INTISARI

IDENTIFIKASI PERGERAKAN MAGMA BERDASARKAN POSISI SUMBER GEMPA VULKANIK DAN MEKANISME FOKAL GUNUNGAPI SOPUTAN PRA ERUPSI 4 JANUARI 2016

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Gunungapi Soputan merupakan salah satu gunungapi aktif di Sulawesi Utara. Pada 4 Januari 2016 terjadi erupsi eksplosif yang mengakibatkan 14 desa tertutup abu vulkanik. Pada penelitian ini, dilakukan analisis data gempa vulkanik G. Soputan berupa gempa vulkano-tektonik, *low frequency*, dan vulkanik *hybrid*, untuk menganalisis pergerakan magma dan mekanisme fokal. Pengolahan dilakukan untuk menentukan posisi hiposenter dengan metode *Geiger Adaptive Damping* (GAD). Analisis mekanisme fokal dilihat dari distribusi polaritas gelombang P pada kejadian gempa vulkano-tektonik dan *low frequency*.

Distribusi episenter gempa terletak pada radius 0 – 1,2 km di sekitar puncak dan hiposenter berada di kedalaman 0 – 3,5 km dari puncak. Berdasarkan kemunculan jenis gempa vulkanik, dihasilkan kronologi vulkanisme G. Soputan pra erupsi. Periode pertama (6 – 20 Desember 2015) menunjukkan adanya migrasi magma, ditandai dengan kemunculan gempa vulkano-tektonik. Periode kedua (21 – 30 Desember 2015) muncul fluida gas dan uap air dengan kedalaman mencapai < 2,5 km di bawah puncak. Pertumbuhan kubah lava G. Soputan terjadi pada periode ketiga (31 Desember 2015 – 4 Januari 2016). Solusi bidang nodal dari gempa vulkano-tektonik menunjukkan adanya mekanisme *double-couple* yang sama dengan kondisi tektonik kaldera Tondano yaitu sesar geser, sedangkan untuk gempa *low frequency* menunjukkan mekanisme *non double-couple* yang didominasi oleh area dilatasi.

Kata Kunci: G. Soputan, *Geiger Adaptive Damping* (GAD), hiposenter, solusi bidang nodal

ABSTRACT

INDENTIFICATION OF MAGMA MIGRATION BASED ON VOLCANIC EARTHQUAKE POSITION AND FOCAL MECHANISM OF SOPUTAN VOLCANO PRA ERUPTION 4 JANUARY 2016

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Soputan volcano is one of the active volcano in the North Sulawesi. An explosive eruption was occurred on January 4th, 2016 that affected 14 villages by its volcanic ash. In this research, we analyzed volcanic earthquake such as Volcano-Tectonic (VT), low frequency, and hybrid volcanic to identify magma migration and focal mechanism. Processing data was performed by defining hypocenter position using Geiger Adaptive Damping (GAD). Focal mechanism was defined from P wave polarity distribution on VT and low frequency event.

As the result, the epicenters were distributed on radius 0 -1.2 km around the peak and hypocenter located on 0 – 3.5 km from the peak. The eruption chronology can be seen from the occurrences of volcanic earthquakes. First period (December $6^{th} – 20^{th}$, 2015) represents magma migration by the occurrence of VT event. Second eruption period (December $21^{st} – 30^{th}$, 2015) corresponds to gas fluid and water vapor, located less than 2.5 km from the peak of the Soputan volcano. Lava dome activity was started in the third period (December 31st, 2015 – January 4th, 2016). Fault plane solutions from VT events show the double couple mechanism that match with transform fault in the Tondano caldera tectonic setting, whereas low frequency represent non double-couple mechanism that dominated with dilatation area.

Keyword : Soputan Volcano, Geiger Adaptive Damping (GAD), hypocenter, fault plane solution