

Donnerstag, 24. Juni 2021  
Kongress 2 - Oberflächennahe Geothermie  
14.10-14.40 Uhr

## **7 years of operating experience with heating and cooling of a hotel by 9x400m medium deep geothermal probes in a karst aquifer**

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A well established luxury resort in the Tyrolean Alps was extended in 2013/2014 for the fifth time. This opportunity was used to install borehole heat exchangers (BHE) in a dolomitic karst aquifer. The aquifer sharply declines from a thrust fold contact to the Tauern Window into the deeper underground. A number of enhanced geothermal response tests before and during the operation have been carried and optical frequency domain reflectometry methods have been applied to assess the hydrogeological and geothermal integrity of the BHE.

The linear borehole heat exchanger systems have been percussion drilled. In total 3.600 m BHE were completed in nine wellbores consisting of two BHE groups. The BHE have been drilled in an alignment. The thermal profile has conductive heat transfer in the upper section and convective in the lower karstified well bore section.

The underground installation was connected to three heat pumps and three thermal storage tanks with different temperature ranges. Two years were used to optimize the cascade operation and another four years of operational routine were monitored and evaluated.

The presentation will compare the designing approach (1 GWh/a heat extraction and 0.4 GWh/a cooling load) with the obtained performance after the first six years of full operation in heating and cooling this particular hotel complex. The systems was dedicated to supply the 25 x 12.5 m outdoor swimming pool e.g.. The annual utilization of the geothermal energy was determined to be 6,600 h. It will be demonstrated how the systems performance and COP developed and how optimization measure could be implemented.