

ABSTRAK

ESTIMASI MEKANISME FOKUS GEMPA VT MENGGUNAKAN INVERSI MOMEN TENSOR DI GUNUNG API MERAPI

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Gunung Merapi merupakan gunung api aktif yang memiliki dampak erupsi yang membahayakan di permukaan. Urutan kejadian erupsi Gunung Merapi umumnya didahului oleh gejala awal berupa kemunculan gempa *volcano-tectonic* (VT). Gempa VT berperan dalam penentuan peningkatan aktivitas vulkanik. Penelitian kali ini bertujuan untuk mengetahui lokasi sumber gempa serta memperkirakan mekanisme fokus kejadian gempa VT periode 1-27 Oktober 2019 yang diolah menggunakan metode inversi momen tensor. Untuk menentukan mekanisme fokus dibutuhkan model hiposenter awal yang dihitung menggunakan metode *Geiger Adaptive Damping* dan model magnitudo yang dihitung menggunakan rumus *Local Richter Magnitude*. Berdasarkan hasil penelitian sebelumnya menunjukkan bahwa episenter tersebar memusat pada kawah utama. Kedalaman sumber berada di rentang kedalaman 1-5 km dari puncak dengan nilai momen magnitudo 1,0 hingga 2,2. Mekanisme sumber gempa VT periode 1-27 Oktober 2019 didominasi oleh patahan *oblique* dan *strike-slip* yang memiliki orientasi NWW–SEE dan NEE–SWW. Diperkirakan bahwa gempa VT pada periode 1-13 Oktober 2019 menunjukkan masih terjadi peristiwa suplai magma yang menyebabkan terbentuknya rekahan dangkal yang diikuti dengan kejadian erupsi sedangkan periode 20-27 Oktober 2019 tidak diikuti kejadian erupsi.

Kata kunci: Gunung Merapi, Gempa *volcano-tectonic*, mekanisme fokus, inversi momen tensor.

ABSTRACT

FOCUS MECHANISM ESTIMATION OF THE VT EARTHQUAKE USING MOMENT TENSOR INVERSION IN THE MERAPI VOLCANO

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Mount Merapi is an active volcano which has an endangerment eruptive impact on the surface. The sequence of Mount Merapi eruption is generally preceded by the precursor of the volcano-tectonic (VT) earthquakes. The VT earthquake plays a role in determining the increasing volcanic activity. This study aims to determine the centroid location and estimate VT earthquake focal mechanism in the terms of 1-27 October 2019 using moment tensor inversion method. To determine the focal mechanism, the initial model of centroid location and its magnitude is needed. Which are calculated by the Geiger Adaptive Damping method and the Local Richter Magnitude formula respectively. The study shows that the epicenters are spread around in the main crater. The depth of VT earthquake sources was at about 1-5 km from the top of Merapi with a range of moment magnitude is 1.0 to 2.2. The source mechanism of the VT earthquakes in the term of 1-27 October 2019 was dominated by oblique and strike-slip faults which have NWW-SEE and NEE-SWW orientations. It is estimated that the VT earthquake in the term of 1-13 October 2019 showed that Merapi Mount are still occurring supply of magma which caused shallow fractures were formed which are followed by eruption event, while in the term of 20-27 October 2019 the VT earthquake events not followed by eruption events.

Keywords: Merapi Mountain, Volcano-tectonic Earthquake, Focal Mechanism, Moment Tensor Inversion.