

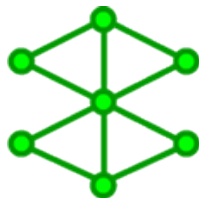


School of Biotechnology and Biomolecular Sciences

Metagenomic and geochemical changes following rainfall at a legacy radionuclide waste disposal site



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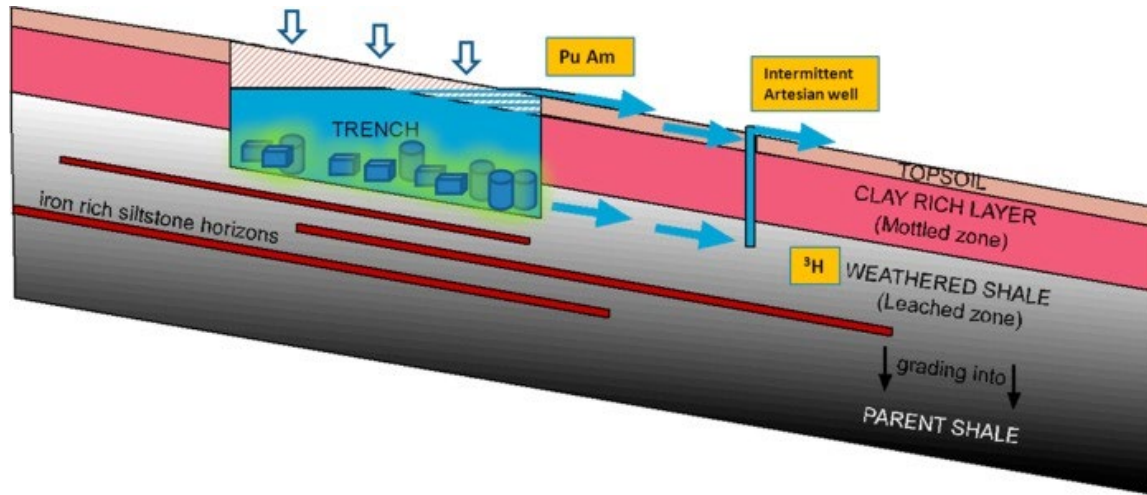
Introduction

- Radioactive legacy disposal site 1960-68
- 3 m deep trenches
- Mixed waste including $^{239+240}\text{Pu}$, ^{241}Am ,...



Introduction

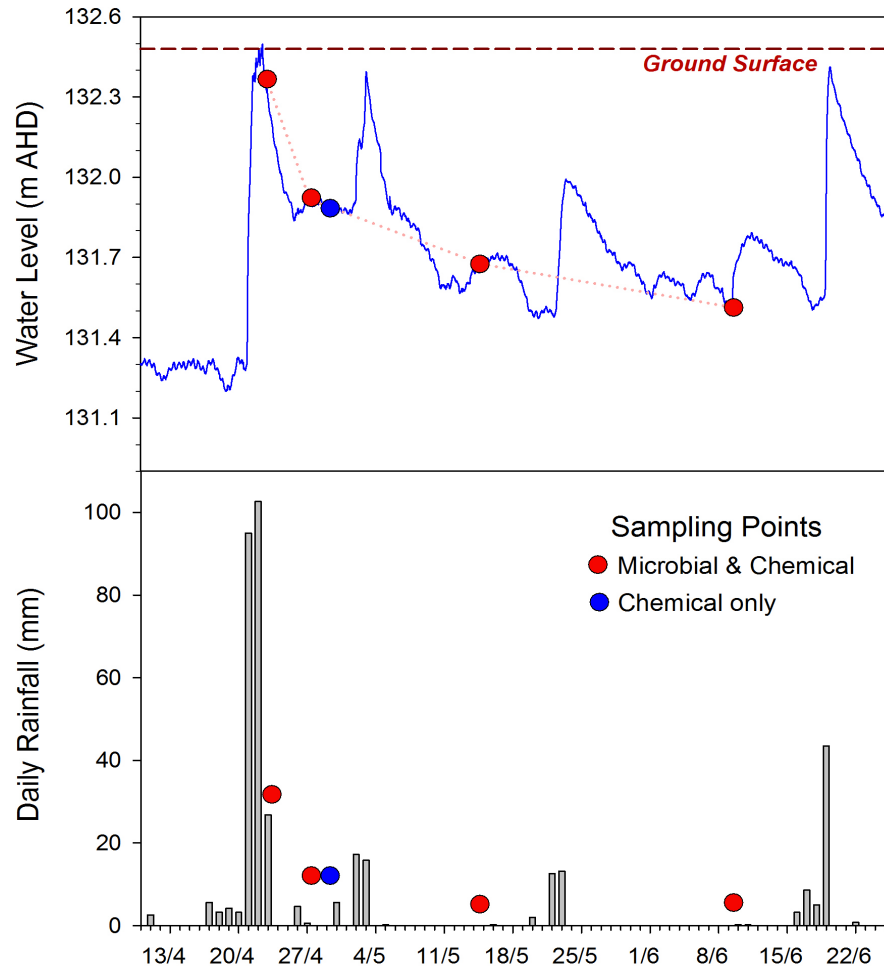
Low permeability clay soil matrix ensures rapid in filling of trenches with water during intense rainfall events, often resulting in trench overflow ('bathtub like') and contaminant export



