

# **DOC characterisation of the Malm aquifer in the Molasse basin of southern Germany**

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In this study we present the characterisation of the dissolved organic carbon (DOC) from geothermal waters from a calcereous aquifer (Malm) located in southern Germany by its molecular and isotopic composition. The Malm aquifer is well-known to charge geothermal waters with temperatures of up to 140°C to gain energy and heat. Within the “AquiScreen” project monitoring of geothermally used groundwater systems is conducted to investigate the possible interactions of the technical plant with the natural environment under geochemical, microbiological and mineralogical aspects. Our investigations are aimed to develop an organic-geochemical monitoring tool to evaluate the working reliability of the geothermal plants. Several geothermal plants in the Molasse basin have been investigated for the quality and quantity of the dissolved organic carbon (DOC) and its development over time when the geothermal plants are active. Therefore, water samples from the Malm aquifer, representing a depth range from 220 m to 3445 m depth have been taken in the geothermal plants. Water samples have been analysed for DOC concentration and isotopic composition and the content of low molecular weight organic acids (LMWOA). To get a better insight into the structural composition of the DOC also size exclusion chromatography was performed. The shallower parts of the aquifer are characterized by DOC which is dominated by up to 76% of neutral compounds (alcohols, aldehyde, ketones, amino acids). In these samples the percentage of building blocks, which are oxidation products of the transition of humic substances to LMWOA, reaches up to 27%. Water samples from the deeper aquifer (> 3000 m) showed that the DOC mainly consists of these LMWOA with a maximum value of 83% and neutral compounds as well as building blocks only occur in low concentrations.