



GeoSurf – geoelectric soil modelling for a sustainable land use and efficient planning of shallow geothermal systems

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Due to the increased demand of biomaterials and renewable primary products the world's soil is intensively effected. Land usage needs to be efficient, space-saving and sustainable. To fulfil these needs soil properties have to be analysed and mapped. Furthermore the shortage of resources will boost the role of renewable energy sources within all energy supplying systems. Also for very shallow geothermal systems (e.g. collectors or heat baskets) detailed information of soil properties are necessary. The most important parameters for characterisation of the soil body are grain size distribution, bulk density and moisture content.

Within this project geoelectric measurements more than 50 m wide and 20 m deep cross-sections were made. The above-named soil properties and the thermal conductivity were determined as well. The soil parameters were analysed regarding their effects on thermal- and electric conductivity. With the results of these geoelectric cross-sections in comparison with the measured soil texture, reliable statements about the existing soil properties and a deduction of its thermal conductivity can be made. Within the uppermost meters of the ground, thermal conductivity is mainly driven by soil type.

So reasonable recommendations of soil properties and its thermal conductivity are possible only by measuring the electrical conductivity. With these measurements also clear and demonstrative soil models can be illustrated.

The electrical conductivity provides expedient information about the soil that opens up the opportunity for clear recommendations about sustainable land use and for site-specific installation of very shallow geothermal system. Also predictions for other soil controlled investigations are possible.