$^{87}Sr/^{86}Sr$ in situ analyses of fracture infill and adjacent salt rocks from z2 potash salts (Upper Permian), Northern Germany

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In an extremely deformed area of the Morsleben salt structure, Northern Germany, more than 200 fractures were mapped in the z2 potash seam (Kaliflöz Staßfurt, Upper Permian). Most of them extend several cm to m into the surrounding salt rocks and show opening widths of a few mm to rarely 10 cm. For long-term safety considerations, the genesis of these fractures was investigated using i.a. mineralogical-geochemical methods.

The fracture infill depends on the composition of the surrounding rocks and consists basically of polyhalite, halite, sylvite, kainite and carnallite in different proportions.

The $^{87}Sr/^{86}Sr$ results (obtained via LA-MC-ICP-MS) of fracture mineralization and surrounding rocks depend strongly on the mineralogical composition of the rocks.

Fracture mineralizations in anhydrite rocks and anhydrite rocks itself, respectively, display a homogenous isotope ratio of 0.7071 - 0.7076 ± 0.001, which are typical values for Permian rocks (e.g. [1]). In the potash seam, more heterogeneous and higher isotope ratios of 0.7091 – 0.7139 ± 0.003 were detected. In rock salt adjacent to potash seams, the isotope ratios of surrounding salt rocks (0.7103 ± 0.002) and fracture infill (0.7150 ± 0.004) are also increased.

The high isotope ratios are caused by the formation of ^{87}Sr from ^{87}Rb decay, which shifted the Sr isotope ratios to higher values. A possible source for ^{87}Rb are potash minerals (Rb content max. 17 ppm/whole rock), or ^{86}Sr depleted intrasalinare brines.

Finally, no indications for postsedimentary changes by groundwater or extrasalinare brines are discernible. Comparable results for Gorleben salt rocks are reported by [2] who suggest that the system was closed for at least 5 my.

[1] Korte et al. (2006) *Palaeogeography, Palaeoclimatology, Palaeoecology* **240**, 89-107. [2] Schmidt and Mengel (2015) *BfS report* (unpublished)