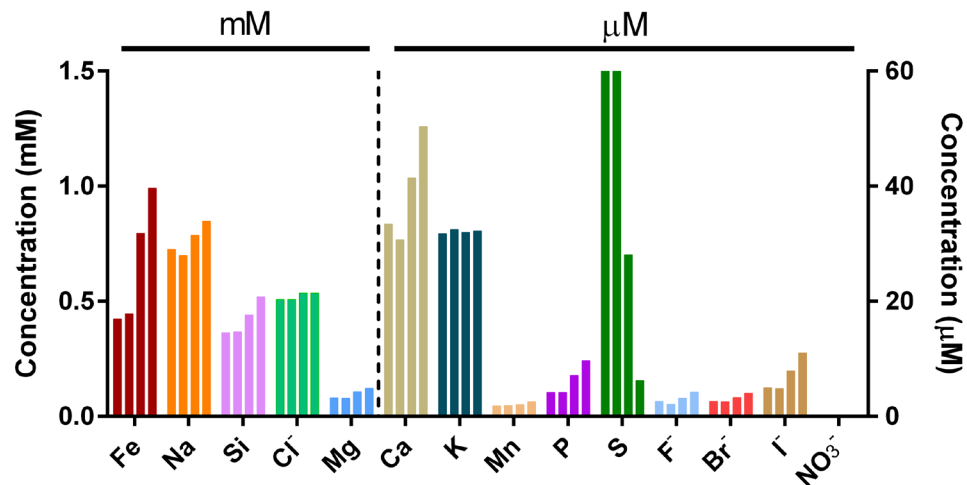
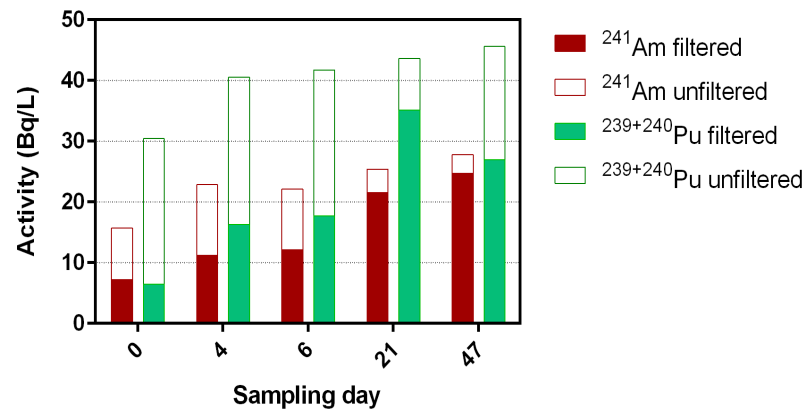
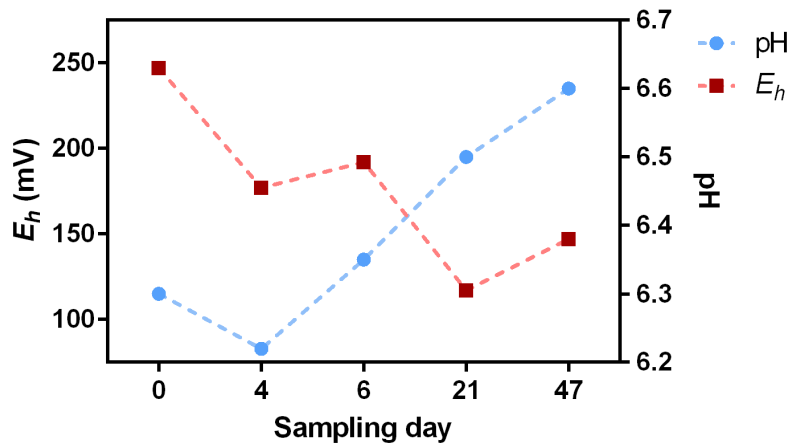
*slope exaggerated

