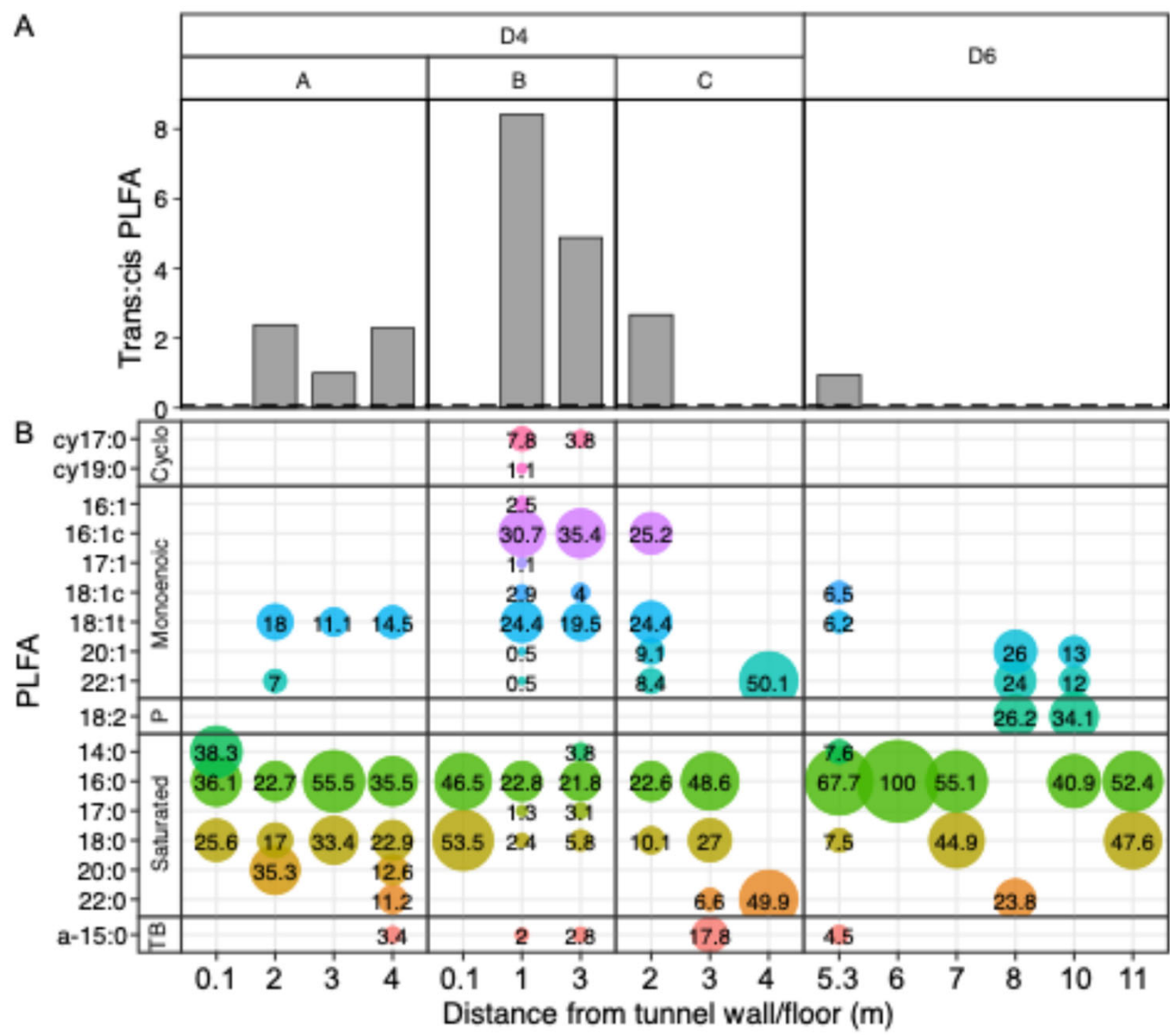


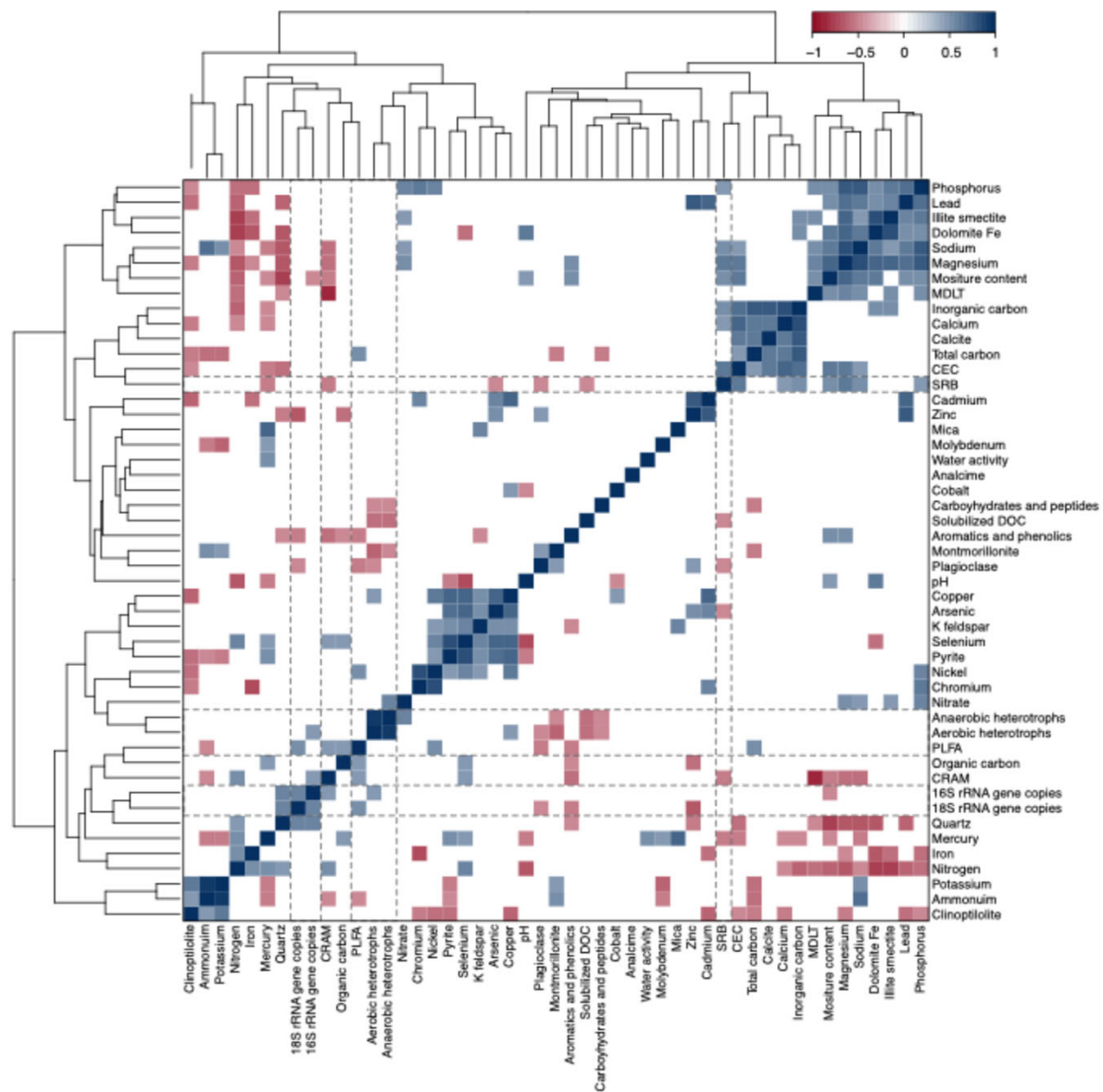


