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Integrated Subsurface Characterization for Hot Spring Development, Trang, Thailand

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Abstract

Hot springs represent a common geothermal feature of the hot earth. The natural hot water can reach surface exit temperatures of more than 100 degrees Celsius. Since ancient times, such waters, where available and after cooling down to temperature levels humans could accept, have been part of health care efforts, including baths, spas, and massages. In southern Thailand, several hot springs can be found and many of them are currently used mainly for health-related purposes. With increasing popularity, there is a need of expansion and development to provide services for all, especially domestic and international tourists. However, for sustainable development, the subsurface conditions of the hot spring area needed to be known; here for a hot spring in Trang, southern Thailand. A combination of geological, geophysical, and geochemical investigations was carried out to get a better understanding of the overall geothermal system. Geological fieldwork was done; geochemical analysis of the cation and anion of the hot water was carried out, and five 1D-resistivity surveys, with 400 m AB/2, and one 2D-resistivity survey over a length of more than 600 m and a depth of around 70 m were performed. In addition, some well data from the area were available. The integration of all quantitative data provides a hydrogeological model, showing where the hot water is coming to the surface along almost vertical pathways into a shallow reservoir, which seems to have a relatively narrow spatial extension. With such an understanding, further development, including drilling wells for further hot water exploitation, can be done more sustainably.

Keywords: hot spring, health care, geophysics, resistivity, Trang