Sampling

- Trench waters collected after an intense rainfall event.
- Full chemical analysis, incl. radionuclides
- Metagenomic samples in triplicates

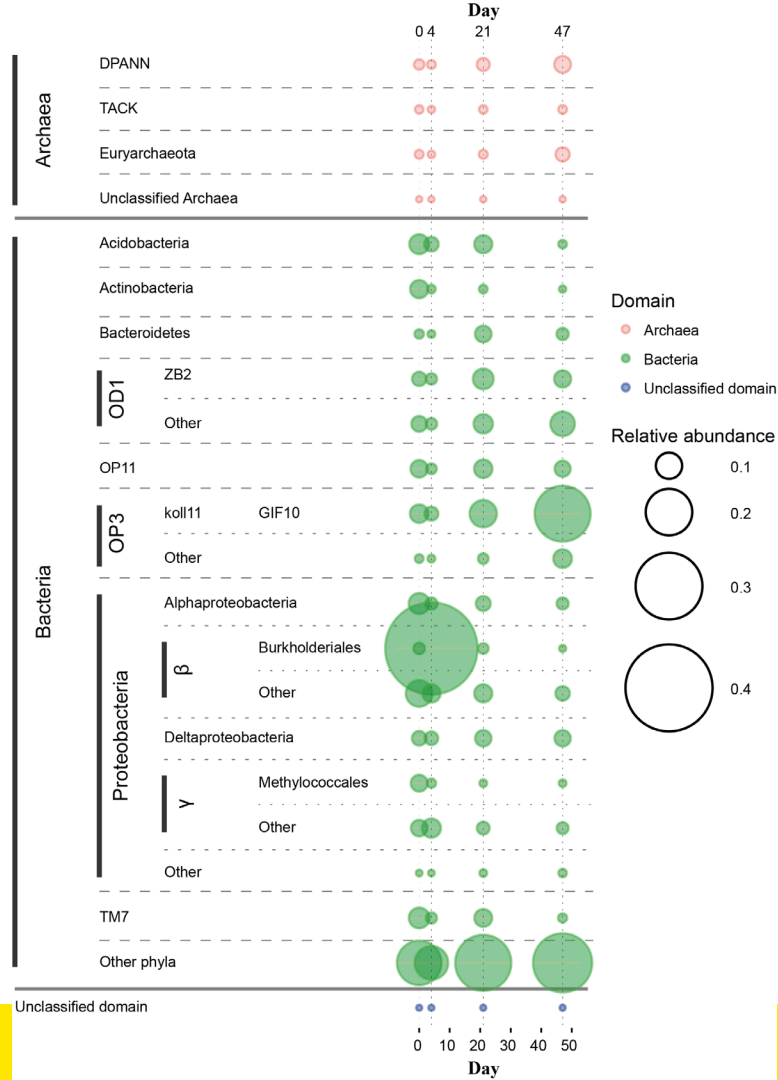


Chemistry



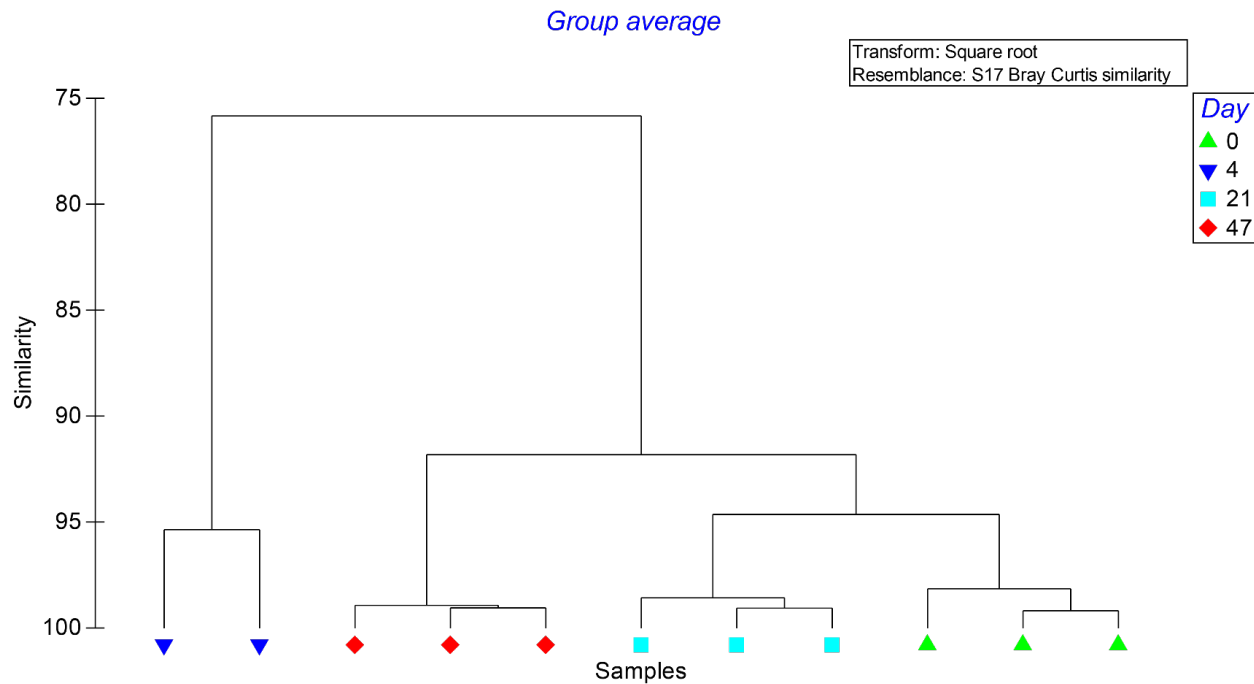
Taxonomic profiling

- Single read processing with GraftM
- Highly diverse community
- Bacteria >> Archaea in all samples
- Ultra-small taxa abundant: OD1, OP11, DPANN
- Proteobacteria is the main phylum, except at day 47 (OP3)
- Burkholderiales >40% at day 4
- In anoxic periods, Archaea >10%, minimum at Day 4
 - ~50% DPANN
 - Remaining Methanomicrobia (incl. ANME-2d)

