ANALISIS AMBANG BATAS CURAH HUJAN BERBASIS *DOWNSCALING* SEBAGAI FAKTOR PEMICU KEJADIAN BENCANA LONGSOR DI KABUPATEN KULON PROGO

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INTISARI

Curah hujan menjadi salah satu faktor meteorologis yang dapat memicu terjadinya bencana longsor. Integrasi antara inventarisasi data kejadian bencana longsor dan curah hujan dapat diimplementasikan pada ambang batas *(threshold).* Keterbatasan data observasi dan tangkapan satelit terkait curah hujan dalam penentuan ambang batas menjadikan dasar urgensi dalam integrasi pengolahan data, sehingga diperlukan alternatif pengolahan data. Penelitian ini bertujuan untuk mengimplementasikan metode *downscaling* untuk meningkatkan resolusi spasial data curah hujan, menentukan nilai ambang batas curah hujan berdasarkan hasil *downscaling* GPM-IMERG dan TBB Himawari-8, dan mengevaluasi kinerja ambang batas curah hujan pemicu longsor dari hasil *downscaling* di Kabupaten Kulon Progo. Penelitian ini menggunakan metode *statistical downscaling* serta pengembangan *E-D Threshold* antara kejadian hujan kumulatif (E) dengan durasi waktu hujan (D). Adapun teknik evaluasi kinerja *threshold* curah hujan pemicu longsor menggunakan hasil kontingensi pada kurva ROC *(Receiver Operating Characteristic)* untuk mendapatkan nilai AUC (*Area Under Curve).*

Hasil penelitian menunjukan bahwa melalui implementasi metode *downscaling* terdapat nilai yang semakin halus, stabil, dan terdapat peningkatan resolusi spasial. Hal ini ditunjukan dengan adanya pengurangan nilai setelah diterapkan *downscaling.* Nilai koreksi menjadi 0,74629 dan hasil RMSE sebesar 15,79. Hasil pengolahan ambang batas berbasis statistik *E-D Threshold* hasil *downscaling* mendapatkan hasil persamaan sebesar $E = 3{,}78*D^{0{,}743}$. Kemudian, didapatkan hasil TPR, TNR, ACC, NPV, PPV, MCC, dan F1 *Score* berturut-turut sebesar 90,63%, 88,75%, 89,58%, 0,922, 0,865, 0,792, dan 0,885. Analisis kurva ROC menyatakan hasil nilai AUC sebesar 0,907 yang berarti (> 0,5), sehingga mengindikasikan bahwa model memiliki performa yang baik.

Kata kunci: *Downscaling*, *E-D Threshold,* GPM-IMERG, ROC, TBB Himawari-8

ANALYSIS OF RAINFALL THRESHOLD BASED ON DOWNSCALING AS A TRIGGERING FACTOR FOR LANDSLIDE DISASTER EVENTS IN KULON PROGO REGENCY

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ABSTRACT

Rainfall is one of the meteorological factors that can trigger landslide disasters. The integration of landslide disaster events data and rainfall data can be implemented through a threshold based approach. The limitations of observational and satellite derived rainfall data in determining thresholds highlight the urgency of integrated data processing, thus requiring alternative data processing methods. This study aims to implement a downscaling method to improve the resolution spatial of rainfall data, determine the rainfall threshold values based on the downscaled GPM-IMERG and TBB Himawari-8 data, and evaluate the performance of the rainfall threshold in triggering landslides in Kulon Progo Regency. The study uses a statistical downscaling method and the development of an E-D Threshold model, which links cumulative rainfall events (E) with rainfall duration (D). The evaluation of the landslide-triggering rainfall threshold performance is conducted using contingency results on the ROC (Receiver Operating Characteristic) curve to obtain AUC (Area Under Curve) value.

The results show that the implementation of the downscaling method produces smoother and more stable values, with improved resolution spatial. This is indicated by the reduction in error values after applying downscaling, with a correction value of 0.74629 and an RMSE of 15.79. The threshold analysis using the downscaled E-D Threshold statistical model yields the equation $E = 3.78*D^{0.743}$. Furthermore, the evaluation results for TPR, TNR, ACC, NPV, PPV, MCC, and F1 Score are 90.63%, 88.75%, 89.58%, 0.922, 0.865, 0.792, and 0.885. The ROC curve analysis shows an AUC value of 0.907 which is (> 0.5), indicating that the model has good performance.

Keywords: Downscaling, E-D Threshold, GPM-IMERG, ROC, TBB Himawari-8