

ABSTRACT

A STUDY OF AMBIENT NOISE TOMOGRAPHY BASED ON BAYESIAN MARKOV CHAIN MONTE CARLO (MCMC) IN THE WESTERN SUMATRA AREA

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Sumatra Island is an area of collision between Eurasian and Australian plates, causing a high intensity of earthquakes. One of them is the earthquake that occurred around West Sumatra to South Sumatra on September 7-11, 2022. This research area has a limited of stations and earthquake data. To investigate the surface wave velocity analysis, we can use the Ambient Noise Tomography (ANT) method.

ANT is a method to obtain subsurface images using coda waves. This method involves an inversion tomography process that requires the value of α (damping factor) as a solution to the mix determined case. To find out the best damping factor value, a trade-off curve (L-Curve) analysis is required as the result of trial and error. The result of the α value will be detailed using Bayesian Markov Chain Monte Carlo (MCMC) calculation, based on probability theory. In addition, Bayesian MCMC can also be used to estimate the observation travel time.

The results of this study there are 3 results namely ANT, ANT with bayesian MCMC to guess the value of α and observation travelttime. The best tomography results on tomografi with bayesian travelttime which has an α value of 0.28 show a clearer low velocity with a better heterogeneity value.

Keywords: *Bayesian MCMC, Earthquake, Inversion, Tomography*