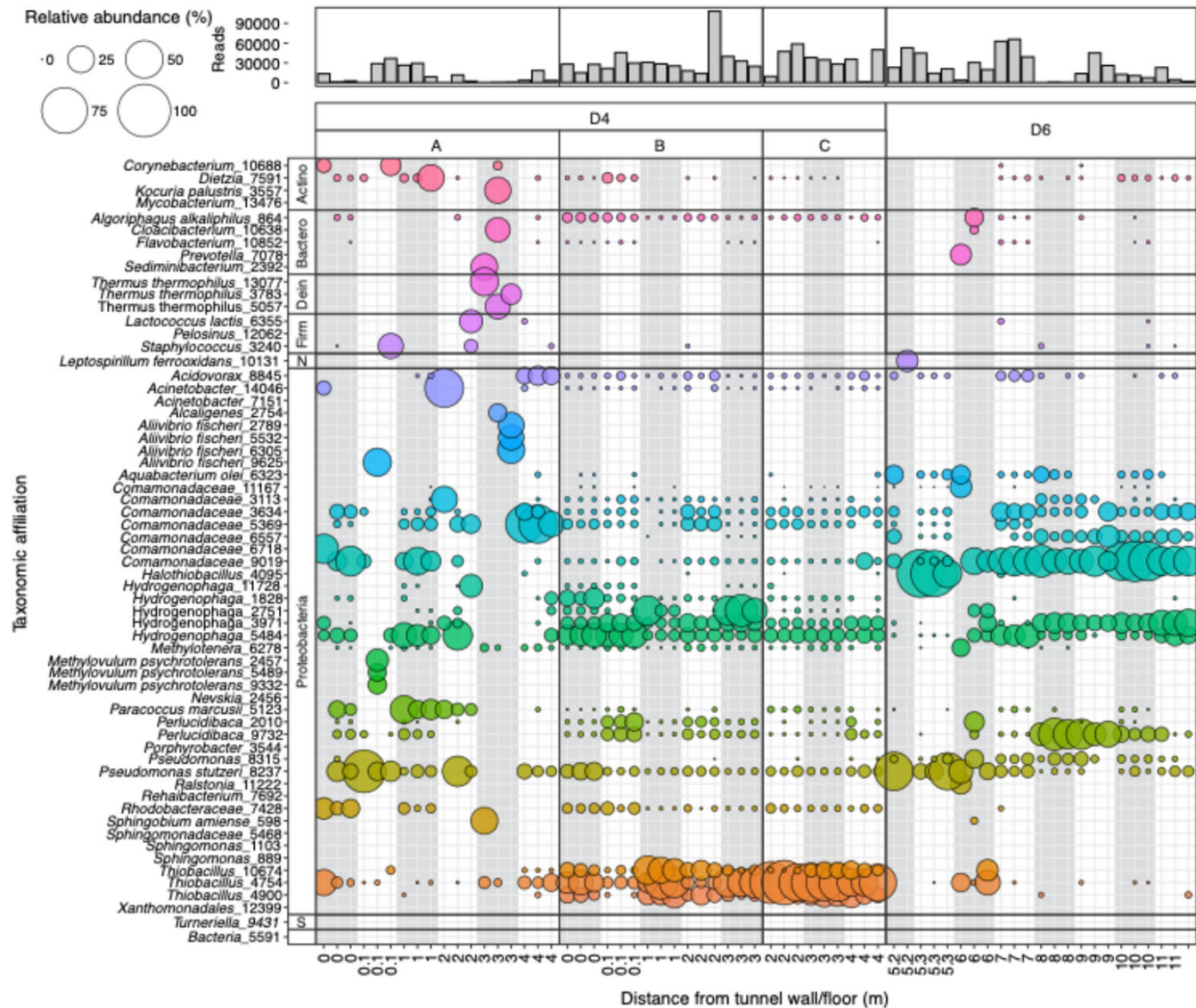
Relate observed abundances and community compositions to water activity, moisture content, and 29 measured chemicals + 18 measured clay and mineral species.







