

ANALISA SUDUT PENUNJAMAN LEMPENG TEKTONIK BERDASARKAN DATA GEMPA BUMI DI PULAU JAWA BAGIAN BARAT

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INTISARI

Indonesia merupakan negara dengan tingkat aktivitas tektonik dan vulkanik yang aktif karena terletak pada zona pertemuan lempeng Eurasia, lempeng Indo-Australia dan lempeng Pasifik. Pulau Jawa bagian barat dengan sistem tektonik subduksinya memiliki tingkat seismisitas yang tinggi dibuktikan dengan banyaknya gempabumi yang terjadi. Gempabumi pada wilayah ini pada umumnya termasuk dalam jenis gempabumi dangkal (<60 km) dan gempabumi menengah (60-300 km). Data gempabumi tersebut dapat digunakan untuk menganalisa sudut dan arah relatif gaya tektonik penunjaman lempeng Indo-Australia terhadap lempeng Eurasia di pulau Jawa bagian barat. Data gempa yang digunakan berasal dari USGS dari tahun 1970-2016 dengan magnitudo 4,5-10 SR dan kedalaman 0-300 km. Dalam penelitian ini, peneliti membagi lokasi penelitian menjadi 6 sayatan dari barat ke timur. Data gempa yang representatif pada masing-masing sayatan diolah dan diinterpolasi dengan menggunakan ArcGIS 10. Hasil pengolahan data gempabumi tersebut berupa model 2D dan 3D. Dari model 2D penunjaman lempeng sayatan 1 hingga sayatan 6 diketahui adanya peningkatan sudut penunjaman seiring dengan bertambahnya kedalaman dan jarak penunjaman. Sudut penunjaman juga bervariasi pada keenam sayatan meskipun diukur di kedalaman yang sama. Melalui model 3D dari keenam sayatan diketahui karakteristik penunjaman lempeng, yaitu semakin ke arah timur penunjaman lempeng Indo-Australia semakin dalam dan semakin curam. Arah pergerakan lempeng diketahui dari data gempabumi yang memiliki *focal mechanism*. Arah relatif gaya tektonik yang terdapat pada *focal mechanism* di lokasi penelitian didominasi oleh gaya yang berarah timur laut – barat daya, sehingga arah penunjaman lempeng diinterpretasikan memiliki arah yang sama, yaitu timur laut – barat daya.

Kata kunci: gempabumi, Jawa, magnitudo, sudut, tektonik

TECTONIC PLATE SUBDUCTION ANGLE ANALYSIS BASED ON EARTHQUAKE DATA IN THE WESTERN PART OF JAVA ISLAND

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ABSTRACT

Indonesia is a country that has high volcanic and tectonic activities because it is located at the intersection of Eurasia plate, Indo-Australia plate and Pacific plate. Western part of Java island with its subduction tectonic system has a high level of seismicity which is evidenced by the numbers of earthquakes that occurred. Earthquakes in this region are categorized into two type of earthquake, that is shallow earthquakes (<60 km) and medium earthquakes (60-300 km). The earthquakes data can be used to analyze angle and to find relative direction of tectonic force on subduction between Indo-Australia plate and Eurasian plate in the western part of Java island. The earthquakes data were downloaded from the USGS from 1970-2016 with magnitudes 4.5-10 SR and depths from 0-300 km. In this study, the researcher divided the study site into 6 sections from west to east. Earthquakes data that representative from each sections were processed and interpolated using ArcGIS 10. The results of the earthquake data processing were in the form of 2D and 3D subduction models. Based on 2D subduction model from section 1 to section 6 there is increasing of subduction angle along with increasing of depth and subduction's distance. Subduction angle is also varied on all sections although measured from the same depth. From 3D subduction model of all sections we can see that Indo-Australia plate will go deeper dan steeper towards the east side. Direction of movement of the plates is known from the data of earthquakes that have focal mechanism in it. Relative direction of tectonic force contained in focal mechanism in this study site are dominated by northeast – southwest direction, so the direction of subduction interpreted in the same direction, which is northeast - southwest.

Key words: *earthquake, Java, magnitude, angle, tectonic*