

Shallow Water Flow Characteristics of the Saline Hot Spring, Khlong Thom, Krabi

Helmut Duerrast*, Maytipa Phalakarn and Kraipat Petrit

Geophysics Research Center, Faculty of Science, Prince of Songkla University, Songkhla, 90110, Thailand

* Corresponding author. E-mail address: helmut.j@psu.ac.th

Abstract

Hot springs are a widespread geothermal feature in most parts of Thailand. In igneous and metamorphic rocks, hot water exists along discrete open faults, fractures, or joints. In areas with a significant sedimentary cover, the hot water moves along various pathways through the porous and permeable material and layers. However, the locations of the hot waters in such environments are not visible and identifiable. Here, we applied the self-potential (SP) method in combination with electrical surveys and soil temperature measurements to identify hot water locations at the saline hot spring area in Khlong Thom, Krabi, southern Thailand. Surveys were done by loop measurements along the selected profile lines and covering areas. The overall SP response is the sum of streaming potential and diffusion potential. The integration of all quantitative results revealed fluid flow patterns in the relatively shallow subsurface of the area. Further, the self-potential data show negative SP anomalies, which can be linked with hot saline water flowing up, whereas positive SP anomalies can be correlated with water flowing down in an overall higher saline environment. It can be concluded that the saline hot spring water in the area is often very shallow and separated by fractures, and additional 'hidden hot springs' could be located where the saline water flows upwards but does not reach the surface. Understanding of this unique hot spring system is vital for further development in this area as the results of this study should be considered when buildings or other infrastructure projects in this area will be designed.

Keywords: hot spring, salinity, self-potential, electrical resistivity, Krabi