

RESEARCH FINDINGS OF LUMPUR SIDOARJO



MAIN IDEA:

- Study geological structure of LUSI mud volcano and create a realistic model of LUSI eruption.



TASKS:

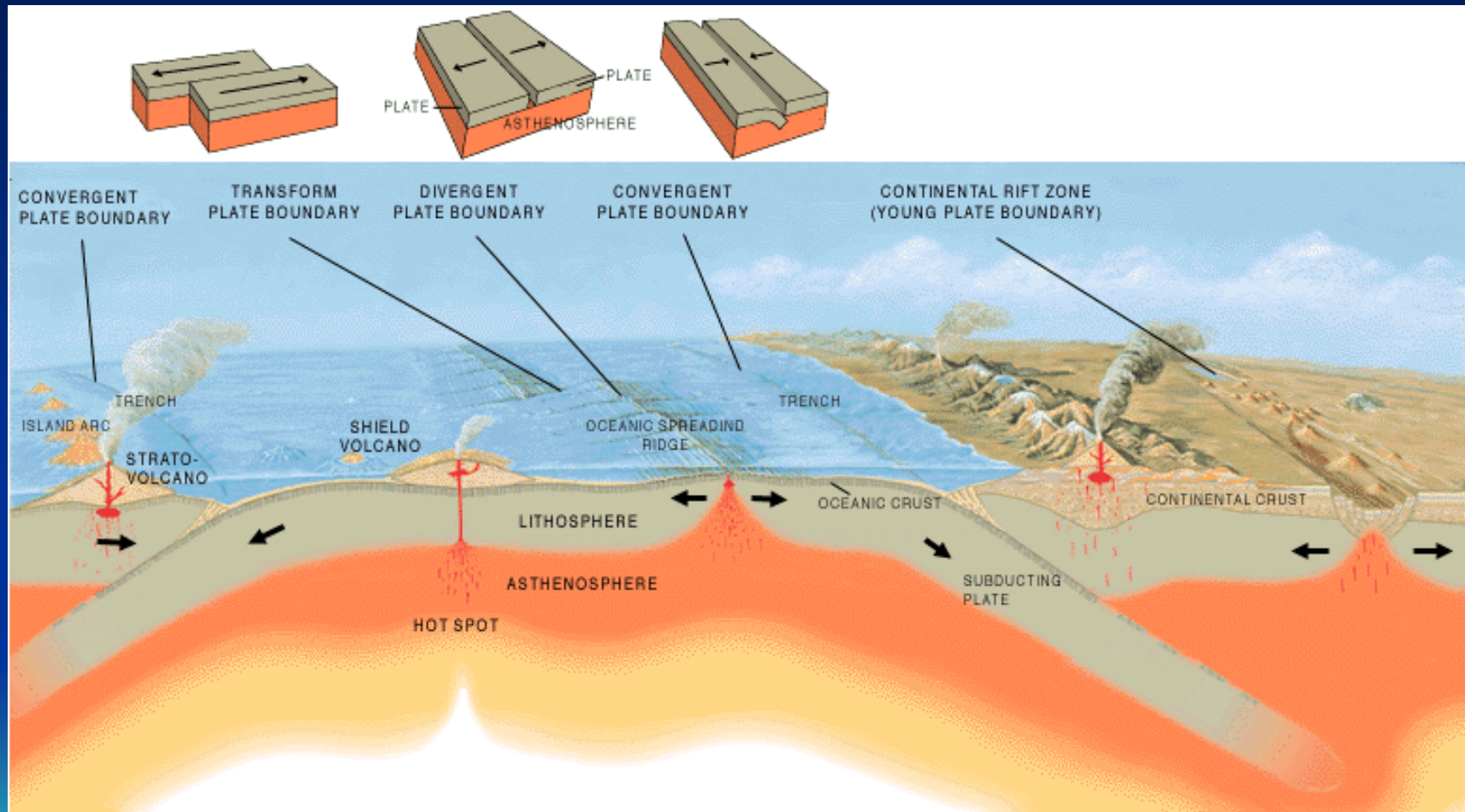
- Study the geological structure of the island of Java and the adjacent territory.
- Construct, using modern computer technology, a 3D geographic information system that reflects the structure of the rocks in the immediate vicinity of the mud volcano «LUSI».
- Study the causes, nature and dynamics of mud volcanism.



