

Water Balance of the San Simon Groundwater Basin, El Salvador, Central America: Implications for the Berlin Geothermal Field

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The Berlin hydrothermal field in El Salvador, Central America is located in the San Simon River Basin on the northwest slope of the Berlin-Tecapa volcanic complex, in the eastern portion of the country. This hydrothermal field is a liquid-dominated system governed by fault structures allowing infiltration and transport of meteoric fluids. Exploitation involves the removal of hot fluids from the geothermal reservoir and re-injection of lower temperature fluids. This study analyzes the surficial hydrology and groundwater storage change (since exploitation) in the hydrothermal reservoir to produce a water budget. Field monitoring of springs, fumarole activity, domestic wells, tributaries to the San Simon River, and meteorologic data provide constraints on the hydrology. A correlation between the composition of the fumarolic gases and the diffuse flux of soil CO₂ was performed to complete the balance. An analysis of the increase in chloride concentration with time in the deep aquifer and the net mass withdrawn from this aquifer allow an estimation of the decrease in storage in the hydrothermal aquifer. This water balance will assist future operations in optimization and sustainability of the geothermal reservoir and could be used to evaluate extraction and re-injection procedures.