Case Study Deep Biosphere

Project Topic: Microbial utilization of CO_2 in the terrestrial subsurface

Project Partner: GFZ Deutsches Geoforschungszentrum Potsdam

Location: Eger Rift mofette field in the Czech Republic

Sample type: Sediment and rock cores, mofette and spring waters

Target Molecule: DNA

Laboratory Analysis:
16S rRNA and metagenomic sequencing of rock, water and enrichment samples using Illumina and Oxford Nanopore Technology

Bioinformatic Analysis:
Basecalling, taxonomic classification, assembly and binning, genome quality assessment, annotation, metabolic pathway reconstruction

Summary:
Specifically adapted laboratory and bioinformatic workflows allowed the reconstruction of microbial distribution patterns down to a depth of 230 m across this, difficult to work with, low biomass environment. Metagenomic genome recovery allowed the detection and characterization of CO_2 utilizing methangenic and chemolithotrophic mcirroganismans. Statistical evaluation provided insights into microbial co-occurrence patterns and bio-geo interactions.

More details:
https://www.frontiersin.org/articles/10.3389/fmicb.2018.02787/full
https://www.frontiersin.org/articles/10.3389/fmicb.2020.543260/full
https://www.frontiersin.org/articles/10.3389/fmicb.2017.02446/full