

Strata-specific bacterial diversity in aquifers of the Thuringian Basin/Germany

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The INFLUINS (Integrated fluid dynamics in sedimentary basins) project investigates coupled dynamics of near surface and deep flow patterns of fluids, transported materials and component substances in the Thuringian Basin. The extensive basin landscape is located in eastern Germany and belongs to the Triassic period of Bunter sandstone (Buntsandstein), shell limestone (Muschelkalk) and Keuper, which crop out at the surface. Older sediments and Permian (Zechstein) can be found at the edges of the basin.

With microbial investigations, we are analyzing the bacterial diversity of groundwater at different locations to see whether there are special patterns in bacterial distributions originating from the different rock strata. Furthermore, we are interested in the bacterial diversity of drilling cores and salt formations from the same locations. This will facilitate understanding fluid movement in the Thuringian Basin. We determined bacterial community from water samples out of nine natural springs and sixteen groundwater wells by cultivation and subsequent morphological, physiological and molecular identification.

First results show that the largest proportions were found to be members of Bacilli and γ -proteobacteria, including the genera *Pseudomonas*, *Marinomonas*, *Bacillus*, *Marinobacter* and *Pseudoalteromonas*.

Next steps will be a comparison of cultivation-dependent and cultivation-independent methods to gain further information on bacterial strains which were uncultivable or suppressed by other bacteria strains.

Experimental Calibration of a Garnet-Clinopyroxene Geobarometer for Mantle Eclogites

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We present a geobarometer applicable to eclogitic mantle xenoliths based on the exchange reaction involving the incorporation of Al in 4-fold coordination present as Ca-Tschermak in omphacitic clinopyroxene coexisting with garnet solid solutions. The barometer is calibrated with piston cylinder and multi-anvil experiments between pressures of 3 to 7 GPa and temperatures from 1200 to 1542 °C. Starting materials are synthetic mixtures of varying basalt compositions (hydrous N-MORB), yielding a homogeneous biminerally garnet-clinopyroxene phase assemblage. We expand our own data set by implementing additional experimental studies conducted in eclogitic systems granting the applicability to a wider range of eclogitic compositions. All experiments are buffered in terms of Al with garnet as the Al-bearing phase. Our calibration reproduces the experimental pressures with 0.4 GPa within the 95% confidence interval. The barometer was then tested with natural eclogites from various mantle xenolith locations covering a wide P-T-X regime. The herein presented barometer opens up the possibility to determine pressures of formation for biminerally eclogite xenoliths without requiring additional accessory phases. With this barometer we provide an additional tool to investigate the P-T state of upper mantle heterogeneities.