

## INTISARI

### **Analisis Pengaruh Suhu, Tekanan, dan Kelembaban Udara pada Data Hasil Pengukuran EDM di Gunung Merapi**

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Metode EDM (*Electronic Distance Measurement*) biasa digunakan untuk mengukur deformasi yang terjadi pada Gunung Merapi, yaitu sebagai prekursor menjelang erupsi. Pada pengukuran EDM terdapat banyak koreksi yang perlu dimasukkan dalam pengolahan agar analisis menjadi lebih akurat, salah satunya adalah koreksi atmosferik (cuaca). Pengukuran cuaca dilakukan secara terpisah sehingga harus diinput dari sensor cuaca eksternal. Pengaruh ini perlu diketahui nilainya agar dapat diketahui resolusi sensor cuaca yang direkomendasikan.

Pengambilan data dilakukan selama 7 hari di keempat Pos Pengamatan Gunung Merapi (PGA Merapi) yang terletak di Kaliurang, Babadan, Jrahah, dan Selo pada bulan September 2016 dengan memperhatikan prosedur pengukuran, serta kalibrasi bacaan sudut dan jarak sebelum pengukuran. Pengolahan data dilakukan dengan cara membandingkan hasil antara data model teoritis, data model lapangan, dan data primer EDM yang telah dipilah dan memenuhi syarat. Tahapan pengolahan data meliputi : konversi sudut, koreksi skala, koreksi kelengkungan bumi, perhitungan jarak miring dicari, koreksi tinggi, perhitungan Delta Northing dan Easting, sampai pada tahap perhitungan koordinat reflektor.

Hasil penelitian menunjukkan bahwa : 1) pada data model teoritis, perubahan suhu menyebabkan kenaikan jarak miring sebesar  $4,8 \text{ mm}/^{\circ}\text{C}$  dan pada kelembaban sebesar  $0,48 \text{ mm}/10\%$ , sedangkan perubahan tekanan akan menyebabkan penurunan jarak miring sebesar  $-1,5 \text{ mm} / \text{hPa}$ ; 2) pada data lapangan perubahannya sebesar  $24,6 \text{ mm}/^{\circ}\text{C}$  (suhu),  $-20,7 \text{ mm}/\text{hPa}$  (tekanan), dan  $5 \text{ mm} / 10\%$  (kelembaban); 3) pengukuran suhu dan tekanan pada Pos Babadan dan Selo kurang akurat karena masih melebihi ralat akurasi tipe EDM yang digunakan, sementara itu pada stasiun Kaliurang dan Jrahah sensor suhu dan kelembaban yang digunakan telah memenuhi syarat.

**Kata kunci :** EDM, koreksi atmosferik, jarak miring, suhu, tekanan, kelembaban

## ABSTRACT

### **Analyzing the Influences of Temperature, Air Pressure, and Humidity on EDM Measurement Data at Mount Merapi**

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EDM (Electronic Distance Measurement) is commonly used to measure the deformation occurred on Mount Merapi, as a precursor before an eruption. In the EDM measurement there are a lot of corrections that need to be included for better analysis, one of which is the atmospheric correction. Weather measurements are carried out separately so should be input from external weather sensor. The influence is necessary to know in order to identify weather sensor resolution needed.

Data acquisition was conducted for 7 days in the fourth Observation Post Mount Merapi (PGA Merapi), located in Kaliurang, Babadan, Jragung, and Selo in September 2016 by taking into account the measurement procedures and calibration readings before the measurements were made. Data processing was performed by comparing the results between the theoretical model data, field model data, and primary data EDM that has been screened and qualified. The stages of data processing include angle conversion, scale correction, curvature correction, slope distance calculation, high correction and reflector coordinate calculation.

The results showed that: 1) on theoretical model data, changes in temperature cause an increase of slope distance rate of 4.8 mm / °C and at humidity of 0.48 mm / 10%, meanwhile changes in air pressure will cause a decrease in the results of slope distance by -1.5 mm / hPa; 2) in the field data, changes in atmospheric conditions at 24.6 mm / °C (temperature), -20.7 mm / hPa (air pressure), and 5 mm / 10% (humidity); 3) measurement of the temperature and air pressure at PGA Merapi Selo and Babadan less accurate because they exceeded the corrected accuracy EDM type used, while at the station Jragung and Kaliurang temperature and humidity sensors used have been qualified.

**Keywords** : EDM, atmospheric correction, slope distance, temperature, air pressure, humidity