# Isotopic composition of water of crystallisation of sulfates of Permian-Triassic age, Eastern Alps, Austria

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The investigated sulfates as gypsum and polyhalite were selected from various gypsum and halite rich deposits of the Northern Calcareous Alps and the Central Alpine Mesozoic. The two units of the Eastern Alps are characterised by the presence of Permian-Triassic evaporitic deposits. Crystallisation water of mineral phases was extracted by heating the samples under vacuum. The cryogenically trapped water was subsequently analysed for delta 18O and delta D on a Picarro L2120-i Analyzer. The isotopic compositions were synchronously measured, with a standard deviation better than 0.1 permil. The fractionation factors for both oxygen and hydrogen between brine where the sulfates formed and crystallisation water of sulfates are not temperature dependent. Using the appropriate relationships, we conclude from the calculations that, for gypsum, oxygen and hydrogen isotopic composition of fluid in equilibrium with crystallisation water varied between -16 to -6 permil and between -90 to -25 permil, respectively. The crystallization water of gypsum associated with halite type deposits has heavier isotopic compositions. The isotopic composition of crystallisation water of gypsum points towards reequilibration with a younger meteoric fluid. In contrast, polyhalite crystallisation water show much heavier values between +10 to +11 permil for oxygen and +16 to +19 permil for hydrogen. These values suggest the fact that this water of crystallisation indicates the isotopic composition of brines. The origin of these brines, diagenetic versus later thermal overprint is subject of further investigations. All the measured values plot along a regression line.