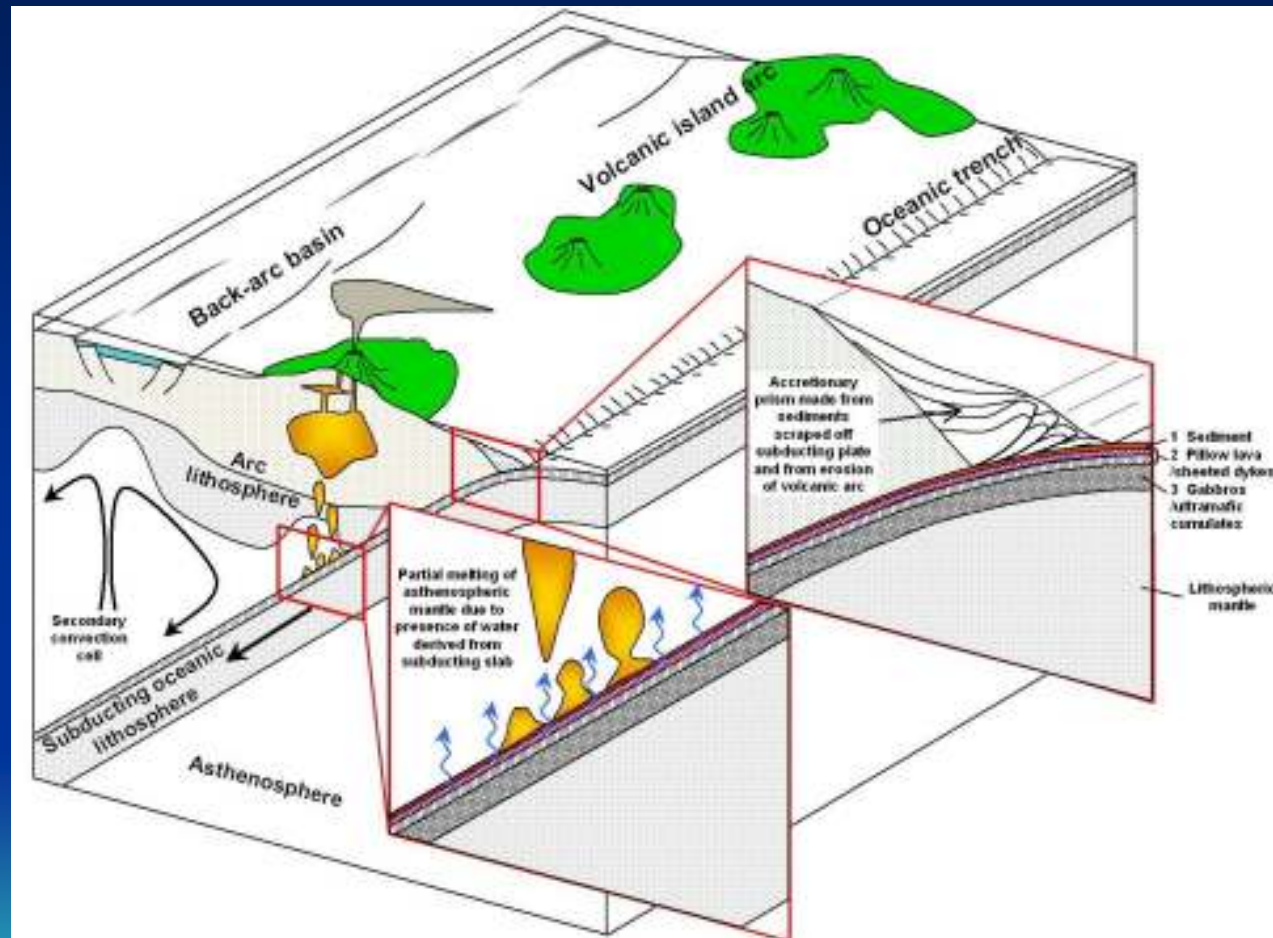
GEOLOGICAL BACKGROUND



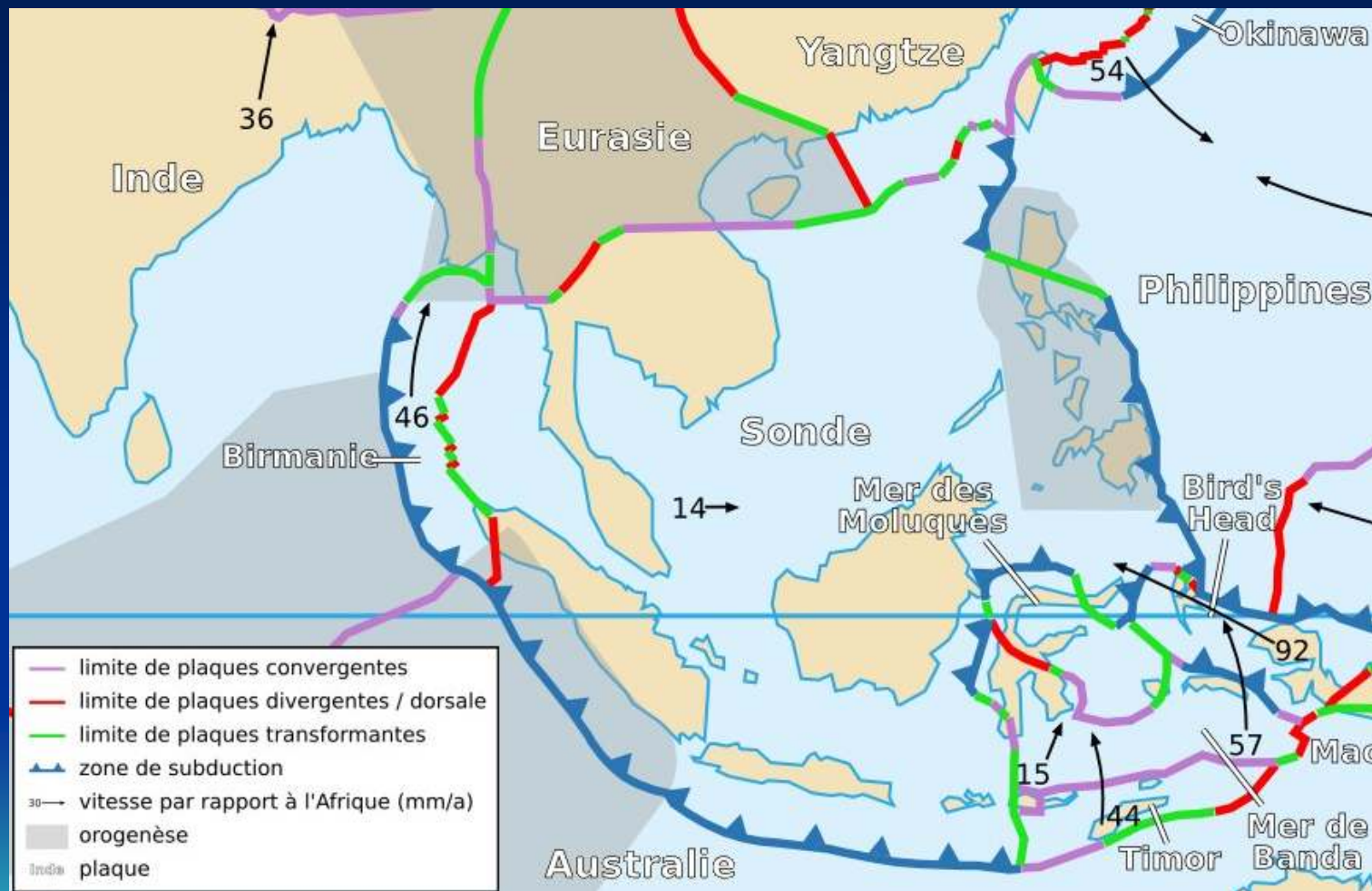
TECTONIC PLATES: AN OVERVIEW



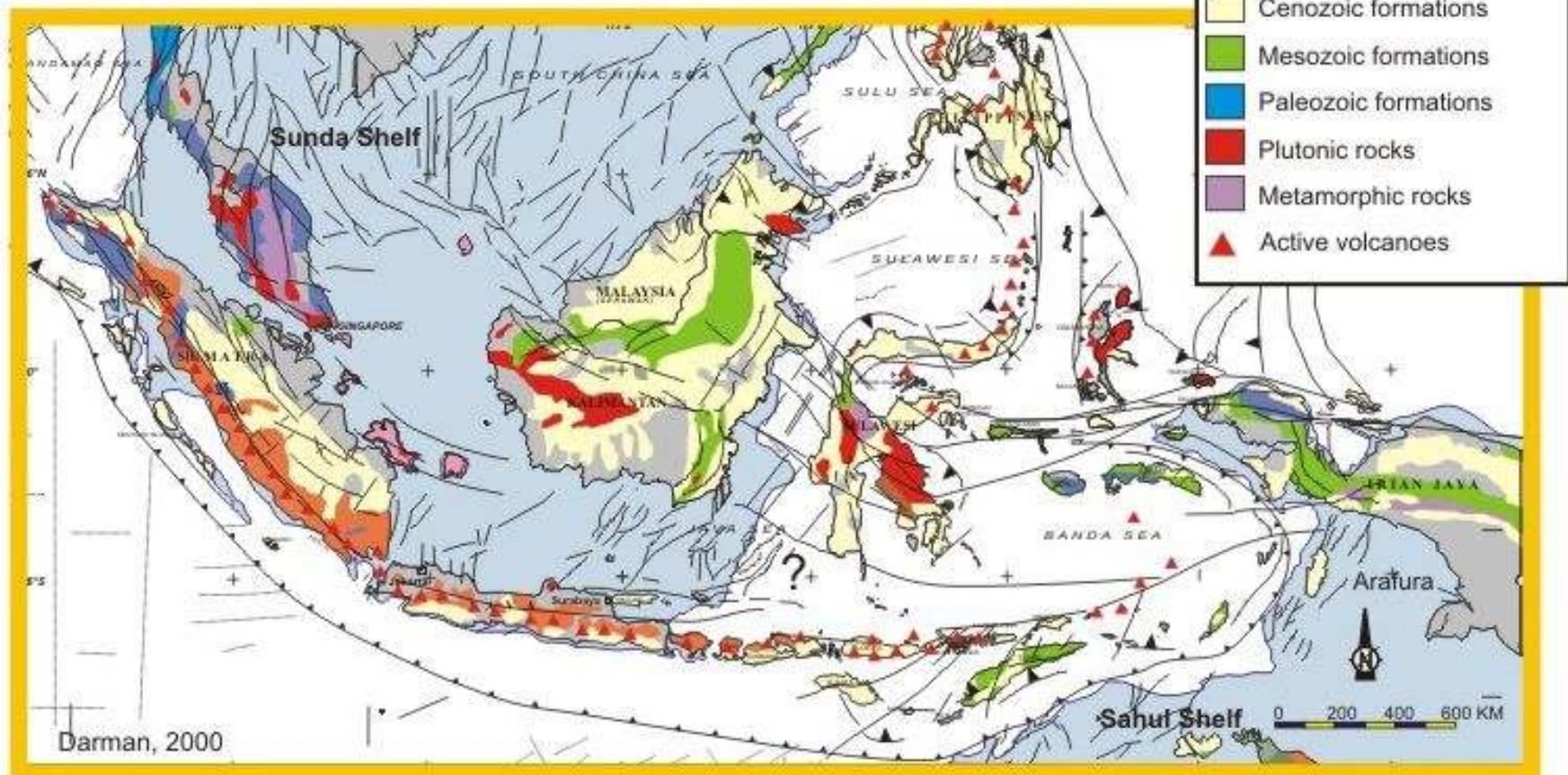
WHAT IS SUBDUCTION ZONES



SUBDUCTION ZONES IN INDONESIA

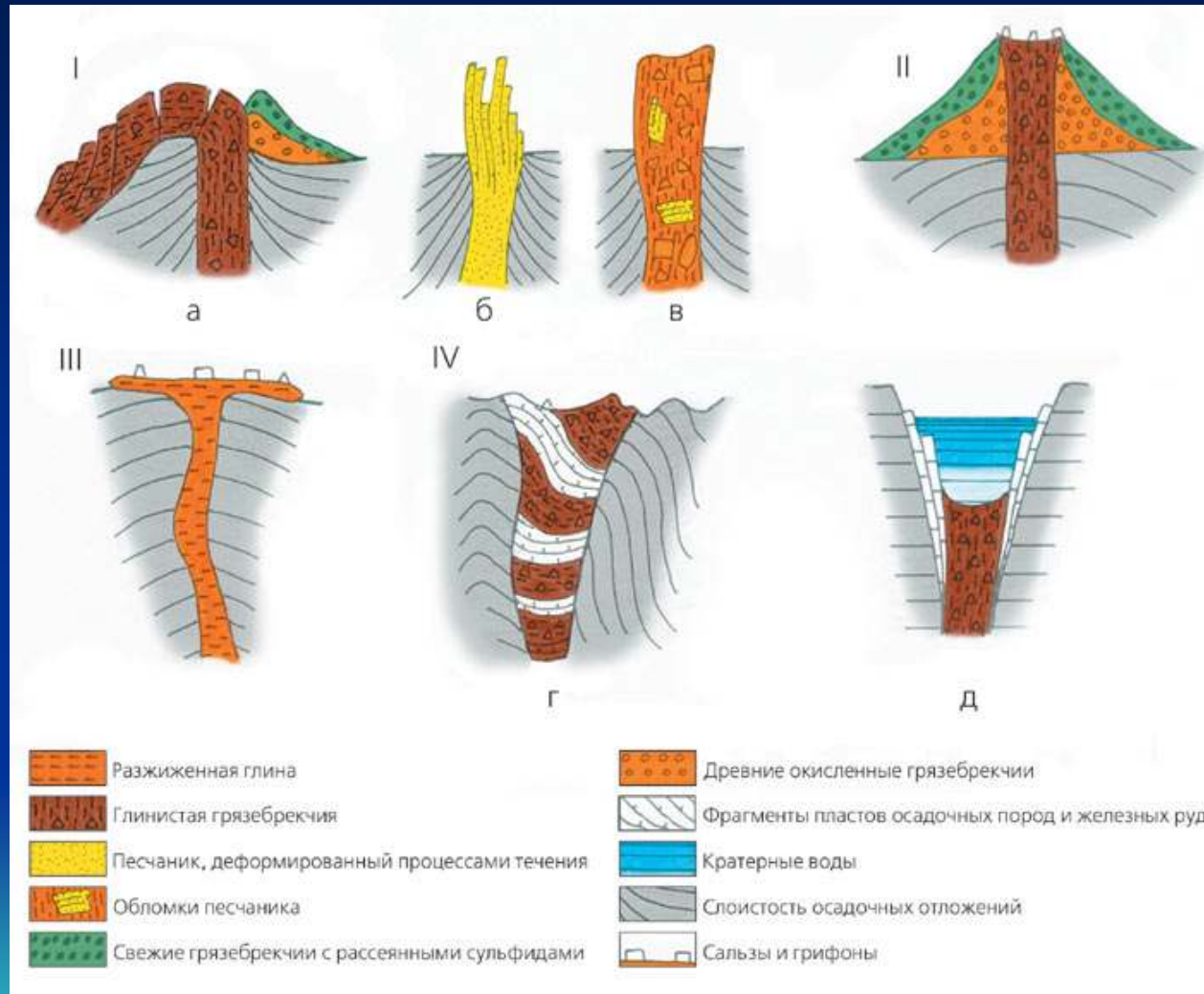


