**Non-traditional isotopic signatures of Permian salts to identify fluid genesis: Insights from salt leaching experiments focusing on strontium-87/strontium-86 and magnesium-26/magnesium-24**

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In the framework of the investigation of the role of groundwater in on-going subsidence processes in the city of Stassfurt, Germany, we analyzed the strontium and magnesium isotope composition of solid salt samples and of samples from the Bunter Sandstone layers covering investigated Zechstein formation.

The overall aim of the study was to identify the genesis and origin of brines encountered in the saline formation. This requires a sound knowledge of fluid sources in the investigated system, i.e. the occurrence of residual brines or dissolution-derived brines that potentially evolved further through water-rock interaction, as well as necessitates an understanding of the dissolution behavior of encountered solid material.

For this, we conducted leaching experiments on Anhydrite, Carnallite and Halite from the Zechstein formation as well as on bulk rock samples from the Bunter Sandstone in the area and measured their strontium and magnesium isotopic composition. In addition, multi-isotopic measurements (e.g. 87Sr/86Sr, 26Mg/24Mg, 81Br/79Br, 2H, 18O) were conducted on abstracted water samples for comparison with the signatures derived from rock material. Results are set into the framework of deep formations in the Northern German Basin.

Despite the fact that the salt mines in Stassfurt experienced flooding, we found a clear indication of still preserved evaporitic brines within the saline formation, and show the degree of contribution of evaporitic components in fluids within the covering layers. In addition, we present novel data on Mg-isotopes to further understand the isotopic cycling of magnesium in salt.