WATER CHEMISTRY AND SUBSURFACE TEMPERATURE ESTIMATION IN THE HVERAGERDI HIGH-TEMPERATURE GEOTHERMAL FIELD, ICELAND

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The Hveragerdi high-temperature geothermal field is located about 50 km southwest of Reykjavik. The northern part of the field lies in the Reykjadalur and Grensdalur area where several wells were drilled in the 1960s for a power plant plans for which were later abandoned. The southern part encompasses the Hveragerdi village where there is wide-spread utilization mostly in the areas of space heating and greenhouse industry. In the field, the chemical composition of the waters is investigated in terms of relative Cl, SO4 and HCO3 concentrations, and relative Na+K, Ca and Mg concentrations. The two hydrochemical types of waters are identified: The first type are Na-HCO3 waters. Some of the type waters are steam-heated water with low chloride and boron concentrations. The second type is Na-Cl water. This type of water includes all the thermal discharges except for some steam-heated springs. The discharges from wells are probably representative of deep, undiluted geothermal fluids. To some extent, the deep Na-Cl waters are affected by dilution with shallow low-salinity waters. Solute-mineral equilibrium studies suggest that geothermal fluids from wells are close to equilibrium with hydrothermal alteration minerals but boiling/degassing and mixing in upflow zones lead to departure from equilibrium for thermal waters from hot springs in the Hveragerdi high-temperature geothermal field, SE-Iceland. The solute geothermometers and the log(Q/K) method give the subsurface temperatures ranging from 183 ?C to 204 ?C on average which compare well with the measured aquifer temperature.