REGIONAL GEOLOGY OF INDONESIA

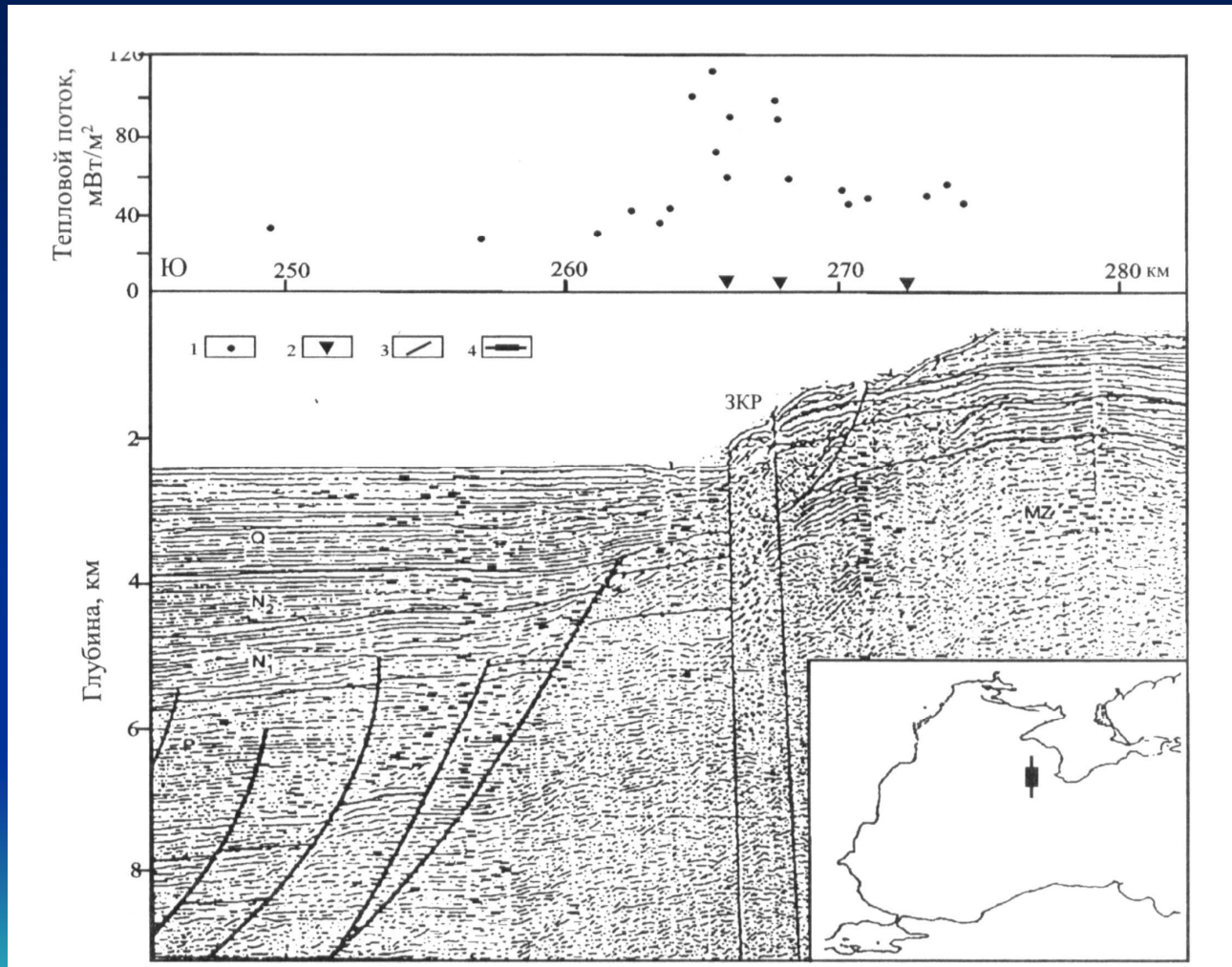




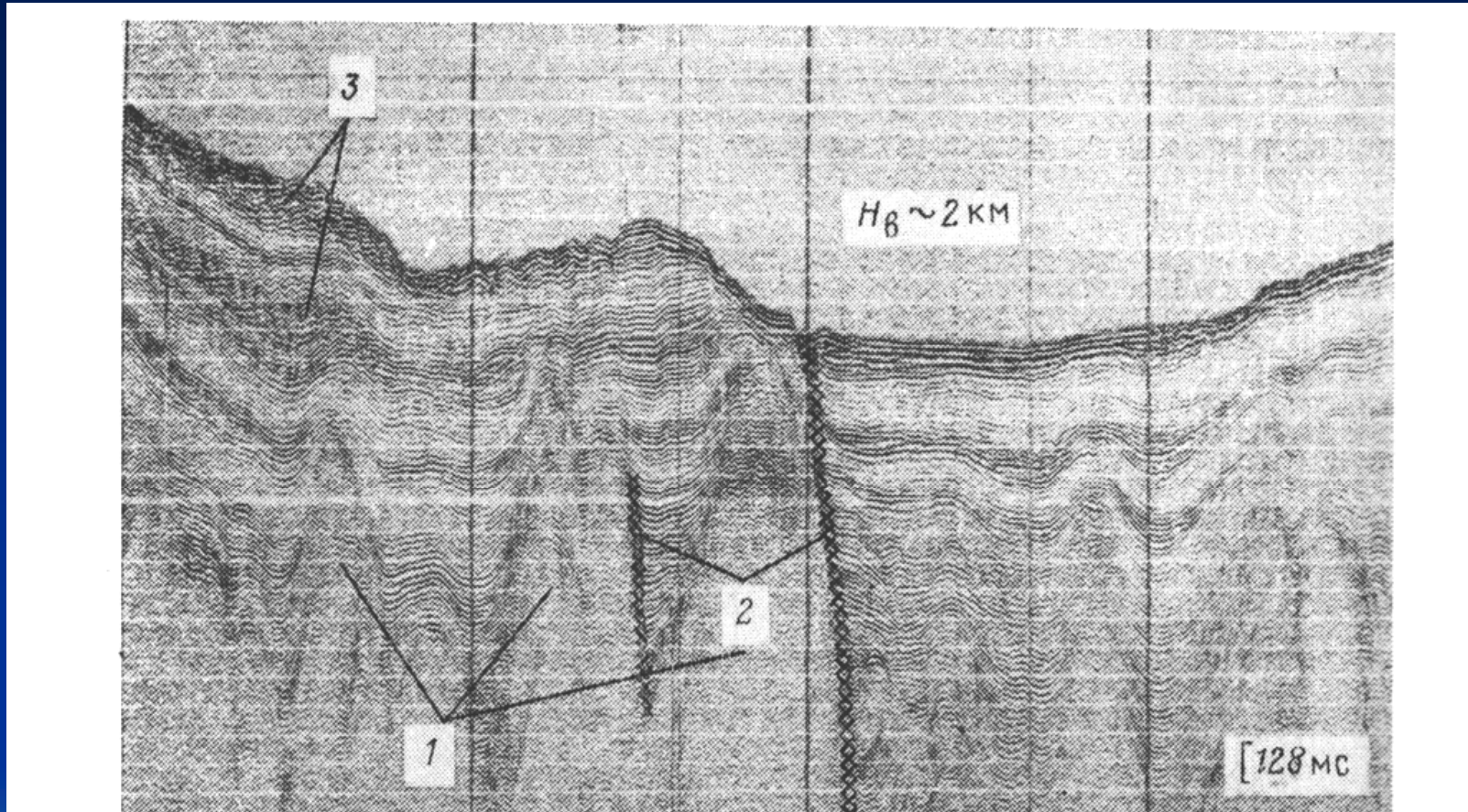
TYPES OF MUD VOLCANOES



USING SEISMIC PROFILES TO “SEE” UNDERGROUND

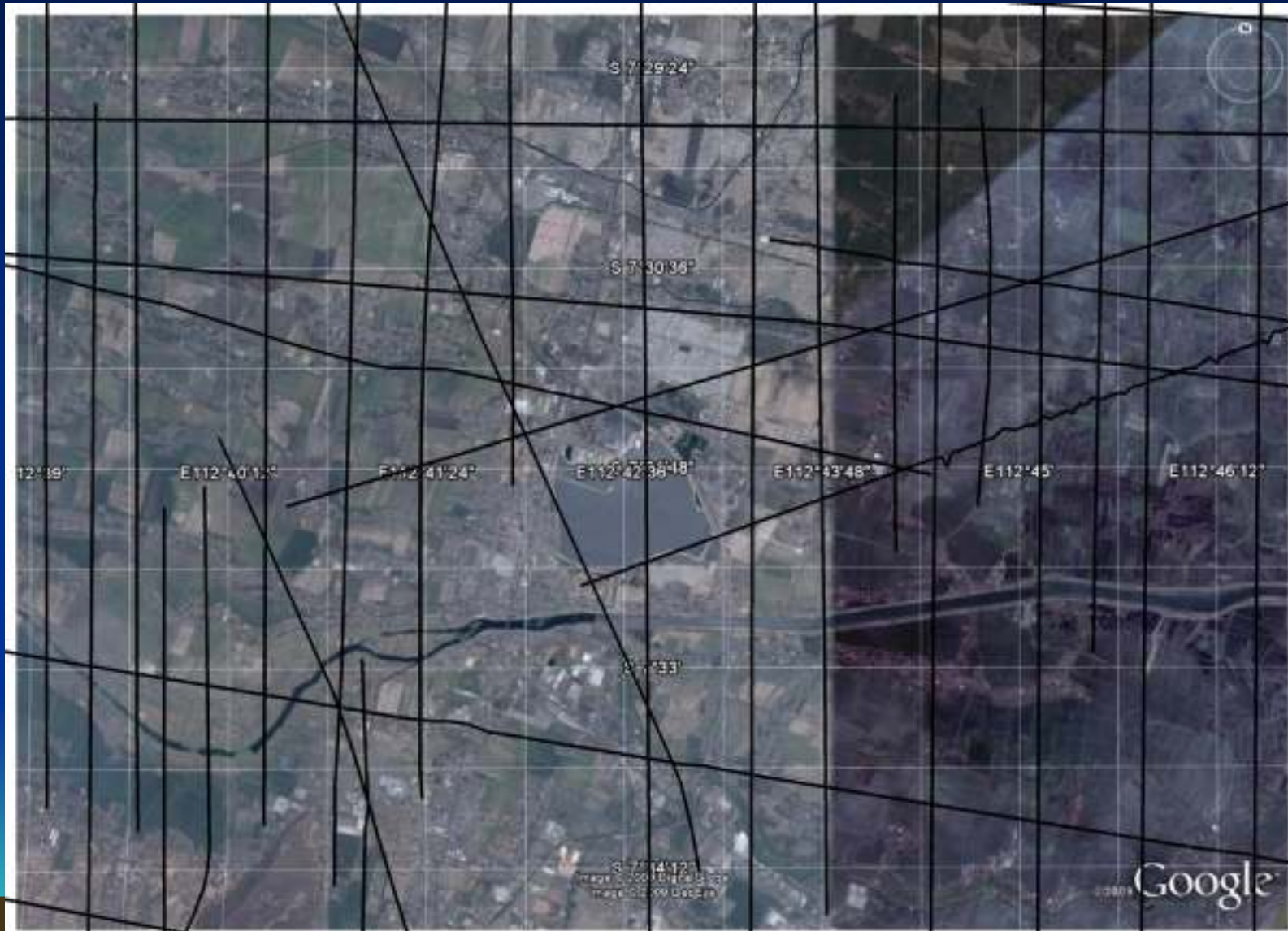


SAMPLE SEISMIC PROFILES



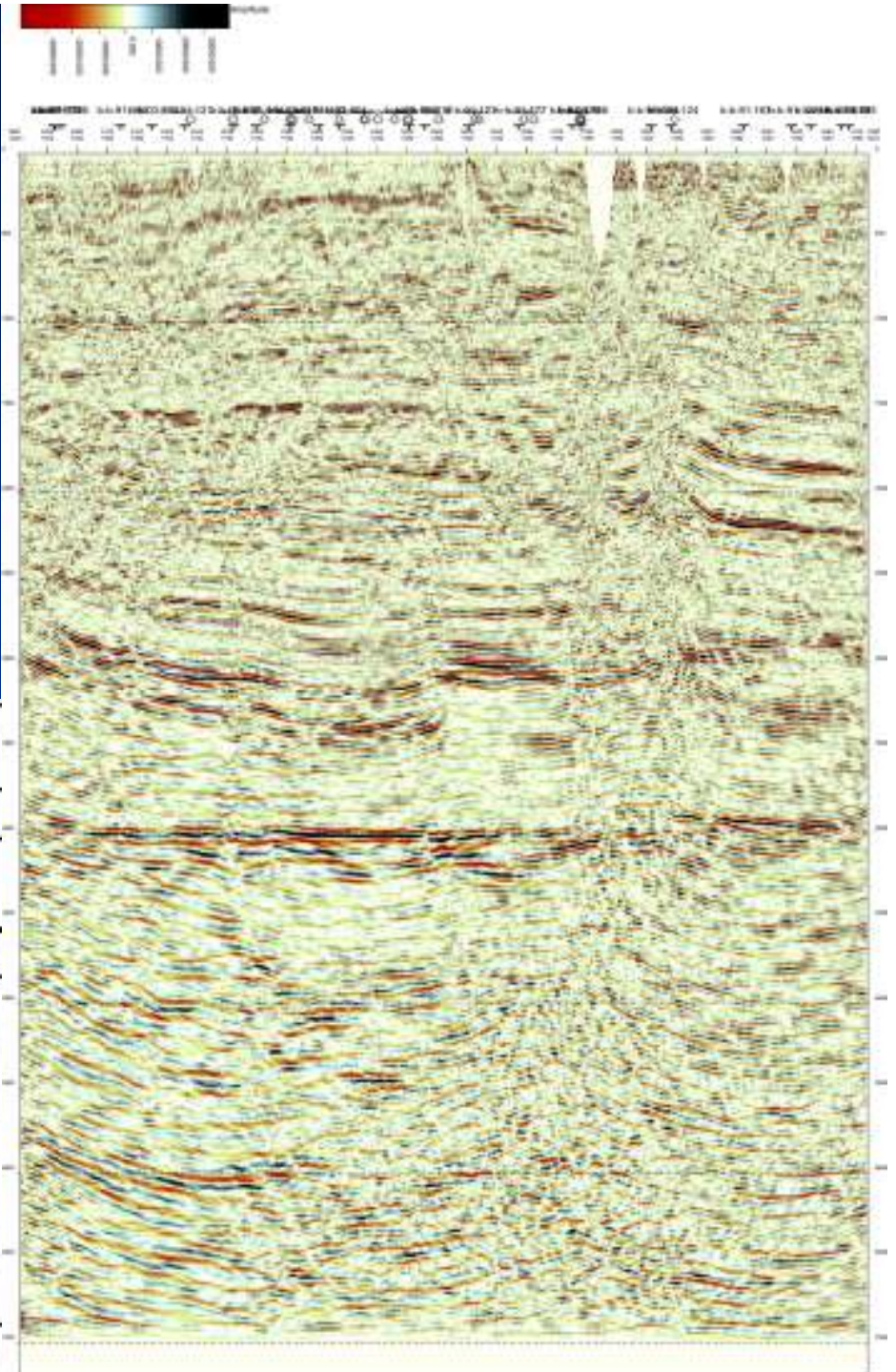
- 1 – Diapires
- 2 – Faults
- 3 – Folds

POSITION OF SEISMIC PROFILES



SEISMIC PROFILES EXAMPLE

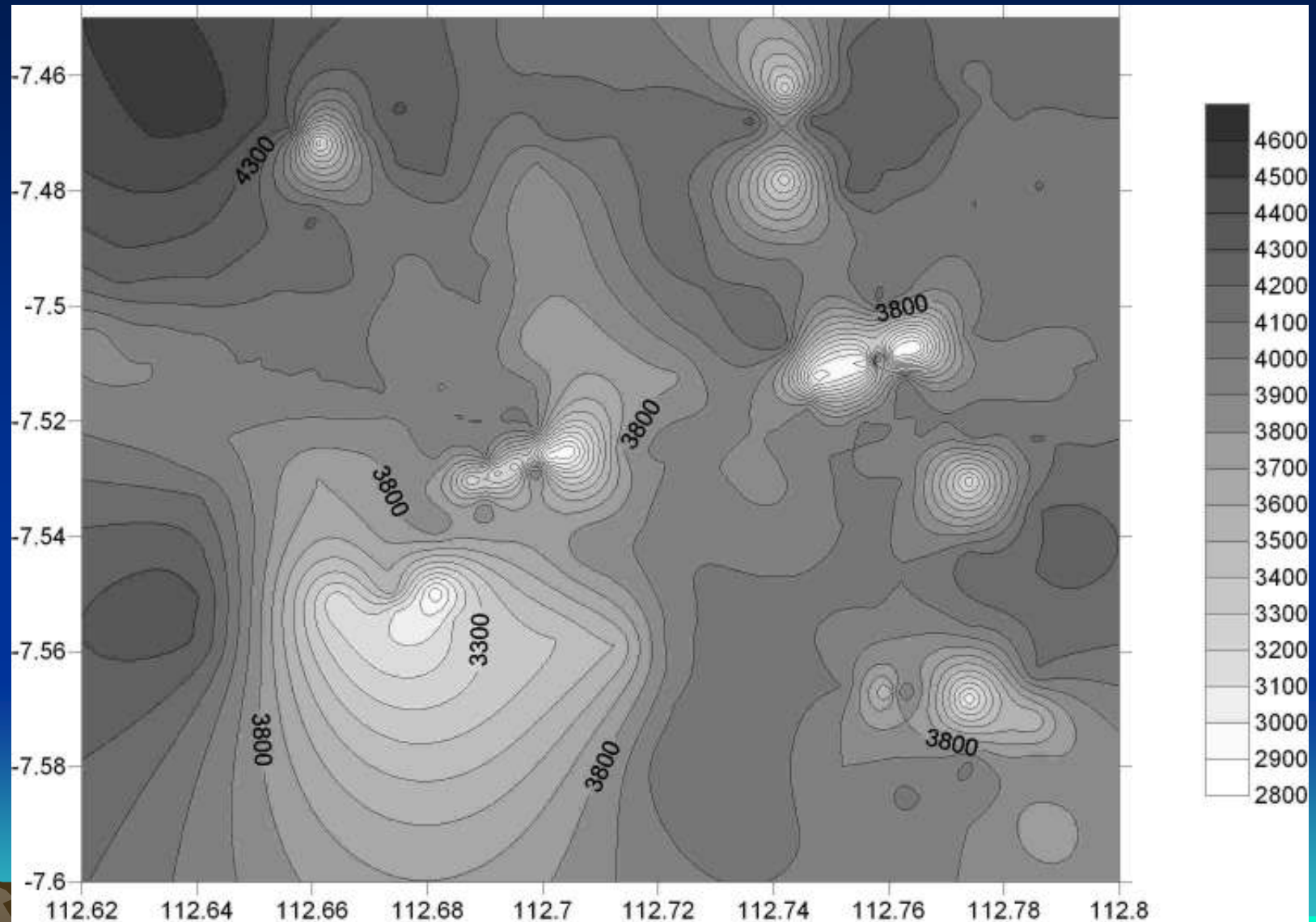
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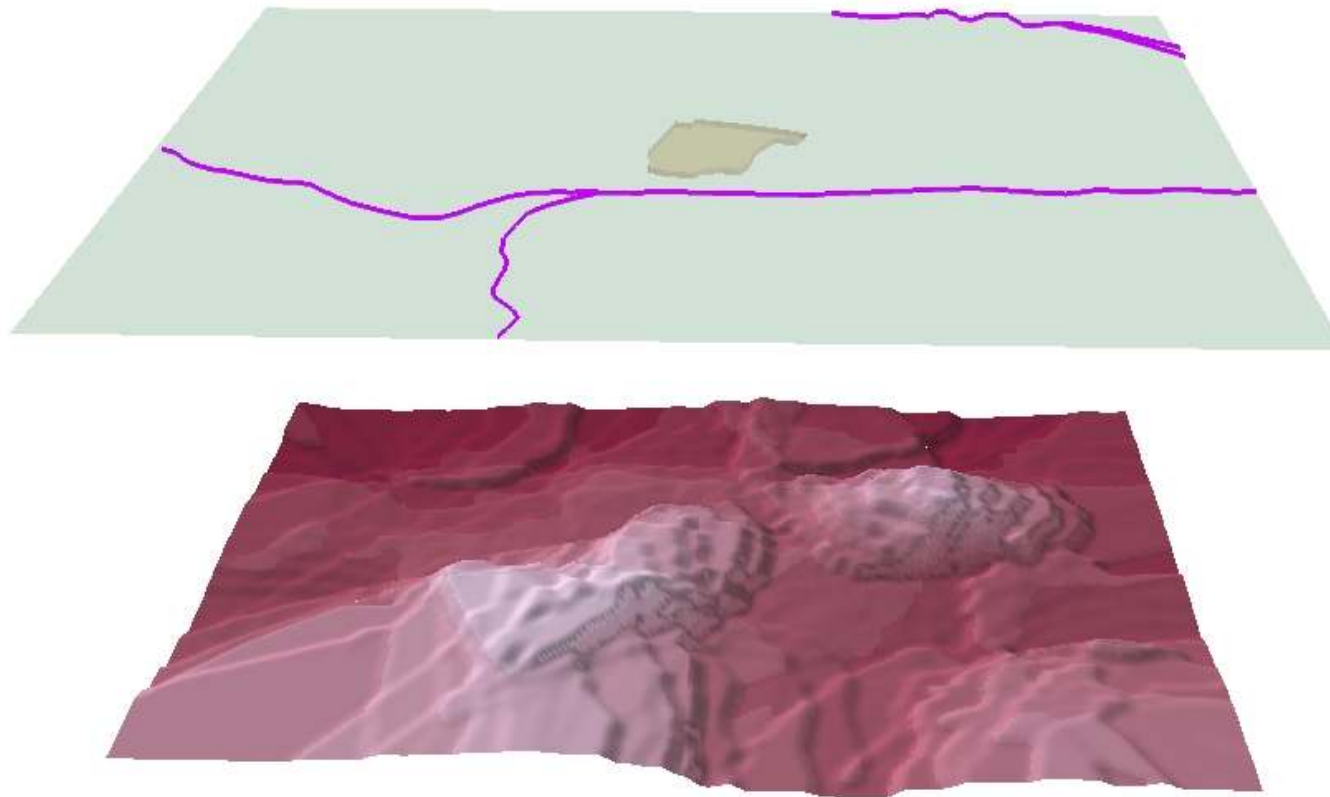
USING SEISMIC PROFILES TO BUILD THE “LUSI” GEO INFORMATIC SYSTEM (GIS)



