

## **ABSTRACT**

The Young Lawu Volcano has been recognized as a dormant volcano which will erupts in the future. The next eruptions may be huge and disastrous since there is a dense settlement area in the vicinity of the Young Lawu Volcano within 8 km. The assessment of hazard is being important in order to build the scenario of mitigation. Meanwhile, the lack of recorded data of previous eruptions represents the ignorance of the people to the volcanic hazard. One method to approach the assessment is the chronology of Young Lawu Volcano eruption based on the morphological features on the slope. Ultimately, the thread of major disaster of Young Lawu volcano according to the analysis of morphological features can be assessed.

The research was conducted through a series of analysis including data collecting from the field observation, analysis of petrography, as well as the absolute dating of charcoal. The morphological unit mapping was done by utilizing the images and digital elevation model observation. The stratigraphy of the morphological unit was arranged to determine the eruption pattern and the volcanic eruption product distribution. Thus, the hazard mapping was proposed as the new assessment of volcanic hazard map.

Since Late Holocene, Young Lawu Volcano erupted many kinds of volcanic products distributed on the flank to northeast-west-east-north-southwest-east (2<sup>nd</sup>)-north (2<sup>nd</sup>)-west (2<sup>nd</sup>)-northeast (2<sup>nd</sup>)-northwest-southeast and northeast from the parasitic cone. The lava signature dominates the slopes which face northeast, north, south, southeast direction while on the other parts, the pyroclastic deposits became abundant. The north flank was built by the eruptions from Panggungan. Arga Tiling and Arga Blungka were the sources of the product in the west part. Sela Pundutan, was the responsible source to the east flank and the south parts were the products of Parang Gumawang, Telaga Kuning, Gua Setupa, and Lumbung Selayur activities. The major thread is a primary eruption such as primary blast, lava flow, and ash flow through the collapsed lava dome in the recent crater rim which may be triggered by an earthquake along the Sidoramping Fault. The secondary product type of lahars, mudflow, and debris avalanche through provided stream channel also need to be considered. The closest population center in high risk is located within the radius 13 km such as Tawangmangu District (west), Ngargoyoso District (west), Jenawi District (northwest). The most eruption product will flow to the west, the northwest, and the northeast. Otherwise, Magetan City (southeast-east), Plaosan District (southeast), and Panekan District (east) will have major impacts of the eruption.

**Keywords: Eruption, Hazard, Young Lawu, Morphostratigraphy**

Gunung api Lawu Muda diketahui sebagai gunung api berfase istirahat yang mempunyai kemungkinan meletus di masa depan. Letusan selanjutnya berbahaya pada daerah pemukiman yang berada di dalam radius 8 km. Penilaian bencana penting dilakukan dalam rangka membangun scenario mitigasi bencana erupsi. Namun keterbatasan rekaman data letusan terdahulu dan penelitian terkait mewakili kekurangan perhatian penduduk sekitar terhadap bahaya letusan gunung api. Salah satu metode yang digunakan untuk menilai bencana adalah kronologi letusan Gunung Api Lawu Muda berdasarkan kenampakan morfologi pada lereng gunung api. Dengan demikian, ancaman bahaya mayor dari letusan gunung api dapat dinilai.

Penelitian ini dilaksanakan melalui rangkaian analisis, meliputi observasi dan pengumpulan data lapangan, analisis petrografi, dan pengukuran umur absolut dari conto karbon. Pemetaan satuan morfologi dilakukan dengan pengamatan citra dan peta *digital elevation model*. Stratigrafi satuan morfologi disusun untuk menentukan pola dan distribusi produk letusan. Pada akhir penelitian ini, peta bencana diusulkan sebagai hasil penilaian terbaru pada bencana letusan gunung api.

Sejak Holosen Akhir, letusan Gunung Api Lawu Young Lawu menghasilkan produk vulkanik yang menyebar ke arah timurlaut-barat-timur-utara-baratdaya-timur (kedua)-utara (kedua)-barat (kedua)-timurlaut (kedua)-baratlaut-tenggara dan timurlaut dari kerucut parasit. Lava mendominasi lereng timurlaut, utara, selatan, tenggara sedangkan endapan dan batuan piroklastik mendominasi di bagian lain. Lereng utara disusun oleh produk letusan dari Panggungan. Arga Tiling dan Arga Blungka adalah sumber produk pada bagian barat. Sela Pundutan menghasilkan produk vulkanik yang diendapkan di lereng timur dan aktivitas Parang Gumawang, Telaga Kuning, Gua Setupa, dan Lumbung Selayur menghasilkan produk vulkanik ke arah selatan. Ancaman utama letusan primer meliputi letusan primer, aliran lava, dan aliran abu vulkanik yang terbentuk dari guguran kubah lava di dalam kawah aktif. Rangkaian letusan bisa terjadi karena dipicu oleh aktivasi patahan Sidoramping berarah utara-selatan. Hasil sampingan dari letusan adalah lahar dan longsoran yang mengalir melalui alur-alur yang tersedia. Pusat pemukiman terdekat yang berisiko tinggi terletak di dalam radius 13 km seperti Kecamatan Tawangmangu, Kecamatan Ngargoyoso, dan Kecamatan Jenawi. Sebagian besar produk erupsi akan mengalir ke arah barat, barat laut, dan timur laut. Selain itu, Kota Magetan, Kecamatan Plaosan, dan Kecamatan Panekan akan terkena dampak letusan yang mengarah ke selatan dan tenggara.

**Kata kunci:** Letusan, Bencana, Lawu Muda, Morfostratigrafi