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# Effectiveness of Multicomponent Geothermometry in Geothermal Reservoir Temperature by a Case Study of Patuha Field, Indonesia

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**Abstract**

Geothermometry holds a valuable role in the reservoir temperature estimation during the evaluation of new fields and monitoring the hydrology of geothermal systems in production. Patuha Geothermal Field (PGF) is one of the few vapor-dominated geothermal system located in West Java Province, Indonesia. Previous studies indicate the existence of different reservoirs in northern and southern area of PGF. Southern area is currently in production with 55 MW capacity [1]. Northern area is believed to possess considerable capacity based on the presence of high temperature surface manifestations. Due to limitation of subsurface data, northern area has not been fully explored. With the aim of estimating reservoir temperature with a better improvement and reliability for a preliminary study, multicomponent geothermometry [2] is being applied. This new geothermometry is specifically proposed for this reservoir estimation because of its advantage in using full chemical analysis and mineral saturation indices to obtain optimization. Two data sets of water chemistry, each from northern and southern area, are put in the simulation with additional information of main minerals presumed as reservoir minerals. As an active production area, southern part has shown reservoir temperature of 220-260°. This temperature is in good agreement with the result of multicomponent geothermometry which shows a value of 245°C. Northern part with no known subsurface data shows a bit lower reservoir temperature at 212°C. Optimization by selecting several main minerals demonstrates that quartz, anhydrite, actinolite, calcite, illite, kaolinite, wairakite, and epidote are minerals that provide better clustering of mineral saturation indices hence more reliable value of reservoir temperature. The differences of reservoir temperature from multicomponent geothermometry in northern and southern area of PGF indicates difference in subsurface temperature distribution between these reservoirs. Clay minerals as selected main minerals is a beneficial information for further alteration analysis to clarify the temperature distribution between northern and southern area of PGF.

**References**

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