EGU22-12600
https://doi.org/10.5194/egusphere-egu22-12600
EGU General Assembly 2022

A complex hazard assessment due to earthquake and tsunami potential in the industrial strategic estate of the Cilegon city

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Due to the existence of the megathrust, south of Sunda Strait potentially generate the powerful earthquake and tsunami. It may impact to South of Java Island and Sunda strait coastal zone. One of the city that may impacted by the earthquake and tsunami is the Cilegon city located in the north-east of Sunda Strait. The city is the strategic area which has industrial estate, critical infrastructures, as well as a tourist destination. The earthquake and tsunami hazard may followed by the collateral hazard. 78 petrochemicals factory as well as steel industry, and other national vital object such as electric stream power plant could give a contribution to the industrial hazard.

Based on a seismological study, the maximum magnitude estimated in megathrust zone Sunda Strait is M 8.7. The existing of active faults and active volcano of Krakatau in Sunda Strait add a complexity of earthquake and tsunami potential in the area. According to historical documentation, there are destructive earthquake associated to south of Sunda Strait megathrust such as West Java earthquake (January 5, 1699), Batavia earthquake (January 22, 1780), Jakarta Earthquake (February 23, 1903), and destructive tsunami associated to the Krakatau eruption (August 27, 1883).

This study aims to assess the multi hazard potential generated by the megathrust earthquake in the south of Sunda Strait. We simulate the worst case earthquake scenario on the south of Sunda Strait megathrust zone, located at 7.53 S;104.04 E, with 10 km fixed depth. Both simulation of earthquake shakemap and tsunami inundation were carried out in this study.

The modeling of earthquake indicates ground shaking possibly generates VI-VII MMI in Cilegon. Moreover, the inundation tsunami modeling estimated there are 4 sub-regencies of industrial estate (Ciwandan, Citangkil, Gerogol, and Pulomerak) will be impacted. The highest tsunami inundation may approximately reach 9 m hit a critical infrastructure of the Merak harbor. The maximum distance of tsunami penetration is estimated to be 1.5 km from the coastal line.

Keywords: earthquake and tsunami potential, multi collateral hazard, industrial estate, cilegon city, critical infrastructure