

ABSTRACT

Primary lahar is one of the potential hazards in Ijen Volcanic Complex, East Java. It is mainly due to the existence of voluminous acid crater lake on the summit of Ijen Stratocone (Mt. Ijen), the currently active vent located on the southern boundary of Ijen Caldera. Occurrence of primary lahar was recorded in 1817, 1936, and 1952. They were mainly flowing through Banyupahit River as the main outlet of the crater lake. Banyupahit River flows northward through Ijen intra-caldera plain and pass through northern Ijen caldera wall up to the Java Sea. Thus primary lahar becomes the main thread for the exposed population and infrastructure nearby Banyupahitahit River.

We evaluate geomorphological factor of Banyupahit River to delineate hazard zone related to the primary lahar with 2 different methods, those are LaharZ modelling and Analytical Hierachy Process (AHP) Modelling. Those methods used to identified most high risk location settlements in Banyupahit River Basin caused by primary lahar hazard. Geomorphological characteristic of Banyupahit River basin can be divided to 5 zone, thoses are Upstream zone, Transitional zone, Caldera wall zone, Upper downstream zone and Lower downstream zone. Thazard map shows there are 4 settlement locations at high risk. First, settlement in Kalianyar Village at Transotional zone that have volcanic footslope landform. Second, settlement in Kalianyar Village at Caldera wall zone that have caldera plain lanform. Third, settlement in Kalisengon Village at Caldera wall zone that have caldera plain landform. Fourth, settlement in Bantal

Village at Lower downstream zone that have fluviovulcanic plain landform.

Geomorphological factor that make those locations at high risk are low height of river ripararian, narrow river and sinous river. Beside, settlement's distance from river also contribute why those location at high risk.

Keywords: Mt. Ijen, Primary Lahar, Geomorphology, Lahar, AHP, Hazard Map

INTI SARI

Danau Kawah Ijen di Jawa Timur berpotensi menjadi bencana lahar letusan. Lahar letusan G. Ijen berpotensi lebih merusak apabila volume danau kawah sebesar $2,75 \times 10^7 \text{ m}^3$ dengan pH air danau yang ekstrem asam mengalir menuruni lereng gunung melalui lembah sungai. Sungai Banyupahit merupakan satu-satunya keluaran air danau Kawah Ijen. Kondisi geomorfologi menentukan tingkat kerawanan dari masing-masing tempat di sepanjang DAS Banyupahit.

Metode redelineasi wilayah lahar dengan LaharZ dan Metode *Analytical Hierarchy Process* (AHP) dari faktor geomorfologi yang berpengaruh terhadap kerawanan lahar letusan digunakan untuk mengkaji kondisi kerawanan aliran lahar letusan di DAS Banyupahit. Kedua metode tersebut dibandingkan sehingga didapatkan lokasi/tempat yang sangat rawan terdampak aliran lahar letusan. Terdapat 4 permukiman berlokasi di Desa Karanganyar dan Desa Bantal yang sangat rawan terdampak aliran lahar letusan. Permukiman pertama di Desa Karanganyar, Bondowoso dengan *landform* lereng kaki gunung api rawan lahar karena perubahan lebar lembah sungai yang menyempit dan tinggi tebing yang rendah. Permukiman kedua di Desa Karanganyar, Bondowoso dengan *landform* dataran kaldera rawan lahar karena lokasi permukiman berjarak sangat dekat dengan sungai serta bentuk lembah sungai yang asimetris. Permukiman ketiga di Desa Kalisengon, Bondowoso dengan *landform* dataran kaldera rawan karena jarak permukiman dekat dengan sungai dan tinggi tebing sungai rendah. Permukiman keempat di Desa Bantal, Situbondo dengan *landform* daratan fluviovulkan rawan lahar karena Kondisi tebing sungai yang rendah, jarak permukiman yang dekat dengan sungai, sungai yang sempit dan kelengkungan sungai yang sinuous.

Kata kunci: G. Ijen, Lahar Letusan, Geomorfologi, LaharZ, AHP, Kerawanan Bencana