Case Study area Saalbach

Case study area presentation

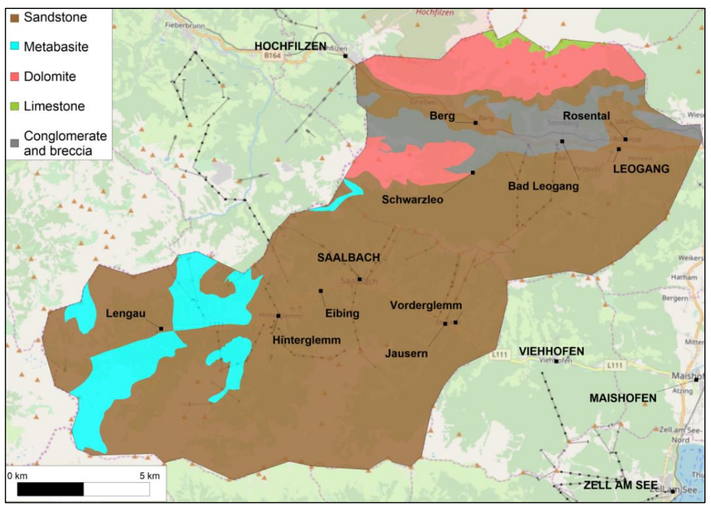
Leogang and Saalbach-Hinterglemm are two municipalities located in the far west of the province of Salzburg, bordering Tyrol. Both municipalities are located in west – east oriented valleys, to the north lies the Leogang valley with the river Leoganger Ache and to the south the Glemmtal with the river Saalach, in which the Leoganger Ache flows into.

Settlements are located in altitudes of about 800-1.000 m and host roughly 6000 inhabitants. The region belongs to the Kitzbüheler Alps with the highest peak, the “Birnhorn”, at 2,634 m altitude and hosts one of the largest skiing resort in Austria. Considering that the two municipalities record more than 2 million guest nights every year, it is clear that tourism is an important economic factor for the whole region.

Geological and hydrogeological features

The area is located in the geological unit of the Austroalpine. The E-W striking Leogang valley represents the geological boundary between the Northern Calcareous Alps with their sandstones, conglomerates and carbonates to the north and the Greywacke Zone the with its sand-, silt- and claystones to the south.

The valleys are filled with Quaternary sediments and bear multiple narrow aquifers used both for thermal use and for drinking water supply. The identified aquifer bodies are characterized by fine- to coarse grained Quaternary gravels and reach thicknesses of up to 20 m. The average annual temperature is in the range of about 8 °C. Up to date, only scattered groundwater heat pumps are installed in these two valleys.



This simplified geological map represents a compilation of available geological and lithological information from maps of the region with scales between 1:200.000 and 1:50,000. Units comprising lithologies with similar thermal rock properties were grouped to receive a simplified but realistic distribution of thermal conductivity values.

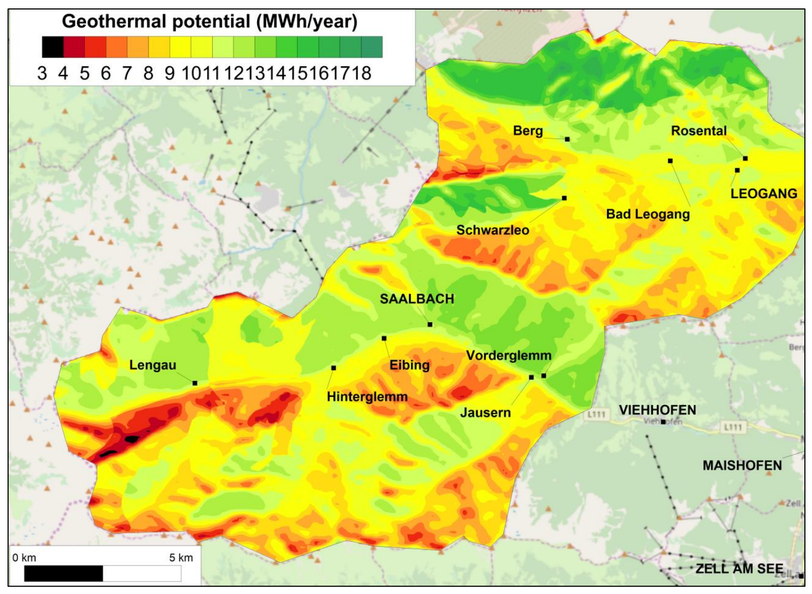
Estimation of shallow geothermal energy potential

The main results of this study are two maps, indicating the potential for closed- and for open-loop installations. The calculations were carried out by TUM (Technical University of Munich) and POLITO (Politecnico di Torino) using the G.POT method for closed-loop and a method developed by TUM in collaboration with POLITO & ARPA VdA for open-loop. The common outputs are maps of geothermal potential expressed in MWh/y.

Spatial distribution of closed-loop potential

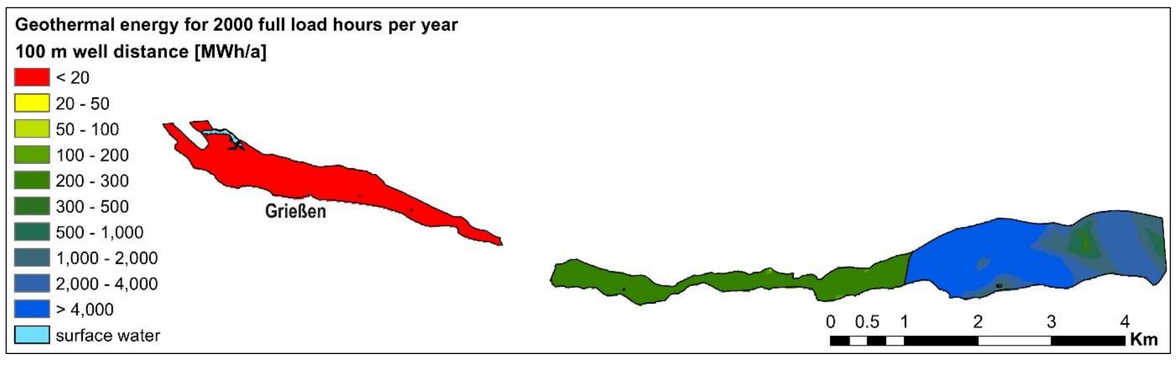
The effect of ground temperature is quite clear, as southward-oriented slopes exhibit ground temperatures of about 8-10 °C, while northward-oriented slopes are much colder (about 2-7 °C). On the other hand, the thermal conductivity exhibit a much lower spatial variability, with most of the surface lying in the range 2-2.8 W/(mK).

For this reason, the highest values of geothermal potentials are found in the lower, southward-oriented side of the valleys of Saalbach (12-13 MWh/y) and of Leogang (9-12 MWy). Much lower values are found in the northward-oriented slopes, ranging between 4 and 9 MWh/y.



Spatial distribution of open-loop potential

The W part offers low suitability for thermal use due to low aquifer thickness (3 m) and a hydraulic conductivity of only 1·10-4 m/s. The middle part offers moderate conditions. Especially larger systems would be limited by the significant drawdown in the 7 m thick aquifer. The W part offers high aquifer thickness of 20 m and good hydraulic conductivity of 2·10-3 m/s and is combined with a high hydraulic gradient, and therefore offers quite suitable conditions also for larger GWHP systems.



Dissemination activities

On 13th of November, the potential maps will be presented to the communities Leogang and Saalbach-Hinterglemm.

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme