

This study utilized a 2D electrical resistivity survey to investigate the shallow subsurface geologic structure in Tambon Nong Han, San Sai District, Chiang Mai Province. The survey lines were positioned perpendicular to a fault interpreted from satellite imagery, which trends northwest-southeast. The identification of this fault through remote sensing is significant, as it suggests a previously unconfirmed structural feature that may influence local groundwater flow and seismic activity. A dipole-dipole electrode configuration was employed, with 4 survey lines conducted. One survey line extended 1,000 meters with a 5-meter electrode spacing, while the remaining three were each 400 meters long with the same spacing. Data processing was performed using AGI EarthImager™ 2D software to generate cross-sectional resistivity profiles. The results revealed anomalies along all four survey lines, indicating fault zones characterized by discontinuities in the subsurface geology. Additionally, low-resistivity zones were observed, suggesting the presence of groundwater or fluids along the fault, which further supports its structural significance. The subsurface structure was interpreted as consisting of three main sedimentary layers. The upper layer exhibited very low resistivity, likely corresponding to saturated clay deposits. The middle layer showed high resistivity, interpreted as gravel, while the lower layer had low resistivity again, suggesting clay-rich sediments. These findings confirm the presence of fault structures beneath the sediment and highlight the effectiveness of integrating satellite imagery with geophysical surveys for structural interpretation. This approach provides valuable insights into the shallow subsurface, contributing to a more accurate geological understanding of the study area.

2 INTRODUCTION

Nong Han Subdistrict, San Sai District, is located along a NW-SE trending fault and has experienced recurring seismic activity, particularly after the 5.1 Mw earthquake in 2006. Previous studies in 2011 and 2014 used satellite imagery and electrical resistivity surveys to interpret fault structures. However, subsurface evidence remained inconclusive due to technological and depth limitations. **This study aims to investigate fault lines and subsurface geological structures in the area.** The results will improve fault identification and seismic hazard assessment, providing more reliable evidence for structural interpretation.

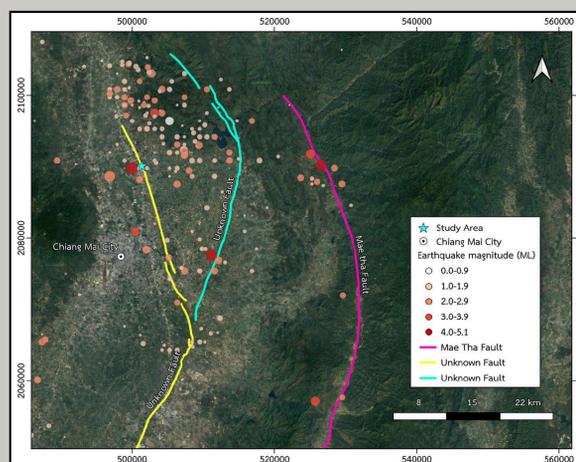


Figure 1. Location of the earthquake epicenter and unknown faults in the Chiang Mai basin.

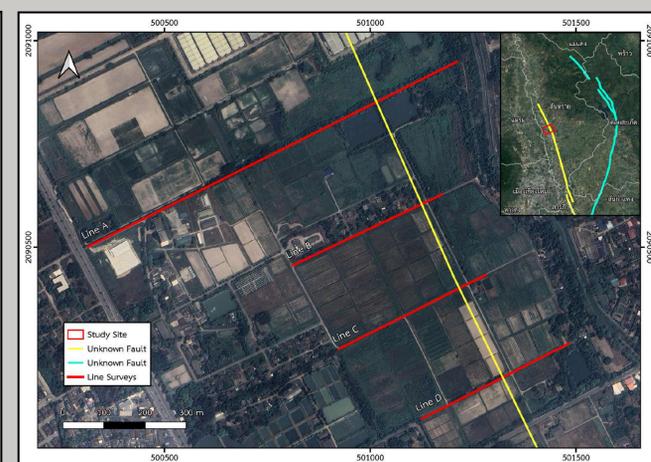


Figure 2. Survey lines in the study area perpendicular to the fault line interpreted from satellite imagery.

3 METHODOLOGY

1. Field Data Acquisition

2D electrical resistivity survey with dipole-dipole electrode configuration.

The survey consists of four survey lines:

- Line A: 1000 m in length
- Lines B, C, and D: 400 m in length
- Minimum electrode spacing: 5 m



Figure 3. 2D electrical resistivity survey

2. Data Processing

- AGI EarthImager™ 2D software → Inverse resistivity section

3. Data Interpretation

4 RESULT

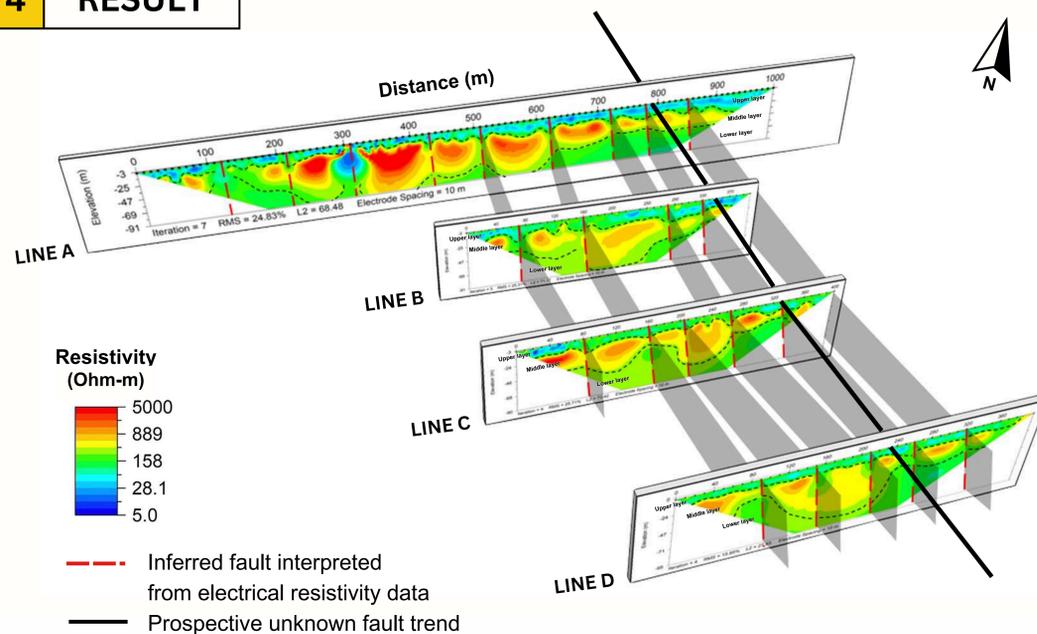


Figure 4. The relationship of fault trend between prospective and interpreted faults from the electrical resistivity survey.

5 CONCLUSION

The survey results reveal electrical resistivity anomalies across all survey lines, indicating a prospective fault zone with geological discontinuities. At distance 500-850 m (Fig. 4), Lines A, B, C, and D show consistent lateral and vertical anomalies, confirming the presence of a subsurface fault that aligns with previously identified trends and may still be active. The subsurface structure consists of three layers: the upper layer with very low resistivity, likely water-saturated clay; the middle layer with high resistivity, interpreted as gravel; and the lower layer with low resistivity, possibly clay-rich sediments.

6 REFERENCES

- Chantraprasert, S. (2011). Fault interpretation from Google™ earth images in Chiang Mai Basin, unpublished.
- Seismological Bureau, Thai Meteorological Department. (2024). Earthquake information and statistics. http://www.seismology.tmd.go.th/eq_stat/eq_stat.php, accessed 30 September 2024.