GEOCHEMICAL CHARACTERISATION OF THERMAL WATERS IN HULULAIS GEOTHERMAL PROSPECT

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The Hululais area is one of several Quartenary andesitic-dasitic volcanic centers of the Sumatera volcanic arc. The Hululais prospect area concentrates mostly on the West side of the major zone of crustal weaknesses created by the Northwest – Southeast trending Sumatera fault system. The Northwest – Southeast and Northeast – Southwest structures control the existence of the Huluhais volcanic system and presence of thermal manifestations. The prospect area is characterised by appearance of fumaroles, hot springs and altered rocks.

Fluid chemistry analyses on hot spring waters show a dilution of shallow meteoric ground water and indicate that some may originate from a single hot water reservoir. However, hot spring water located in the Southern part contain higher ratio Cl/HCO_3 than those located in the North indicating less shallow ground water contaminations. Higher HCO_3/SO_4 ration in the Northern hot springs designates the fluids flows from South to North. The up welling fluids most likely take a place beneath Suban Agung (North) and move laterally Northward to Semelako area (South). The presence of magmatic steam in Suban Agung fumarole is indicated by high content of N2, He Ar and isotropic data. Recharge area is located at about 600 meters above sea level. Mercury anomaly from a lineation trending Northwest-Southeast that coincides with the main fault pattern in this area.

The subsurface temperature estimates using solute and gas geothermometry were obtain ranges values of $240 – 300^oC$ respectively. These are confirmed by isotope data which show enrichment's in their isotropic content as a result of evaporation from high temperature fluids of more than $180\ ^0C$. These analyses indicate that Hululais can be categorised as high enthalpy geothermal system