INTISARI

Gunung Merapi merupakan salah satu gunung yang paling aktif di dunia dengan rentang waktu erupsi setiap 4 hingga 6 tahun sekali. Material hasil erupsi yang mengendap di sekitar puncak gunung dan bercampur dengan air hujan berpotensi menimbulkan bencana sekunder berupa aliran debris. Bencana aliran debris memiliki daya rusak yang besar, sehingga diperlukan pengembangan sistem peringatan dini sebagai langkah mitigasi dan pengurangan risiko. Penelitian ini bertujuan untuk mencari persamaan *critical line* pada tiap sungai di sistem peringatan dini *Remote Monitoring* Laboratorium Hidraulika UGM.

Kajian ini menggunakan Metode *Committee* dari *Guidelines for Development of Warning and Evacuation System against Sediment Disasters in Developing Countries* oleh *Ministry of Land, Infrastructure and Transport Infrastructure Development Institute – Japan*. Metode *Committee* menggunakan parameter *working rainfall* untuk menetapkan *critical line*. Dalam penelitian ini, beberapa parameter seperti indeks curah hujan minimum *non-causing rainfall* dan *half-life* disesuaikan dengan kondisi penelitian di Gunung Merapi.

Dari hasil penelitian, pengaturan *critical line* menggunakan parameter intensitas hujan dan *working rainfall* dengan *half-life* 24 jam. Intensitas hujan mencerminkan erosi permukaan, sementara *working rainfall* mewakili stabilitas tanah dalam inisiasi *debris flow*. Didapatkan persamaan *critical line* pada tiap stasiun yang merepresentasikan keadaan suatu sungai. Analisis pergerakan *snake line* terhadap *critical line* metode Committee menunjukan bahwa *snake line* cenderung kembali menuju sumbu (0,0) ketika tidak ada hujan selama beberapa waktu. Oleh karena itu metode *Committee* lebih efektif untuk hujan intermiten.

Kata kunci: bencana aliran debris; *critical line; working rainfall*; Merapi

ABSTRACT

Mount Merapi is one of the most active volcanoes in the world with reoccuring eruption within 4 to 6 years. Material from previous erpution that settles around the top of the mountain and mixes with rainwater have the potential to cause secondary disasters in the form of debris flows. Debris flow disasters have a large volume, so it is necessary to develop an early warning system as a mitigation and risk reduction measure. This study aims to find the critical line equation for each river in the Remote Monitoring Lab Hidraulika UGM early warning system.

This study uses the Committee Method from the Guidelines for Development of Warning and Evacuation System against Sediment Disasters in Developing Countries by the Ministry of Land, Infrastructure and Transport Infrastructure Development Institute – Japan. This method uses the working rainfall parameter to set the critical line. Several parameters were adjusted, such as the minimum non-causing rainfall index and half-life to adjust to the research conditions at Mount Merapi.

From the research results, the critical line setting uses the parameters of rain intensity and working rainfall with a half-life of 24 hours. Rain intensity reflects surface erosion, while working rainfall represents soil stability in debris flow initiation. The critical line equation is obtained at each station which represents the state of a river. Analysis of the movement of the snake line against the critical line of the Committee method shows that the snake line tends to return to the axis (0,0) when there has been no rain for some time. Therefore the Committee method is more effective for intermittent rain.

Keywords: debris flow disaster; *critical line; working rainfall*; Merapi