

INTISARI

Mikrozonasi Bahaya Guncangan Gempabumi Berdasarkan Analisis *Horizontal-to-Vertical Spectral Ratio* (HVSR) di Kecamatan Kalasan, Kabupaten Sleman, Provinsi Daerah Istimewa Yogyakarta dan Kecamatan Prambanan, Kabupaten Klaten, Provinsi Jawa Tengah

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Gempa Jogja 27 Mei 2006 bermagnitudo 6,3 Mw menyebabkan kerusakan di beberapa tempat. Pusat gempa terletak di kedalaman 12,5 km pada koordinat $7,961^{\circ}$ LS dan $110,446^{\circ}$ BT. Bahkan, Candi Prambanan yang terletak sekitar 15 km dari episenter juga mengalami kerusakan yang parah. Penelitian mikrotremor dilakukan di sekitar Kecamatan Kalasan dan Kecamatan Prambanan, DIY – Jawa Tengah untuk memetakan daerah rentan guncangan akibat gempabumi.

Data mikrotremor dianalisis menggunakan metode HVSR untuk mendapatkan nilai frekuensi dominan (f_0) dan faktor amplifikasi (A_0). Data tersebut diolah hingga didapatkan nilai periode dominan (T_0), ketebalan lapisan sedimen lunak (H), dan indeks kerentanan seismik (K_g). Pada penelitian ini didapatkan nilai f_0 antara 0,64 – 19,03 Hz, nilai A_0 antara 1,57 – 9,55 kali, nilai T_0 antara 0,06 – 1,56 s, nilai H antara 3,60 – 101,39 m, dan nilai K_g antara 0,34 – 116,83.

Pemetaan didasarkan pada amplifikasi hingga didapatkan 4 zona, yaitu Zona Rentan Guncangan Gempabumi I dengan amplifikasi sangat tinggi (> 9 kali), Zona Rentan Guncangan Gempabumi II dengan amplifikasi tinggi (6 – 9 kali), Zona Rentan Guncangan Gempabumi III dengan amplifikasi sedang (3 – 6 kali), dan Zona Rentan Guncangan Gempabumi IV dengan amplifikasi rendah (0 – 3 kali). Zona I mencakup Desa Cucukan. Zona II mencakup Desa Cucukan, Sengon, Madurejo, Sumberharjo, Jogotirto, dan Tirtomartani. Zona III mencakup Desa Cucukan, Sengon, Madurejo, Sumberharjo, Jogotirto, dan Tirtomartani. Zona IV mencakup Desa Joho, Randusari, Brajan, Kemudo, Bugisan, Tlogo, Taji, Kokosan, Kebondalem Lor, Bokoharjo, Sambirejo, Sumberharjo, Madurejo, Wukirharjo, Selomartani, Tirtomartani, Tamanmartani, Tirtomartani, Purwomartani, dan Bimomartani. Secara umum, lokasi penelitian didominasi oleh Zona III dan IV.

Kata kunci: Mikrotremor, HVSR, Prambanan, Mikrozonasi, Amplifikasi

ABSTRACT

Microzonation of Earthquake Hazards Based on Horizontal-to-Vertical Spectral Ratio (HVSr) Analysis in Kalasan, Sleman, Special Region of Yogyakarta and Prambanan, Klaten, Central Java

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The Yogyakarta earthquake on 27 May 2006 with a magnitude of 6.3 MW caused damage in several places. The epicenter was located at a depth of 12.5 km at the coordinates of 7.961 °S and 110.446° E. In fact, Prambanan Temple, which is located about 15 km from the epicenter, also suffered severe damage. Microtremor research was carried out in the vicinity of Kalasan and Prambanan, DIY - Central Java to map areas prone to shocks due to earthquakes.

Microtremor data were analyzed using the HVSr method to obtain the dominant frequency (f_0) and amplification factor (A_0). Then the data is processed to obtain the value of the dominant period (T_0), the thickness of the sediment layer (H), and the seismic susceptibility index (K_g). The research area has an f_0 value between 0.64 – 19.03 Hz, an A_0 value between 1.57 – 9.55 times, a T_0 value between 0.06 – 1.56 s, an H value between 3.60 – 101.39 m, and the K_g value is between 0.34 – 116.83.

Mapping is based on amplification until 4 zones are obtained, namely the Earthquake Vulnerability Zone I with very high amplification (> 9 times), the Earthquake Vulnerability Zone II with high amplification (6 – 9 times), the Earthquake Vulnerability Zone III with moderate amplification (3 – 6 times), and the Earthquake Vulnerability Zone IV with low amplification (0 – 3 times). Zone I includes Cucukan Village. Zone II includes the villages of Cucukan, Sengon, Madurejo, Sumberharjo, Jogotirto, and Tirtomartani. Zone III includes the villages of Cucukan, Sengon, Madurejo, Sumberharjo, Jogotirto, and Tirtomartani. Zone IV includes Joho, Randusari, Brajan, Kemudo, Bugisan, Tlogo, Taji, Kokosan, Kebondalem Lor, Bokoharjo, Sambirejo, Sumberharjo, Madurejo, Wukirharjo, Selomartani, Tirtomartani, Tamanmartani, Tirtomartani, Purwomartani and Bimomartani villages. In general, the research locations are dominated by Zones III and IV.

Keywords: Microtremor, HVSr, Prambanan, Microzonation, Amplification