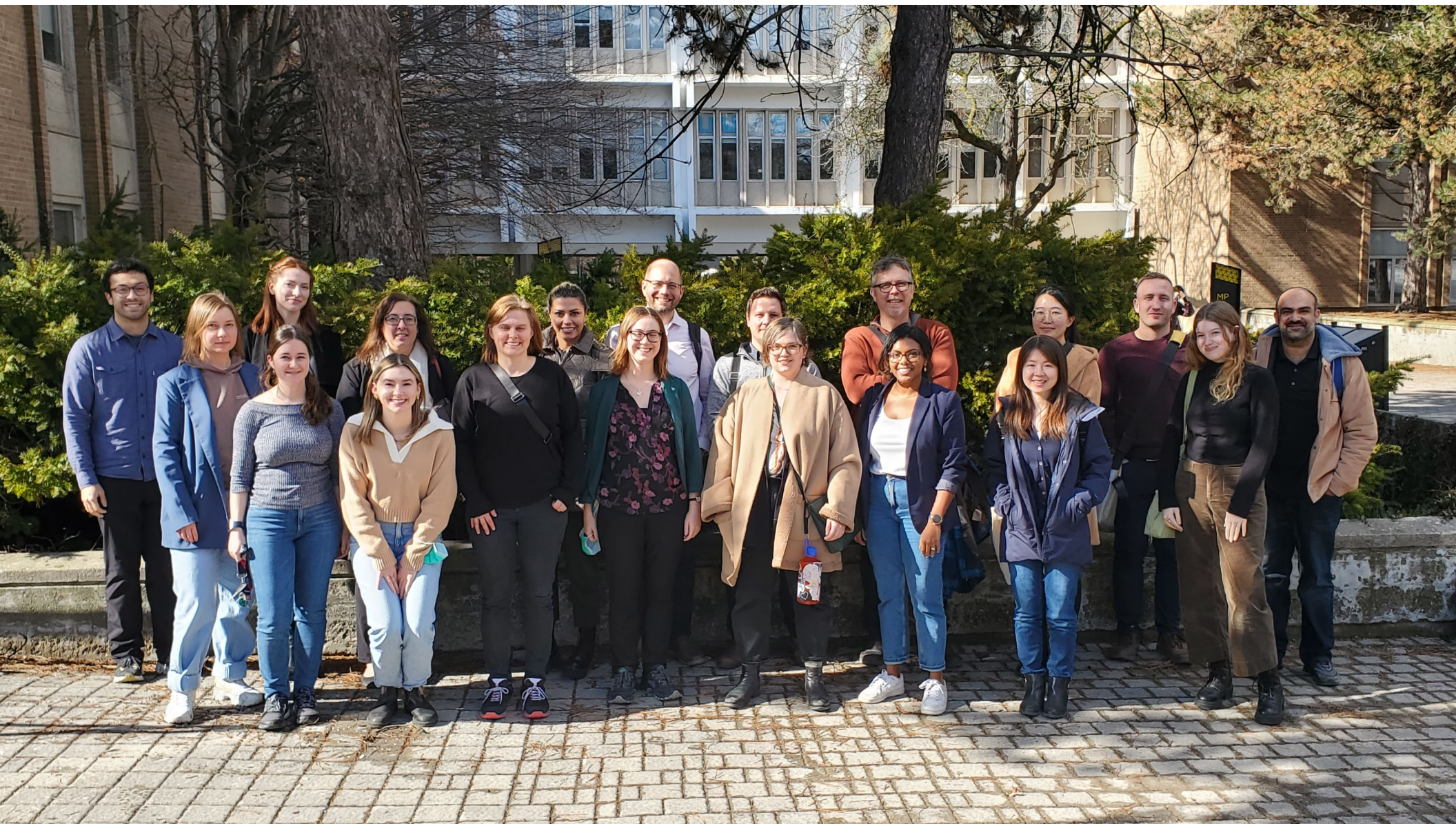






Conclusions

- Relatively low microbial abundance in all samples.
- Microbial profiles dominated by putative heterotrophs, hydrogen oxidizers, and sulfur oxidizers.
- Culturable SRB detected in few samples at low abundance, and sequences associated with known SRB not detected in 16S rRNA gene profiles.
- Microbial profiles differed more based on core than on any other measured variable.
- Samples contain low amounts of carbon.
- PLFA results indicate signs of microbial stress.



Acknowledgements



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