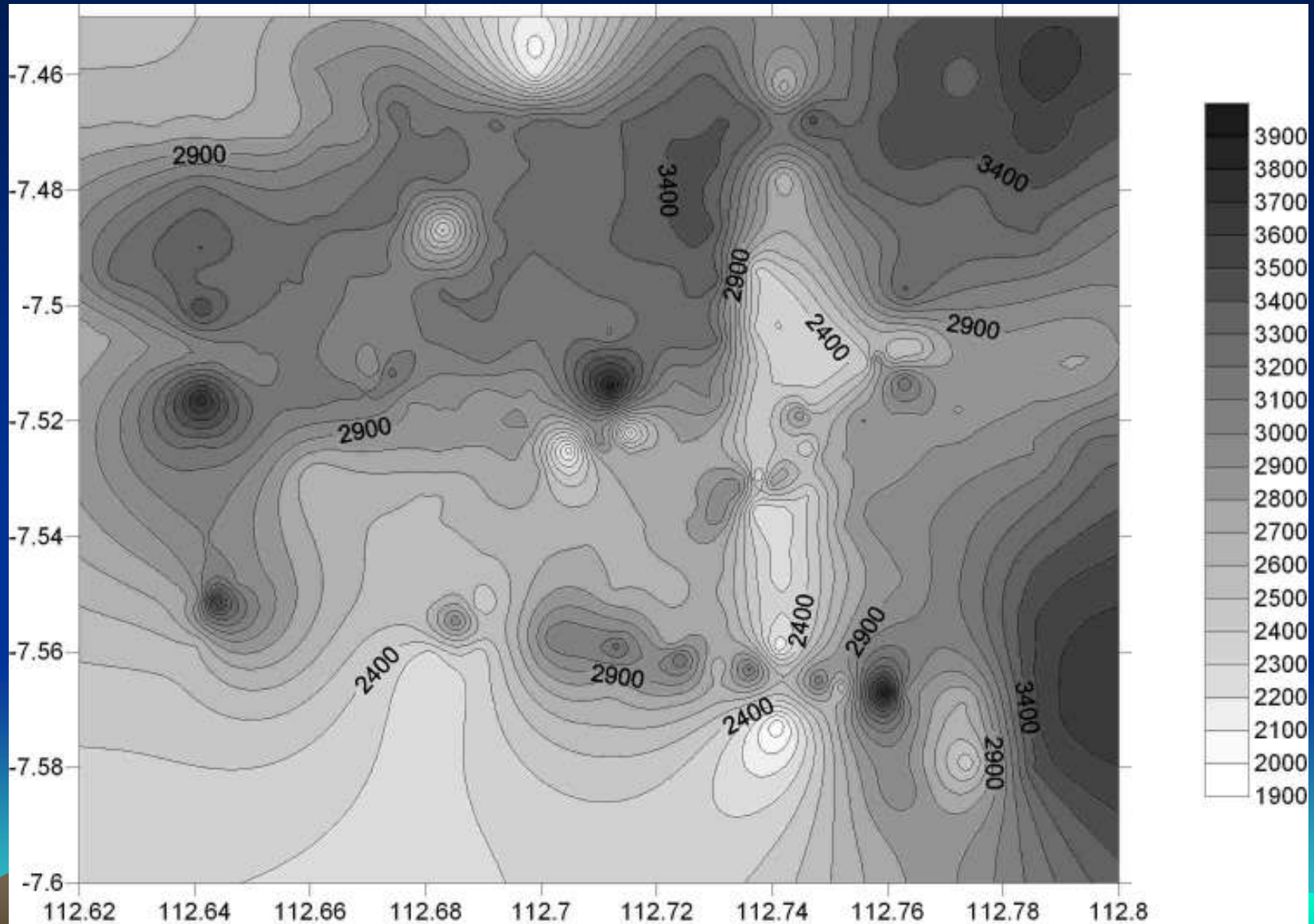
FIRST REFLECTIVE SURFACE



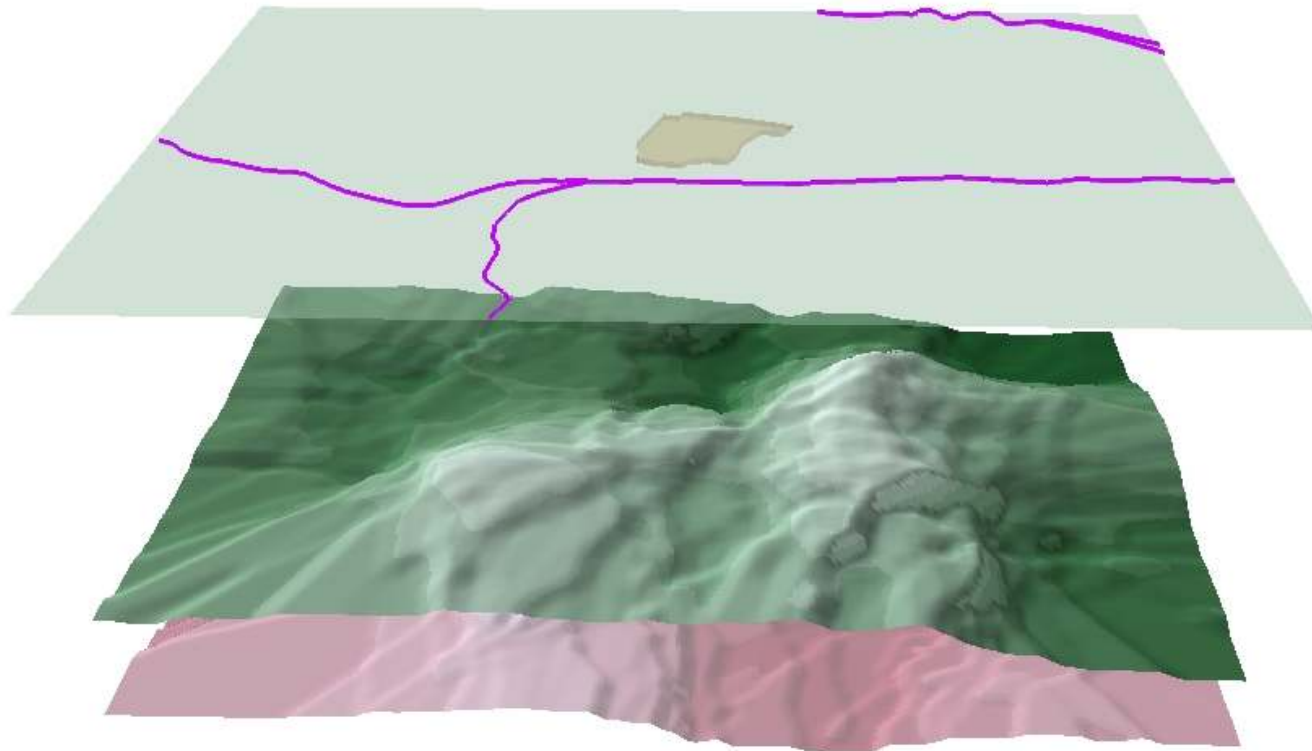
OVERLAY WITH SURFACE MAP



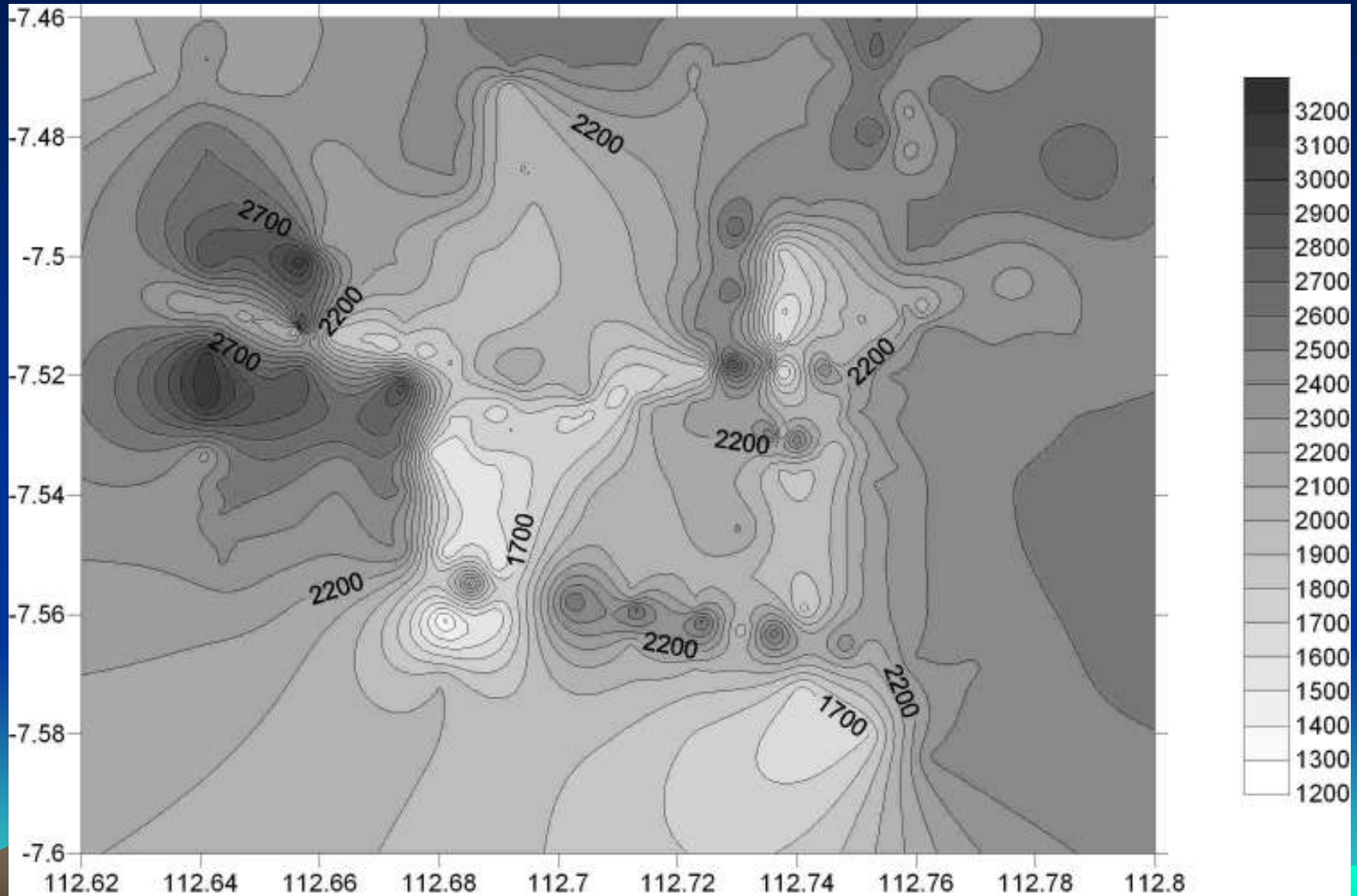
SECOND REFLECTIVE SURFACE



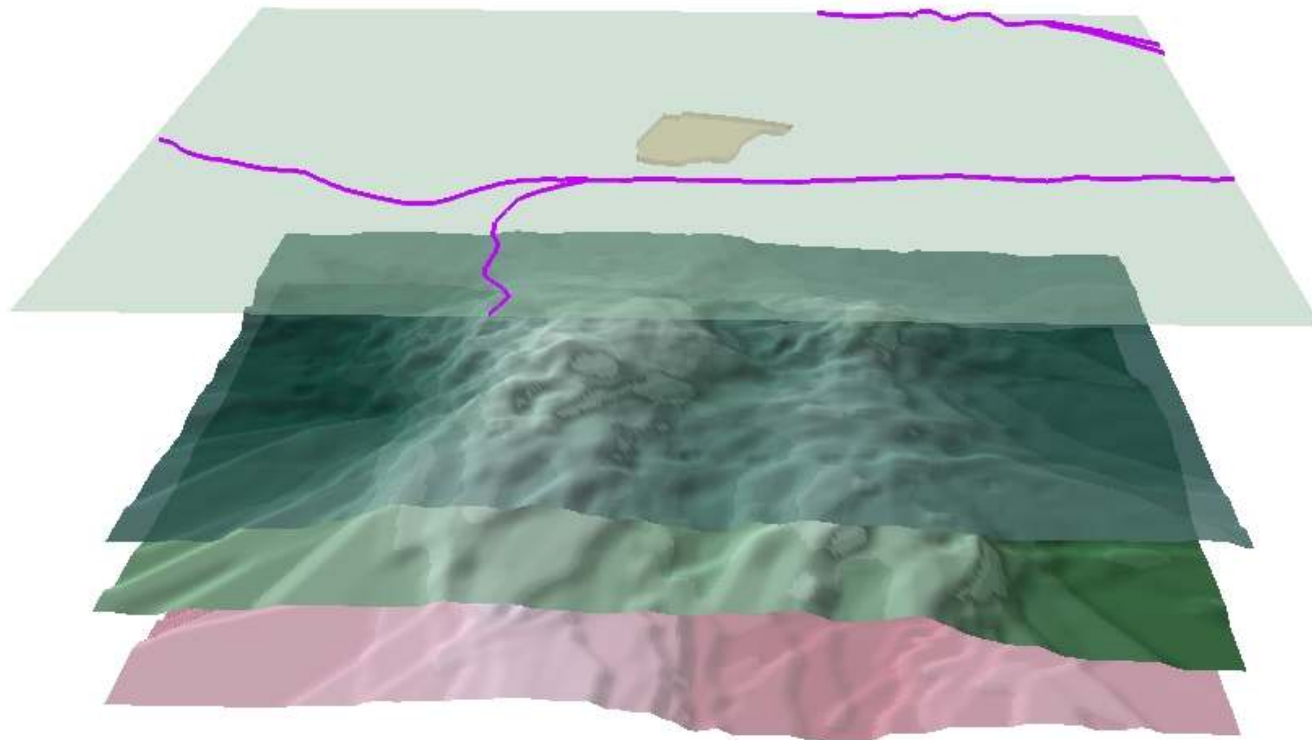
OVERLAY WITH SURFACE MAP



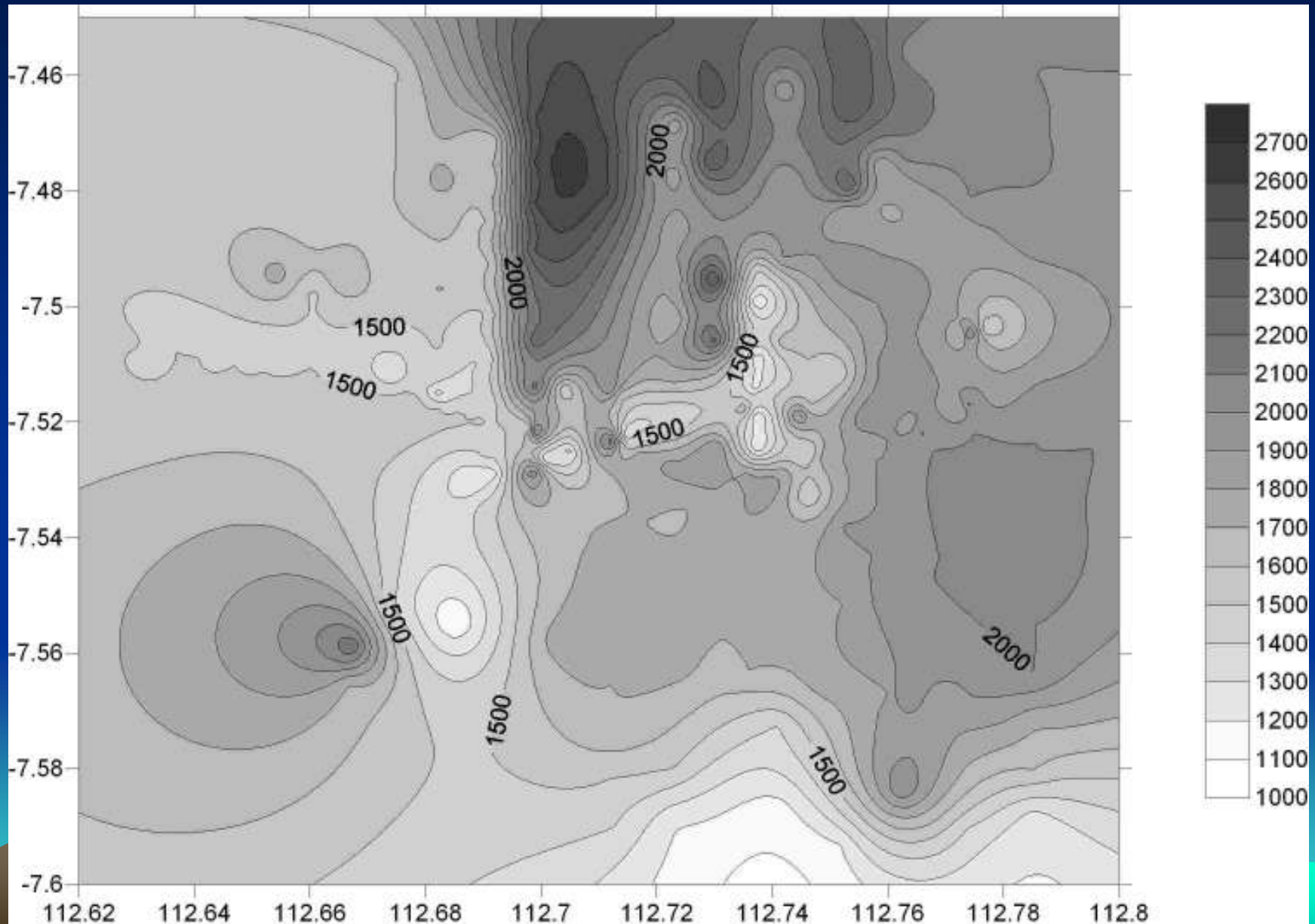
THIRD REFLECTIVE SURFACE



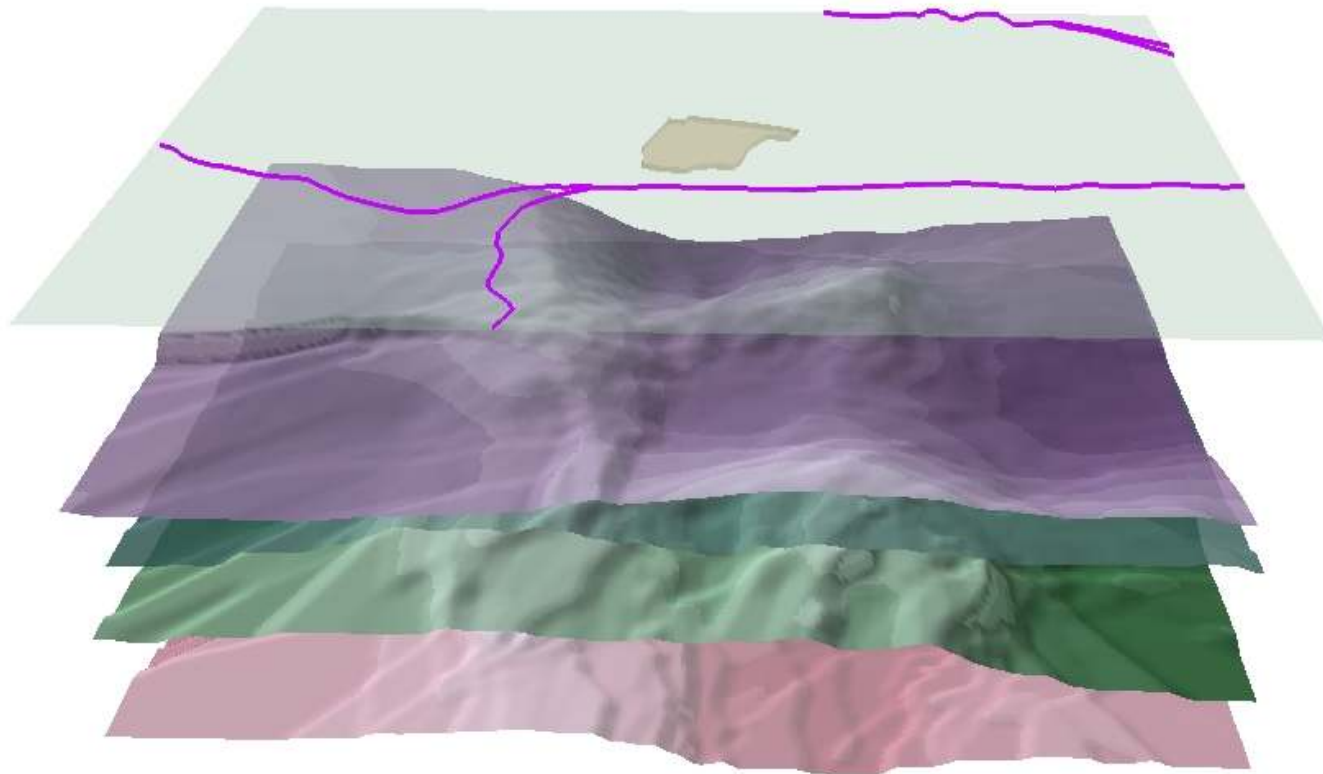
OVERLAY WITH SURFACE MAP



