the iron melting process. Such slags were extensively distributed in the surrounding environment. They are characterised by high magnetic susceptibility values (max. 3796 x 10^{-3} SI) and, thus, has a significant effect on the magnetic survey results, as well as on measurements of the electric conductivity and related parameters. The presented susceptibility models are based on an integrative interpretation of the different geophysical survey results and petrophysical measurements.

Data treatment for a hydrothermal reservoir assessment

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The main components of a hydrothermal system are the availability of a fluid to carry the heat, a conducting or heat producing basement, a reservoir to accommodate the fluid and specific reservoir parameters, e.g., thickness, lateral extension, porosity, permeability and thermal conductivity. Essential fluid parameters for a hydrothermal reservoir assessment are temperature, chemistry and quantity. The properties of a feasible geothermal object are partly measurable, but the geothermal potential depending on its recoverable volume has to be derived from the interpretation and modeling of geological and geophysical data and in a further step by geothermal modeling and simulation. The geological data framework is almost entirely derived from the hydrocarbon exploration and production. For demonstrating the methods of the geological and geothermal exploration the Calcalpine basement of the Vienna Basin is chosen as an example.
The reservoir is represented by dolomitic complexes of the northern frontal parts of the Calcalpine nappe system. In the area of Vienna, the prevailing hydrothermal reservoir rocks are Norian Hauptdolomite and to a minor degree Upper Carnian dolomites of the Lunz-Frankenfels-nappe. The structural features of the dolomite complexes are fold structures, forming two large anticlines (Höllenstein- and Teufelstein-anticline) and a syncline (Flössel syncline), detected by drilling in the areas of Kaisermühlen, Kagran and Hirschstetten, and geometrically analysed (BRIX & SCHULTZ 1993). The delineation of the reservoir in a 3D-model showing the structural features, the stratigraphic succession and the complex fold and fault system (WESSELY 2006) is performed by application of the geological modeling software Petrel, developed by Schlumberger Co. The given geological sections and maps are imported as images and as grid files. Interpretation is performed directly on the geological profiles. For surface generation also information from wells is regarded. The generated surfaces are used as input for the modeling process. The model consists of regular, rectangular cells with a grid size of 100x100x50 m. Each of these cells is filled with reservoir parameters to obtain a 3D property model (EICHKITZ et al. 2009). This property model is the input for the reservoir simulation.
Lithological, facial and petrophysical analyses are carried out using core samples and log analyses. For determination of the essential thermal properties, measurement of porosity, density, thermal capacity and thermal conductivity takes place under several different conditions (in a dry state and under saturation by high saline water). Regarding the dolomitic reservoir rocks different thermal properties have to be taken into account according to facial and diagenetic variations, whereas correlation between diagenetic processes, depositional environments and thermal properties can be created. Intercalations of claystone and the presence of evaporite have to be considered. From the analyses of the disposition of the permeable and impermeable zones the drainage system and fluid path are identified (WESSELY 1983). Based on preceding information about temperature, pressure and salinity of the reservoir fluid gained by formation tests in the wells Kaisermühlen and Hirschstetten, the hydrothermal reservoir assessment shows the suitability of this area for exploiting heat respectively balneologic utilisation by means of the fluids of the Calcalpine basement.
The verification of the possibilities for the exploitation of hydrothermal energy depends on implication of an extensive database, which supplies the preconditions for energy- and economic calculation to assess the method of energy extraction and the estimation of the energy gain. The advanced methods to treat existent data of petroleum exploration for hydrothermal purposes in combination with additional investigations might assure a better selection of hydrothermal objects.

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Nutzungsmöglichkeiten tiefer Geothermie in Österreich

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Die Intentionen zur Nutzung tiefer geothermaler Energie in Österreich gehen in Richtung hydrothermale Nutzung (Wärmeentnahme aus zutage geförderten Lagerstättenwässern mit anschließender Wiederverpressung), aber auch