

# Subsurface structure identification of Lembang Fault Based on Magnetotelluric and Gravity data

Nurhasan<sup>1\*</sup>, Wahyu Srigutomo<sup>1</sup>, Enjang Jaenal Mustopa<sup>1</sup>, Doddy Sutarno<sup>1</sup>, Dieno Diba<sup>2</sup>, Yasuo Ogawa<sup>3</sup>, Hidayat<sup>4</sup>, Dini Fitriani<sup>5</sup>

<sup>1</sup>Earth Physics and Complex Systems Research Group, Faculty of Mathematics and Natural Sciences, Bandung Institute of Technology, Jalan Ganesa 10, Bandung 40132, Indonesia

<sup>2</sup>Earthquake Research Institute, the University of Tokyo, 1 – 1 – 1 Yayoi, Bunkyo, Tokyo 113-0032, Japan

<sup>3</sup>Volcanic Fluid Research Center, Tokyo Institute of Technology, Tokyo, Japan

<sup>4</sup> Geological Agency of Indonesia, Jl. Diponegoro No. 57, Bandung, West Java 40122, Indonesia

<sup>5</sup> Geophysics, Faculty of Mathematics and Natural Sciences, Padjadjaran University, Jl. Raya Bandung Sumedang km 21, Sumedang, West Java 45363, Indonesia

\*Corresponding author: nurhasan@itb.ac.id

## Abstract

Lembang fault with the length of 32 Km stretched from west to east is located about 10 Km north of Bandung city and 5 Km south of the active volcano Tangkuban Parahu. In 2022, the 5.3 Magnitude earthquake was occurred in Cianjur city where the epicentrum is located in the fault that is predicted to affect the Lembang fault. In this study, the Magnetotelluric method was used to model the subsurface resistivity and gravity method for mapping the at the Lembang Fault area. The Magnetotelluric data acquisition was conducted in 12 sites divided into two lines perpendicular to the Lembang Fault. The analysis was performed using 2D inversion modelling in frequency range between 320 Hz to 1 Hz. Based on the inversion results, there are three points to be described i.e. the resistivity contrast has been found interpreted as the Lembang fault system, the characteristic of the volcano is also detected because the Lembang fault located just 5 Km from the volcano, another contrast resistivity the east of the line has been also detected which is not yet known whether represents a fault or another geological structure. These results are consistent with geological dan gravity data in the Lembang Fault area.

*Keywords: Lembang Fault, Magnetotelluric, Earthquake, Inversion*