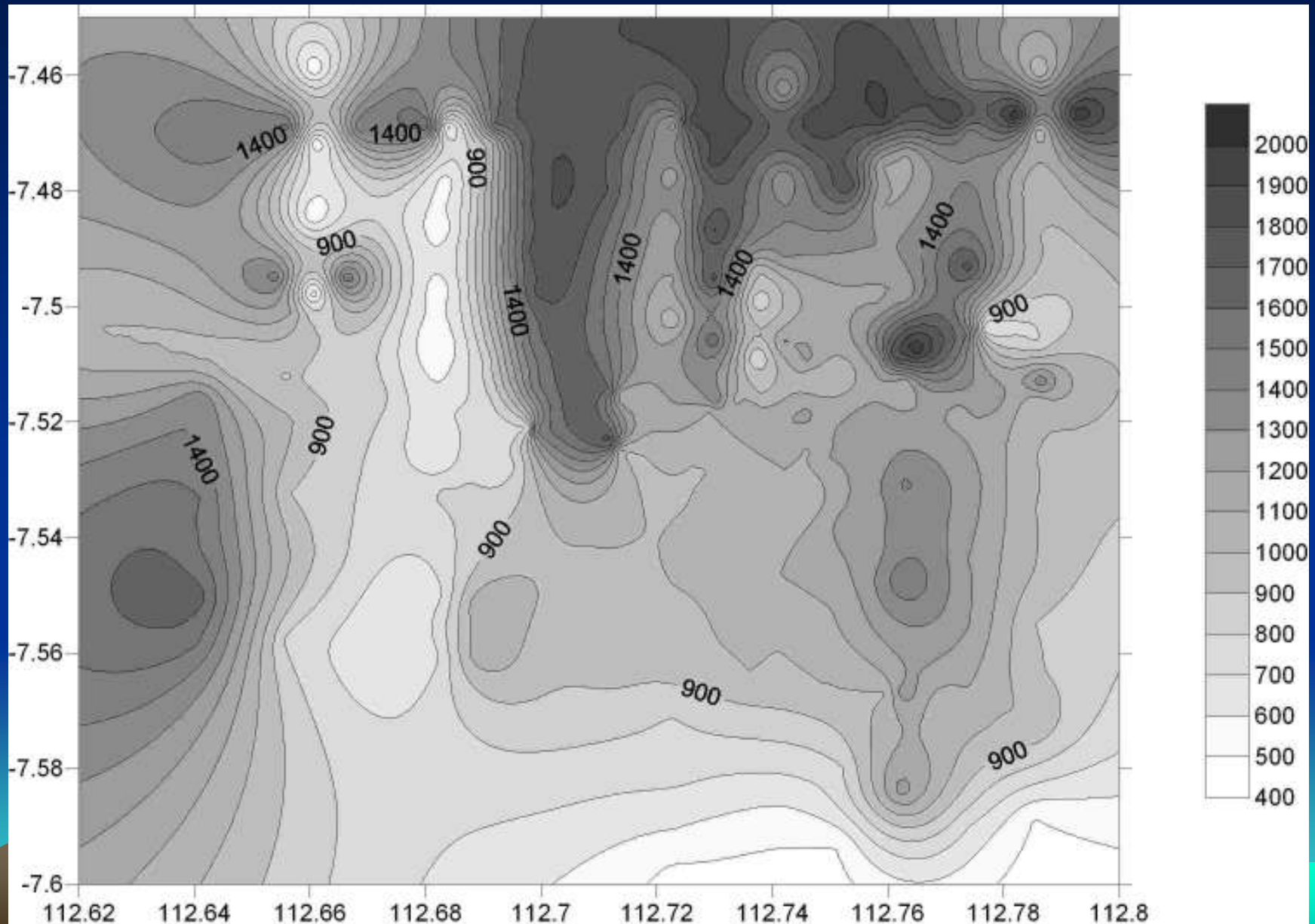
FOURTH REFLECTIVE SURFACE



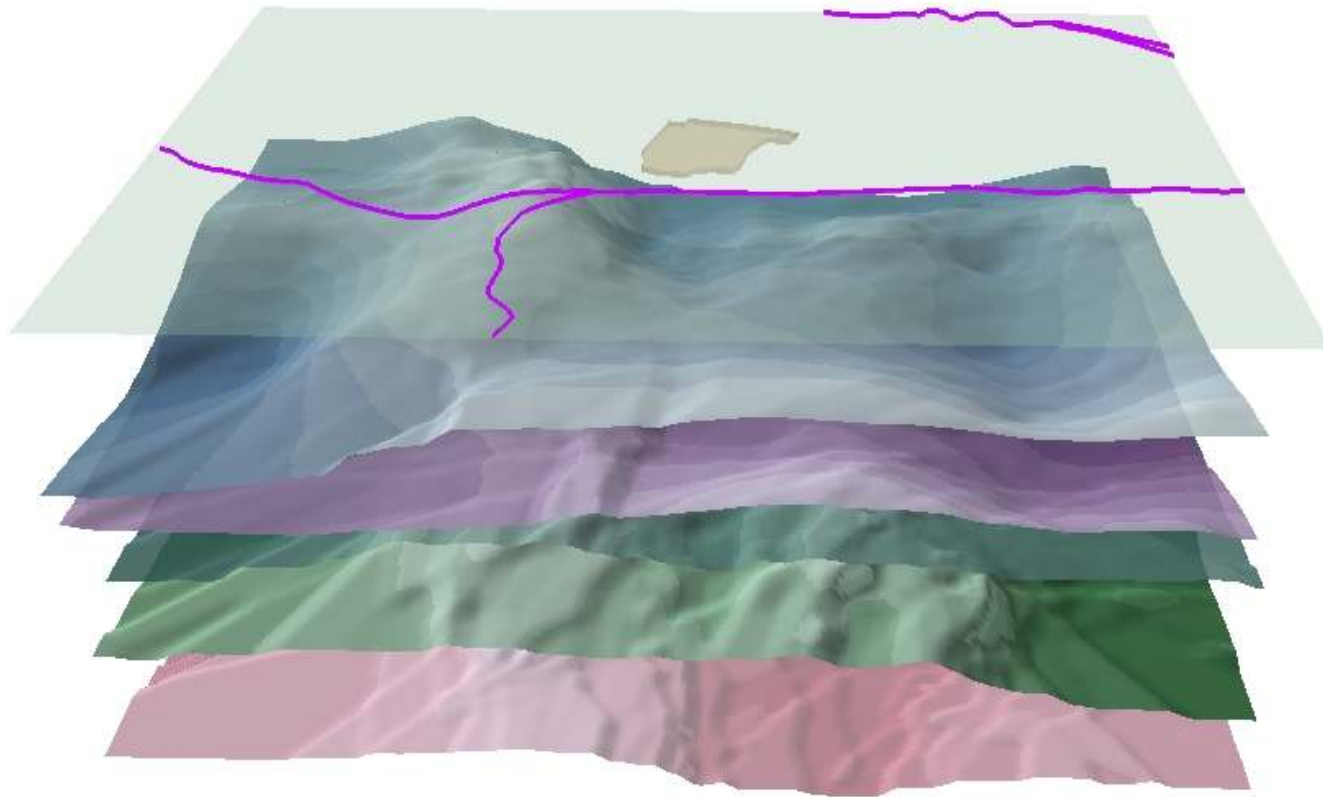
OVERLAY WITH SURFACE MAP



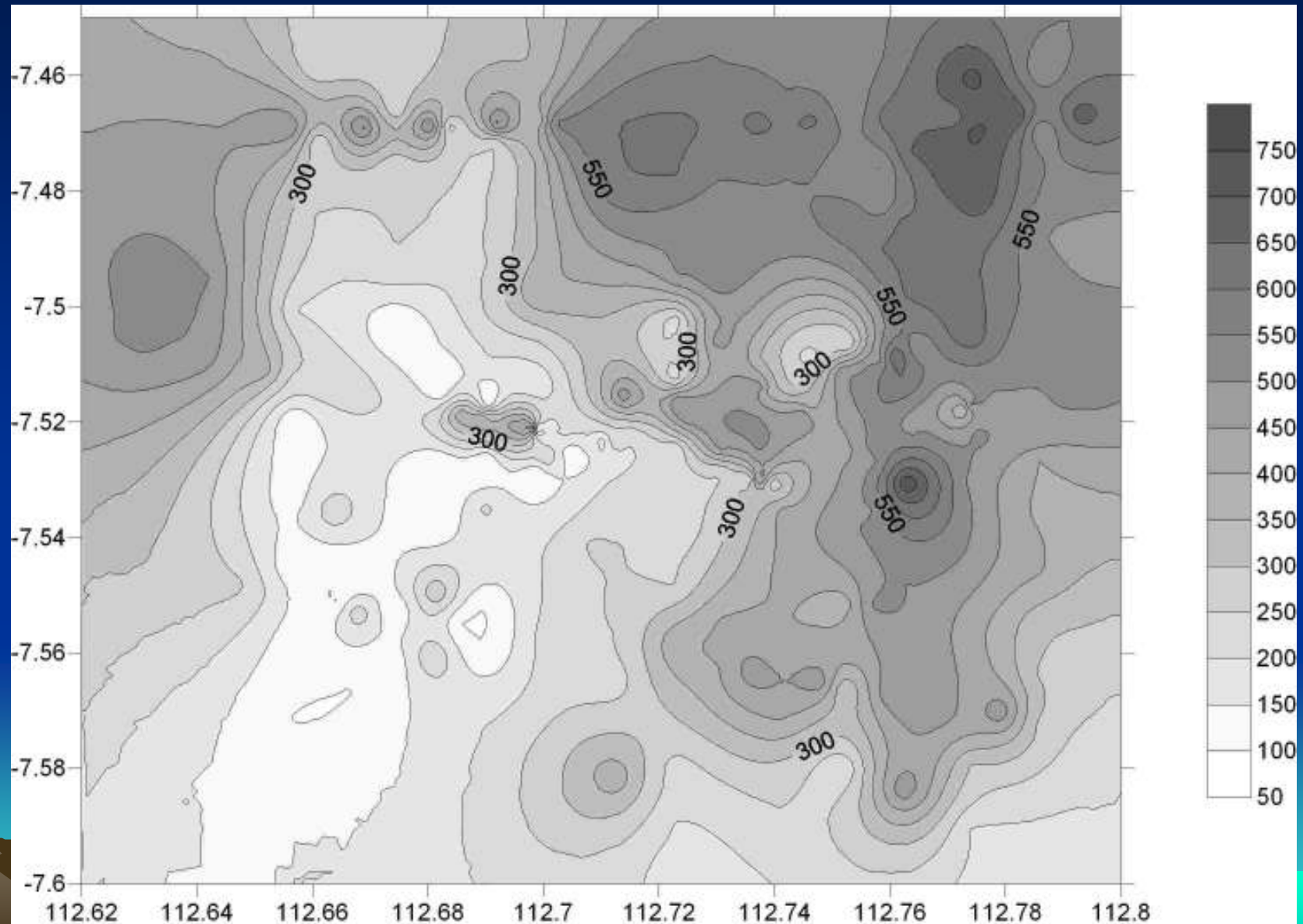
FIFTH REFLECTIVE SURFACE



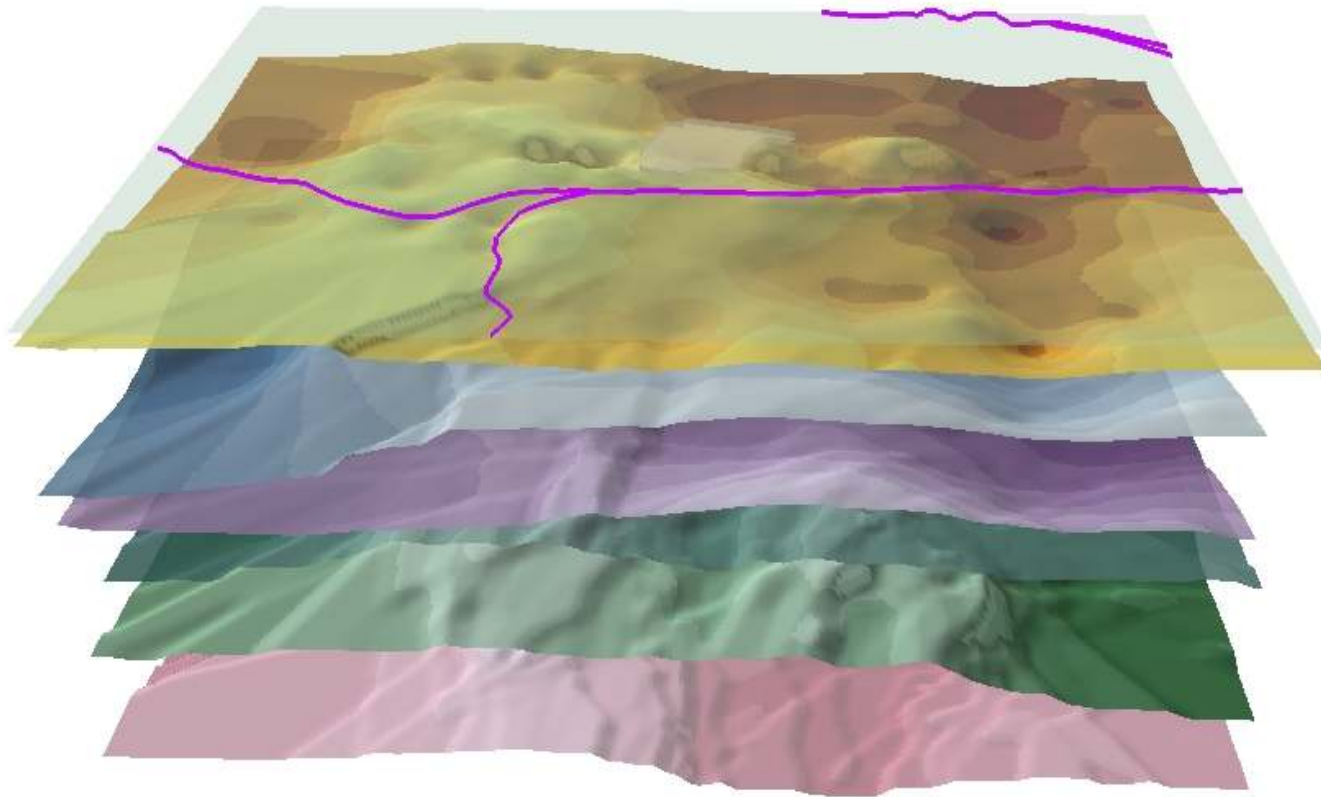
OVERLAY WITH SURFACE MAP



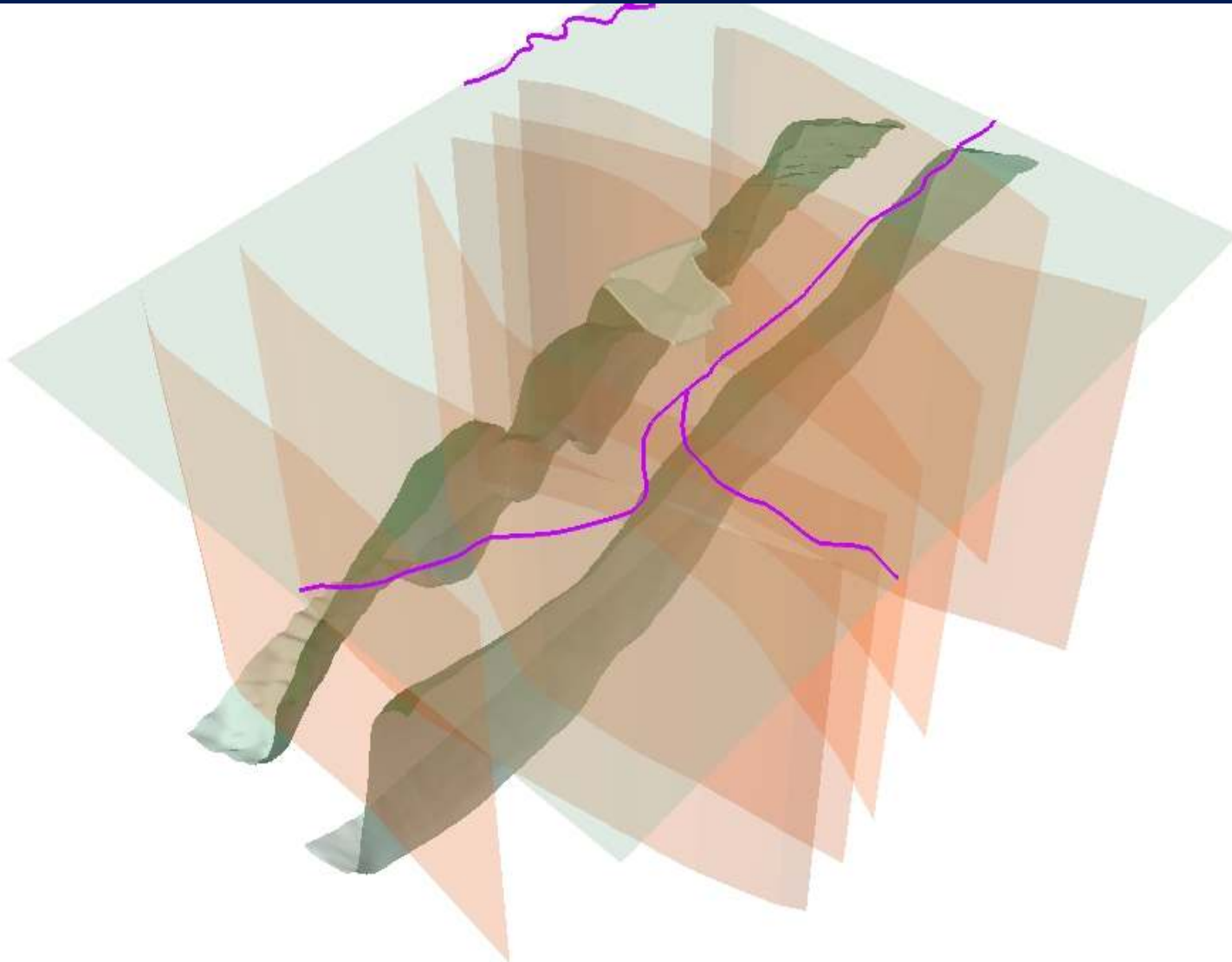
SIXTH REFLECTIVE SURFACE



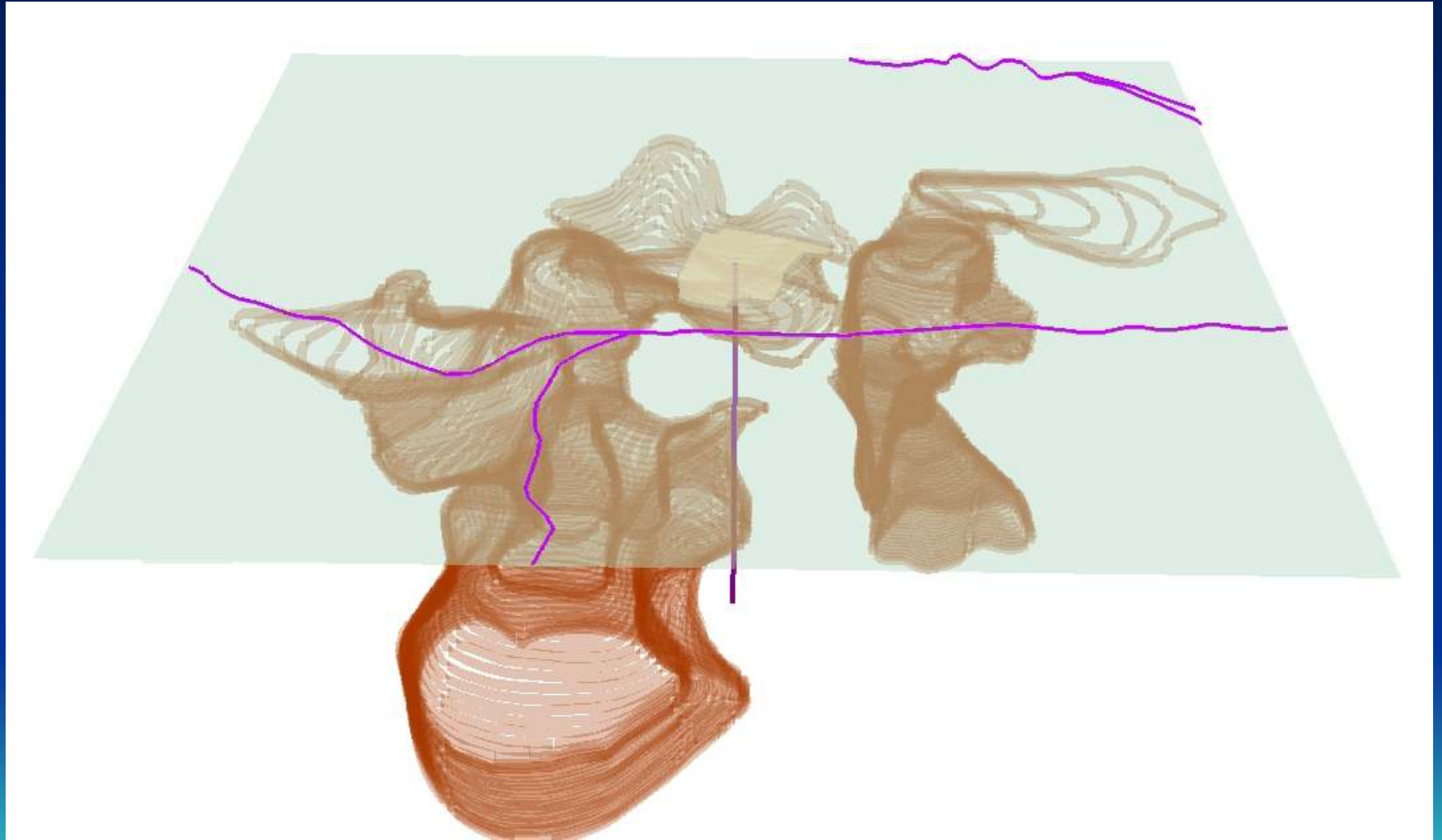
