INTISARI

Kawah Sileri merupakan kawah erupsi hidrotermal berada di lereng Gunung Pagerkandang. Kawah terbentuk pada tahun 1944, diikuti terjadinya erupsi hidrotermal yang menyebabkan 59 korban jiwa serta kerugian material. Manifestasi panas bumi meliputi mata air panas, tebing beruap, fumarol, kolam lumpur, dan batuan permukaan teralterasi ditemui di lantai kawah. Kondisi manifestasi panas bumi bersifat dinamis akan aktivitas alami (hidrotermal) maupun aktivitas manusia seperti operasional pengembangan panas bumi dan perubahan tata lahan. Pengamatan manifestasi dilakukan untuk mengetahui kondisi reservoir panas bumi, geokimia fluida panas bumi, beserta potensi bahaya geologinya. Melalui analisis penginderaan jauh berupa citra inframerah termal beserta karakteristik geokimia fluidanya, maka dapat diketahui potensi bahaya.

Citra inframerah termal menunjukkan manifestasi panas bumi tersebar di lantai kawah dengan suhu tertinggi di mata air panasnya. Mata air panas Sileri timur merupakan air tidak berwarna, suhu air pada musim hujan 73^{o}C dengan pH air 7. Mata air panas Sileri barat memiliki air berwarna abu-abu keruh, suhu air pada musim hujan 71^{o}C dengan pH 4. Jenis air asam sulfat dan air bikarbonat termasuk *steam-heated waters* dan air tidak matang. Berdasarkan analisis isotop $\delta^{18}O$ dan δD, terdapat pengkayaan isotop $\delta^{18}O$ mengindikasikan fluida Sileri didominasi air meteorik dengan imbuhan fluida magmatik yang sedikit. Suhu reservoir Sileri berkisar 275-307^{o}C dengan fase kesetimbangan dua fase dominasi likuid.

Potensi bahaya geologi yang ditemukan di lokasi penelitian berkaitan dengan aktivitas hidrotermal yang masih aktif. Lokasi penelitian di kompleks gunung api dengan kondisi kelerengan curam dan curah hujan yang tinggi, dapat menimbulkan potensi bahaya berupa erupsi hidrotermal, paparan gas vulkanik, dan gerakan massa. Adanya aktivitas operasional panas bumi beserta aktivitas masyarakat, maka diperlukan pemantauan kondisi manifestasi panas bumi beserta pemantauan bawah permukaan meliputi suhu, tekanan, laju fluida pada kedalaman tertentu, geokimia fluida panas bumi, dan kondisi *casing* pemboran. Pemantauan tersebut dapat mengurangi mengurangi potensi bahaya geologi, sehingga meningkatkan kepercayaan masyarakat terhadap perusahaan.

Kata kunci: Kawah Sileri, manifestasi panas bumi, penginderaan jauh, geokimia, bahaya geologi.

ABSTRACT

Sileri Crater is a hydrothermal eruption crater situated in flank of Mount Pagerkandang. The crater formed in 1944, followed by hydrothermal eruption caused 59 fatalities and significant material losses. Various geothermal manifestations occured in floor crater consist of hot springs, steaming ground, fumarols, mud pools, and altered ground. Both hydrothermal activity and geothermal operational could significantly impact the condition of geothermal manifestation. Therefore, monitoring the manifestations is essential to understanding the reservoir condition, fluid geochemistry, and potential geological hazards through remote sensing analysis combined with fluid geochemichal analysis and their potential risk.

Thermal infrared imagery reveals manifestation scattered across floor crater with the highest temperatures at hot springs. The eastern Sileri hot spring features colorless water, with temperature of 73^{o}C during rainy season, and pH 7. The western Sileri hot spring gas turbid gray wayter, with temperature of 71^{o}C during rainy season, and pH 4. These are sulphate and bicarbonate waters characterized as steam heated waters and immature waters. Based on isotopic analysis of $\delta^{18}O$ and δD, there is enrichment of $\delta^{18}O$ indicates the Sileri fluid dominated by meteoric water with a slightly mixing of magmatic fluid. The Sileri reservoir temperature ranges from 275-307^{o}C, with a two-phase reservoir equilibrium dominated by liquid.

The potential geological hazards in this area associated with ongoing hydrothermal activity. Situated within a volcanic complex characterized by steep slopes and high annual rainfall, the area is susceptible to hydrothermal eruptions, volcanic gas exposure, and landslides. The coexistence of geothermal operations and local community activites necessitates the systematic monitoring of geothermal manifestations combine with subsurface monitoring such as temperature, pressure, fluid flow rates at specific depths, fluid geochemistry, and well casing integrity. These comprehensive monitoring is essential to mitigate potential geological hazards and maintaining public trust in geothermal company.

Keywords: Sileri Crater, geothermal manifestation, remote sensing, geochemistry, geological hazards.