

Chemical and Isotopic Signatures of High Temperature Geothermal Systems, Iceland

Halldor Armannsson¹, Bruce Christenson², Mack Kennedy³

¹ISOR, Reykjavík, Iceland

²Institute of Geological & Nuclear Sciences, Lower Hutt, New Zealand

³Center for Isotope Geochemistry, LBNL

The objective is to advance geochemical exploration techniques for identifying high temperature geothermal systems through characterization of the chemical and isotopic compositions of fluids in the hydrothermal-to-magmatic transition zone in Icelandic heat-source environments. The transition from sub- to supercritical conditions at the magma-hydrothermal interface will be accompanied by substantial changes in the physio-chemical characteristics of the reservoir fluids and enclosing reservoir rocks. These changes will have an impact on the overlying aquifer/reservoir systems and on the rheology of the reservoir. Through the identification, characterization and understanding of these changes, we hope to identify useful chemical geo-indicators to assist in the exploration of heat source environments in geothermal systems, particularly supercritical zones in high temperature fields.