OVERLAY WITH SURFACE MAP



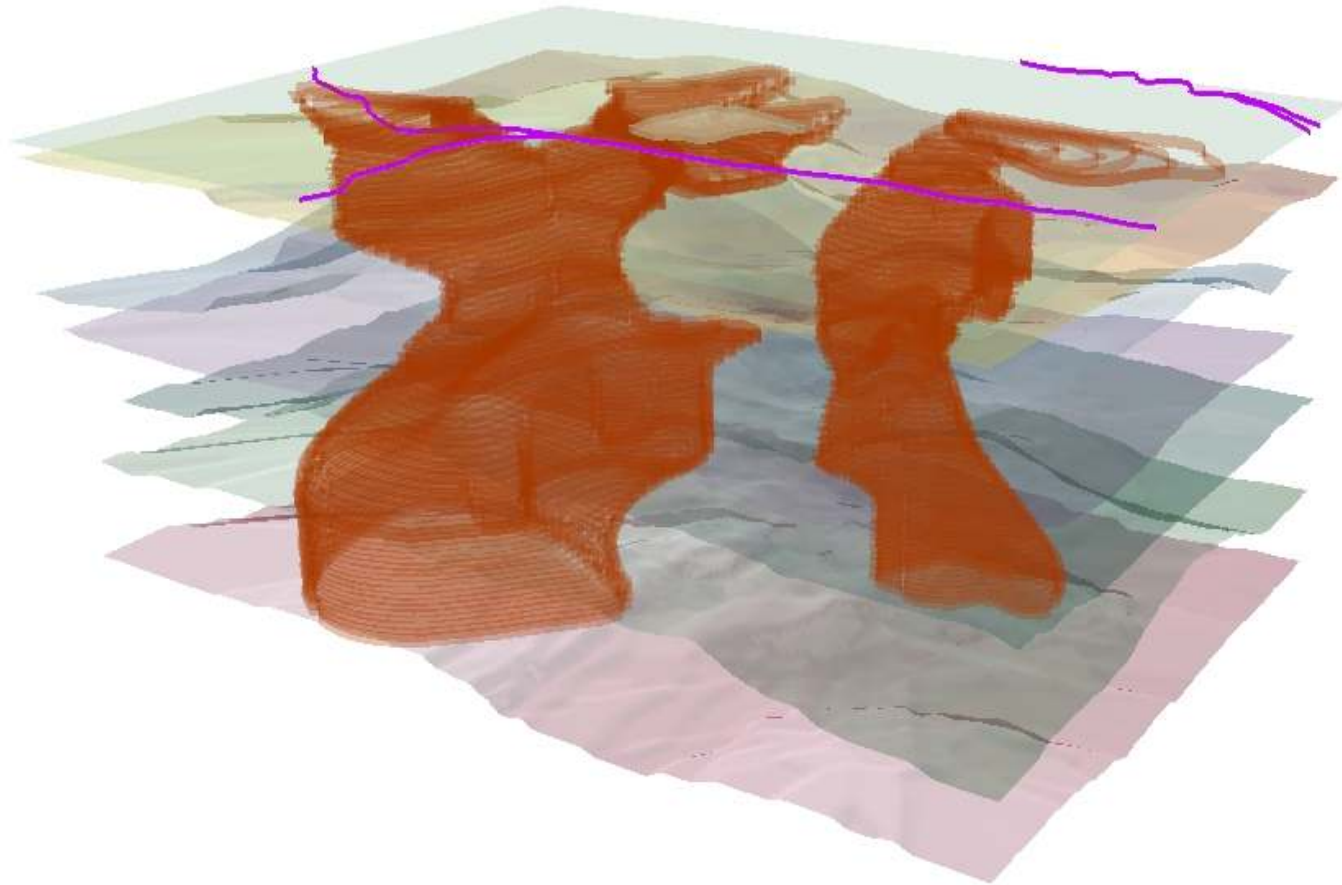
MAPPING THE FAULT LINES



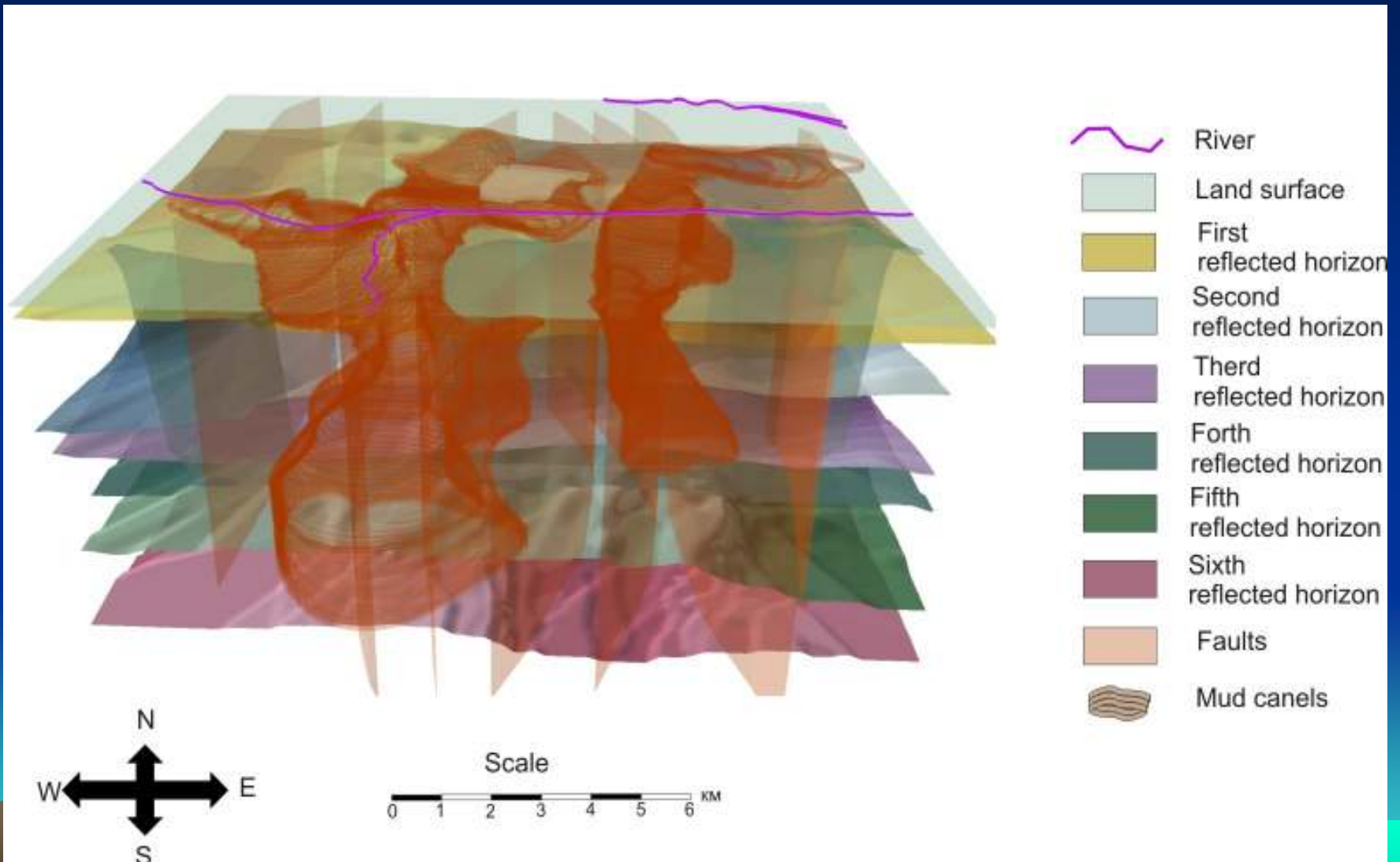
INTERPRETATING THE DATA



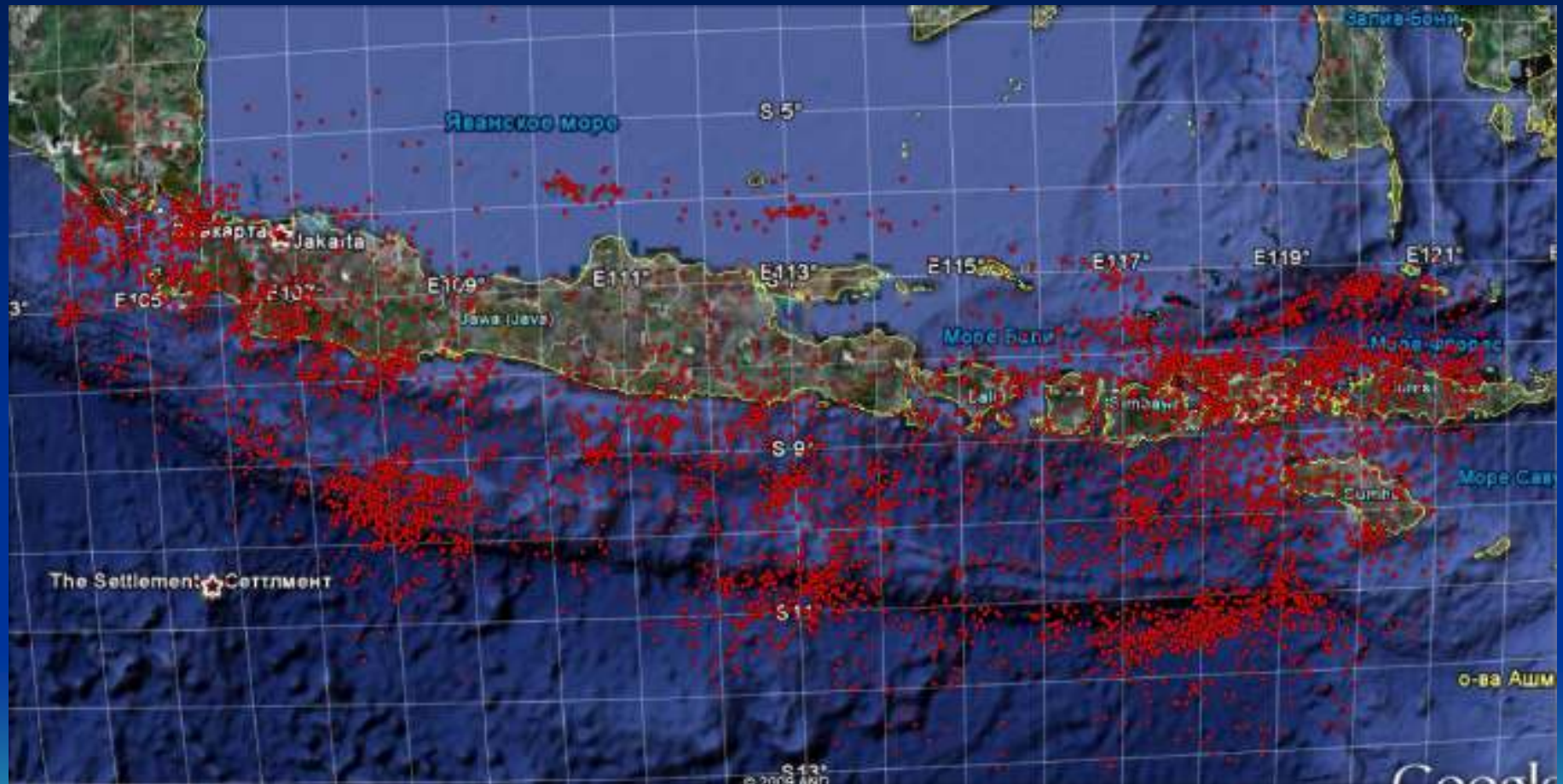
INTERPRETATING THE DATA



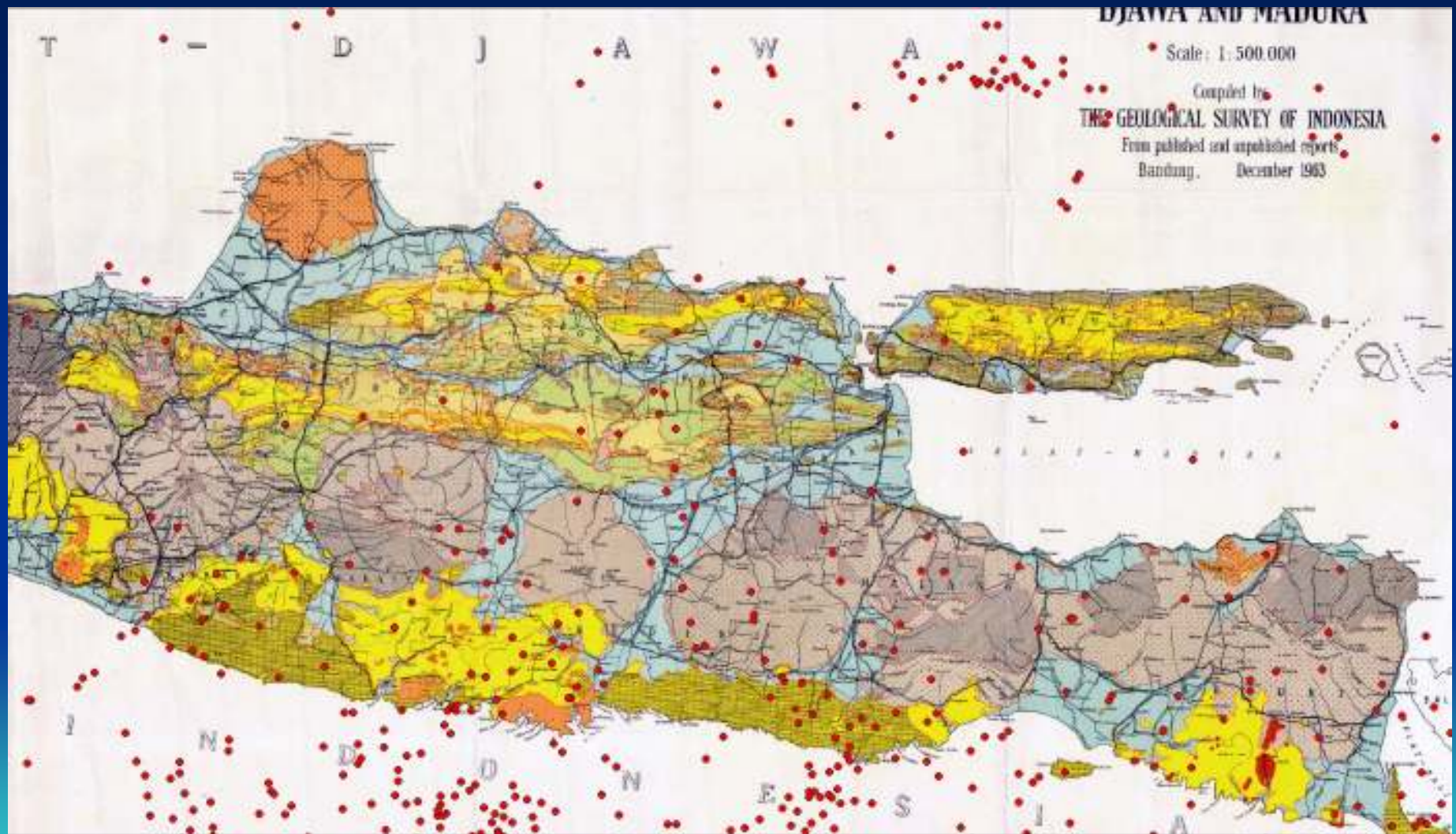
RESULT: LUSI MUD VOLCANO 3D MODEL



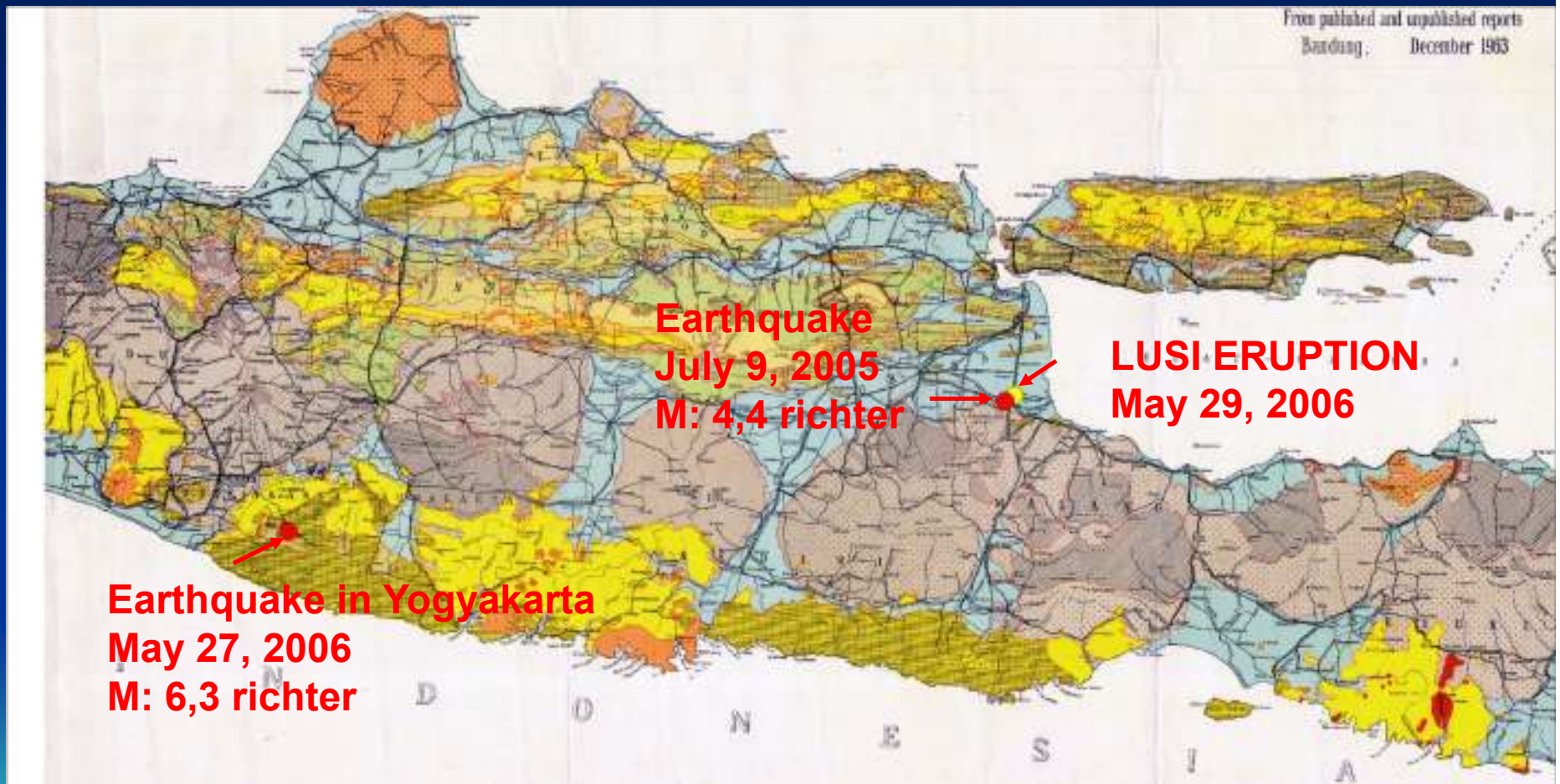
EARTHQUAKE EPICENTERS IN JAVA



EARTHQUAKE EPICENTERS IN EAST JAVA



LUSI ERUPTION TRIGGERS



CONCLUSIONS:

- The LUSI phenomenon is based on a natural mud volcano that has been present for thousands of years in the Sidoarjo area
- The 2006 mud-flow was triggered by a series of sub-surface seismic events, such as the 2005 Sidoarjo and 2006 Yogyakarta earthquake
- There currently remains 2 underground mud-channels that needs to be monitored



RECOMMENDATIONS