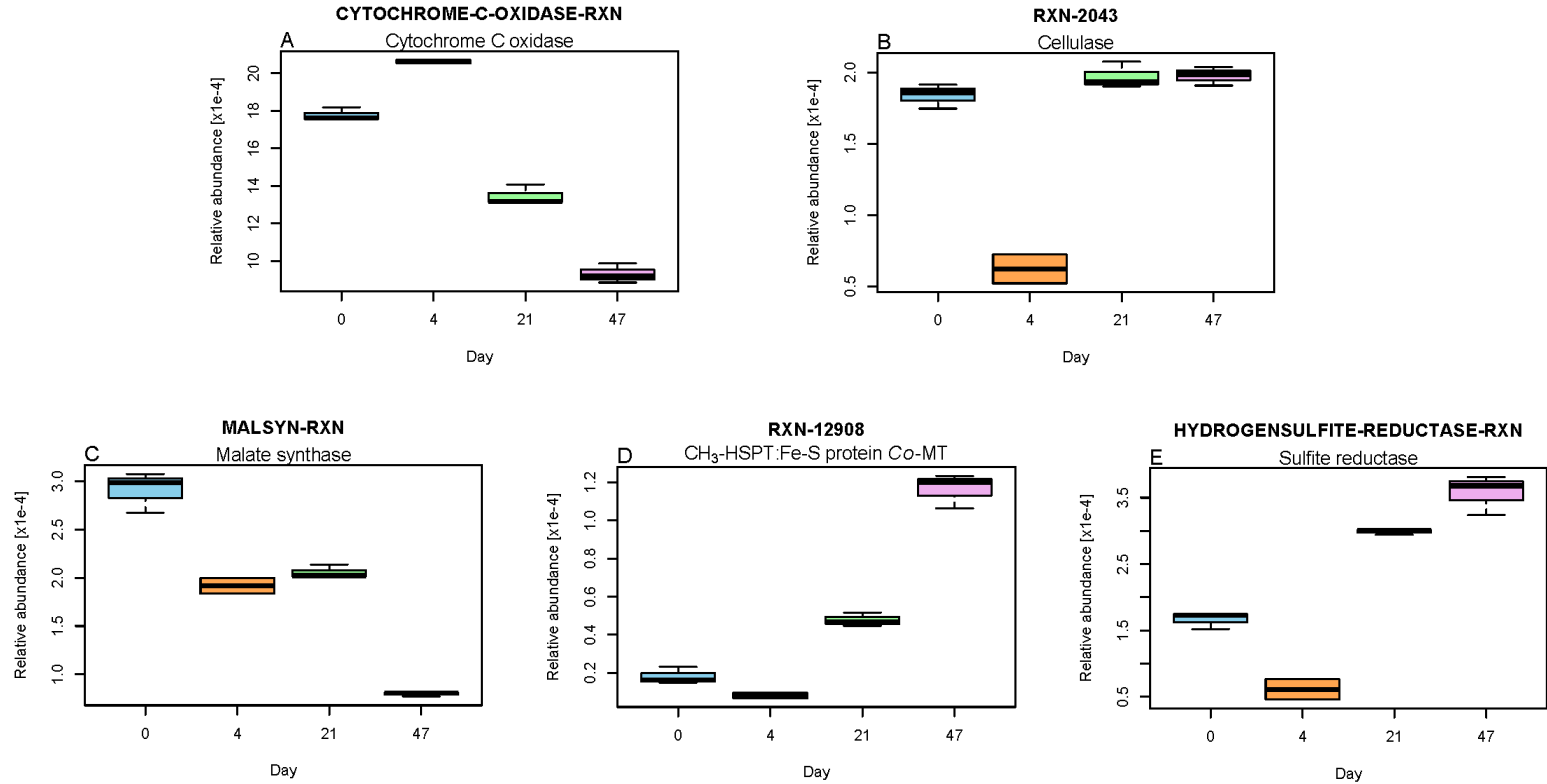


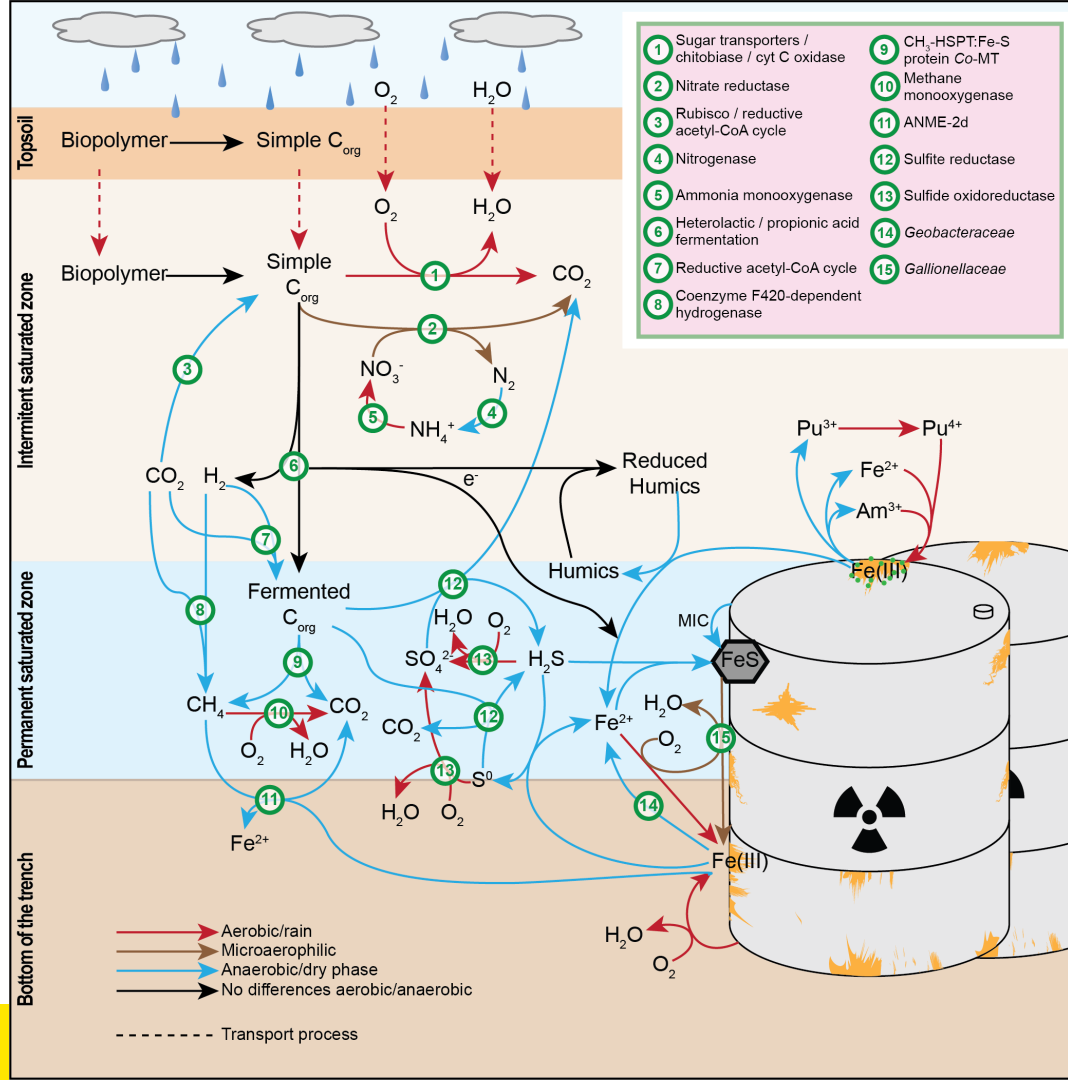
Functional profiling

- Single read analysis with HUMAnN2 → MetaCyc database



Functional profiling





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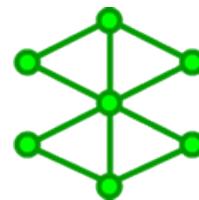
Online at App Env Microbiol in the next few days

Preprint available at bioRxiv 121376

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