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Seismic Microzonation of Bengkulu City, Indonesia

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Extended Abstract

Bengkulu City of Indonesia has been known as an area that is very vulnerable to earthquake (Mase, 2020). This is due to the fact that Bengkulu itself is surrounded by several earthquake sources (Figure 1). The progress of city development shows the positive tendency within last decade (Mase, 2018), but it is not followed by the better understanding on seismic hazard mitigation. Therefore, a study of seismic hazard should be initiated, especially by starting to depict seismic hazard microzonation (Farid and Mase, 2020). This study presents a seismic hazard microzonation for Bengkulu City.

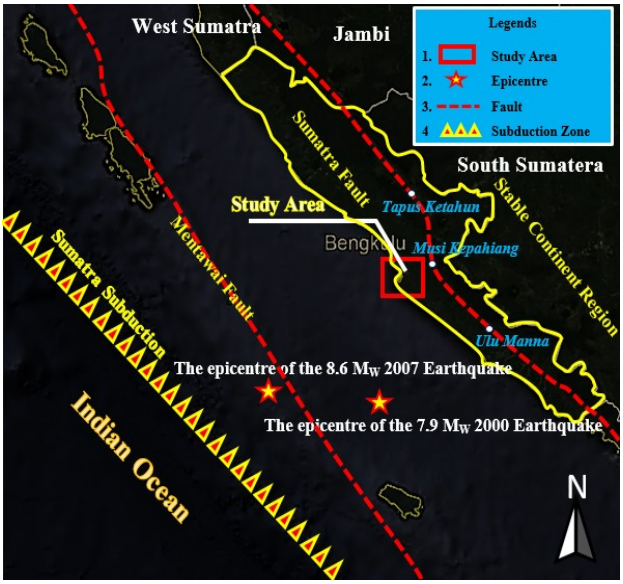

Fig. 1. The seismotectonic setting of Bengkulu Province

This study is performed by collecting the information of geological condition and measuring hundreds of sites in Bengkulu City by using microtremor. Using the inversion technique from García-Jerez et al. (2016), shear wave velocity (V_s) profile and the time-averaged shear wave velocity for first 30 m depth (V_{s30}) is generated on each site. The site classification is then determined based on National Earthquake Hazard Reduction Provisions (1998). The framework performed in this study is presented in Figure 2.

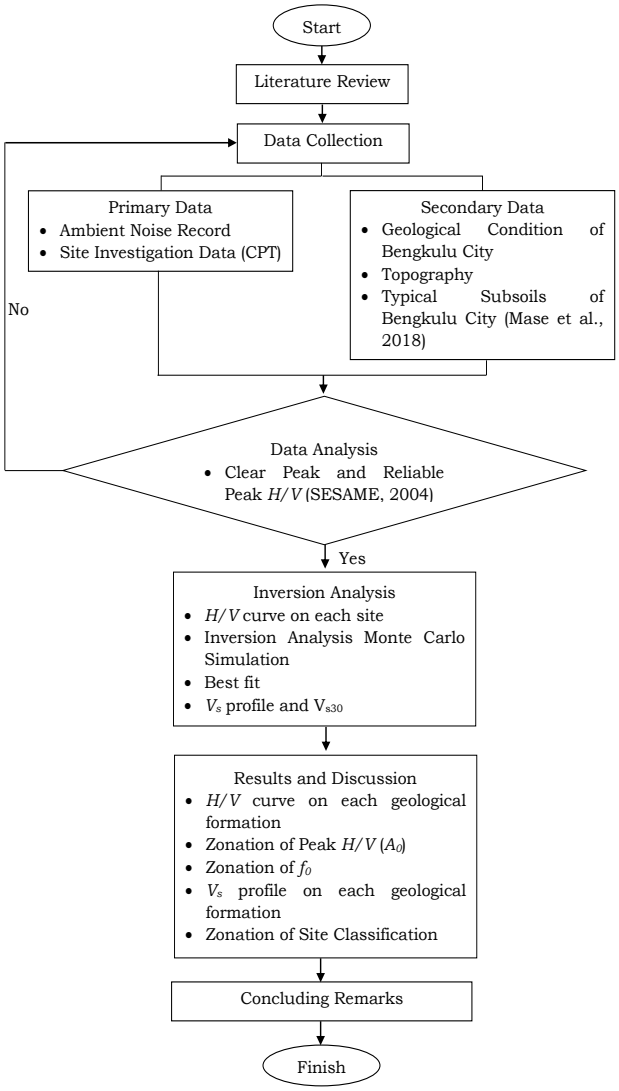

Fig. 2. Research Framework (Mase, 2020)

Figure 3 presents the seismic hazard microzonation of Bengkulu CIty. It can be observed that there are two main site classification in Bengkulu City. The first one is Site Class D ($180<V_{s30}\leq360$) and the second one is Site Class C ($360<V_{s30}\leq760$). Site Class D generally concentrates at the western part of Bengkulu City. This site is mainly dominated by alluvium terraces (Qat). For Site Class C concentrated in the eastern part of Bengkulu City, the areas are dominated by rock formation, such as andesite (Tpan) and bintunan formations (QTb). Generally, Site Class D is relatively more vulnerable to undergo seismic damage. In Bengkulu City, the most population is centralized in the areas with Site Class D. In addition, during the M_w 8.6 Bengkulu Mentawai Earthquake in 2007, liquefied points were generally found at Site Class D (Mase, 2017). The results of this study could help to understand seismic hazard impact in Bengkulu City, which can be also used as reference to implement seismic hazard mitigation.

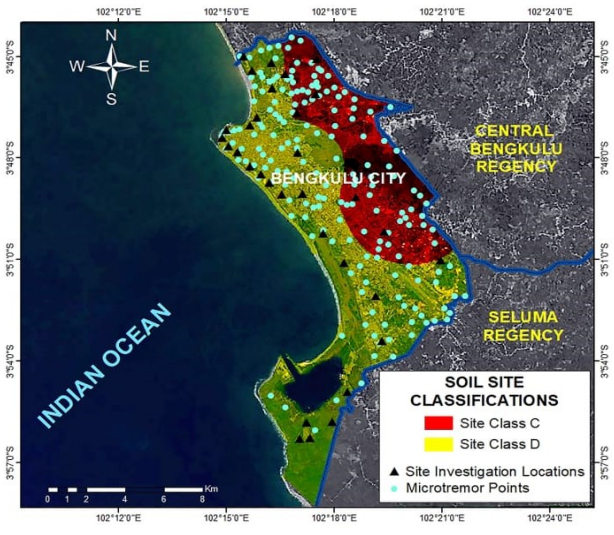

Fig. 3. Seismic Microzonation Map of Bengkulu City, Indonesia

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