

CHACHIMBIRO GEOTHERMAL AREA, NORTHERN ECUADOR — A NEW MAGNETIC EXPLORATION.

Javier Pauta, Ph.D Elisa Piispa, Ph.D Celine Mandon,
and Mst. Matilde Urguizo

December 15th, 2021

AGU FALL
MEETING

SCIENCE
is SOCIETY





JAVIER PAUTA

Geologist from Yachay Tech University



SCHOOL OF
EARTH SCIENCES,
ENERGY AND ENVIRONMENT

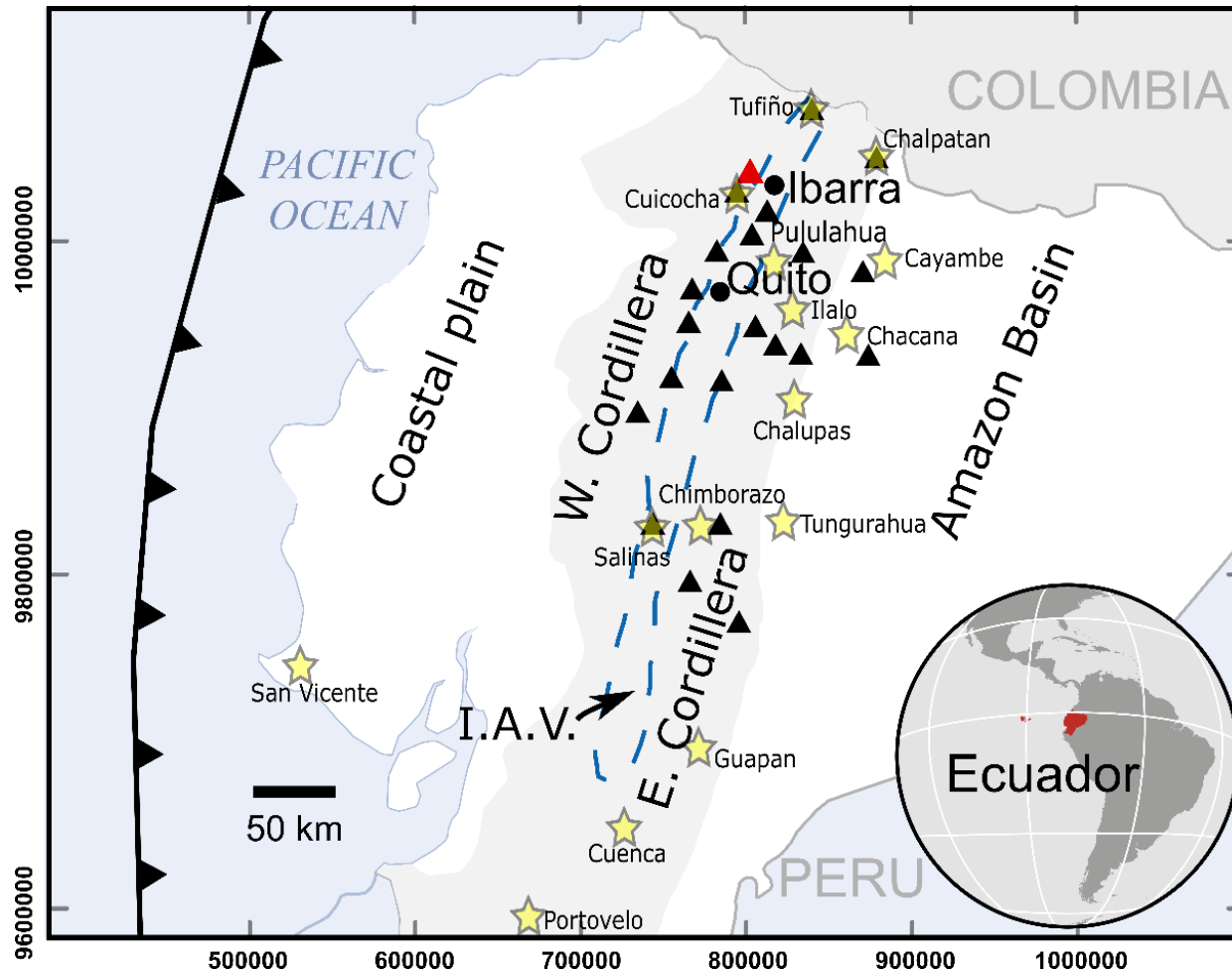


INSTITUTE OF EARTH SCIENCES

SCIENCE
is SOCIETY



GEOLOGICAL SETTING

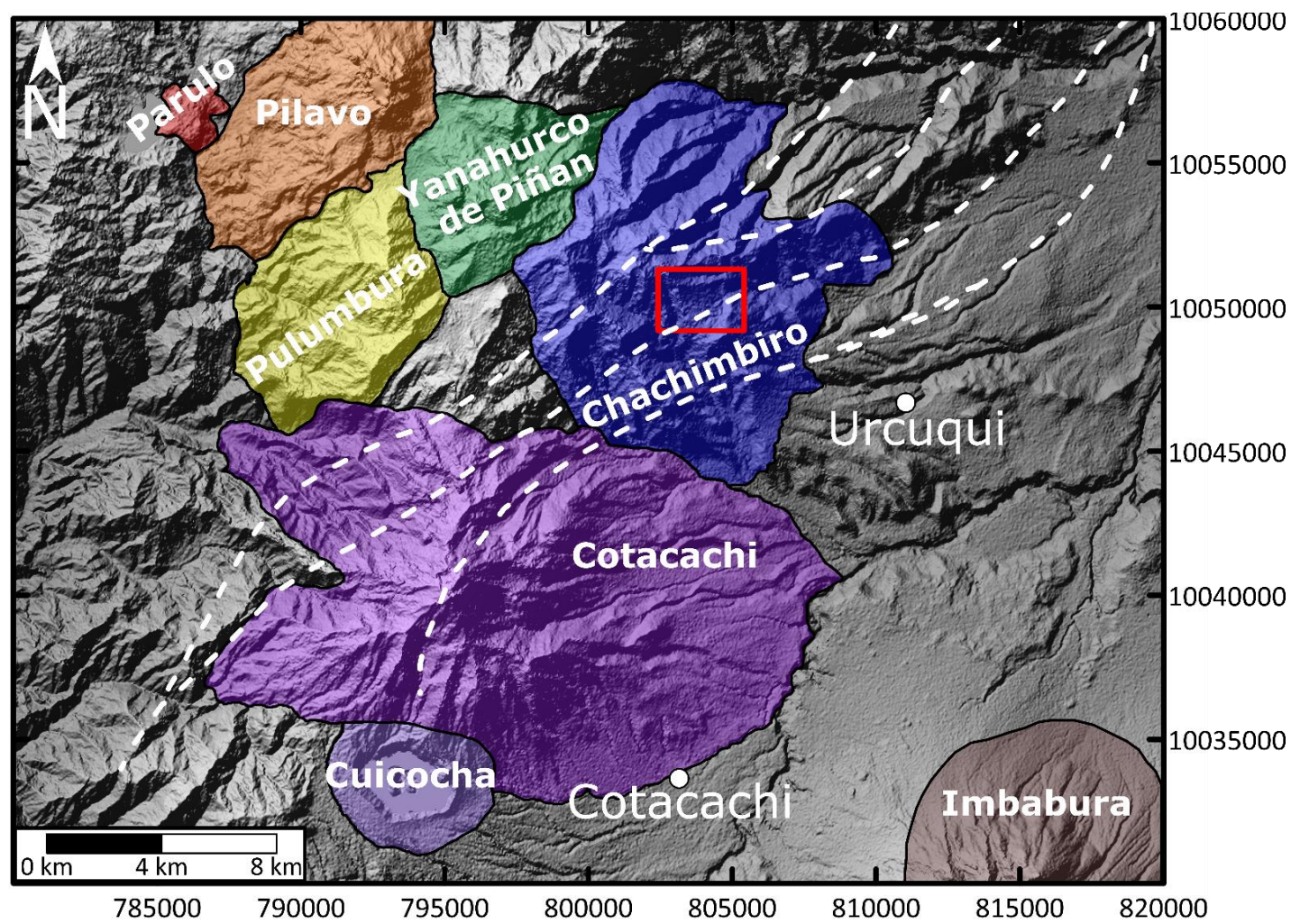


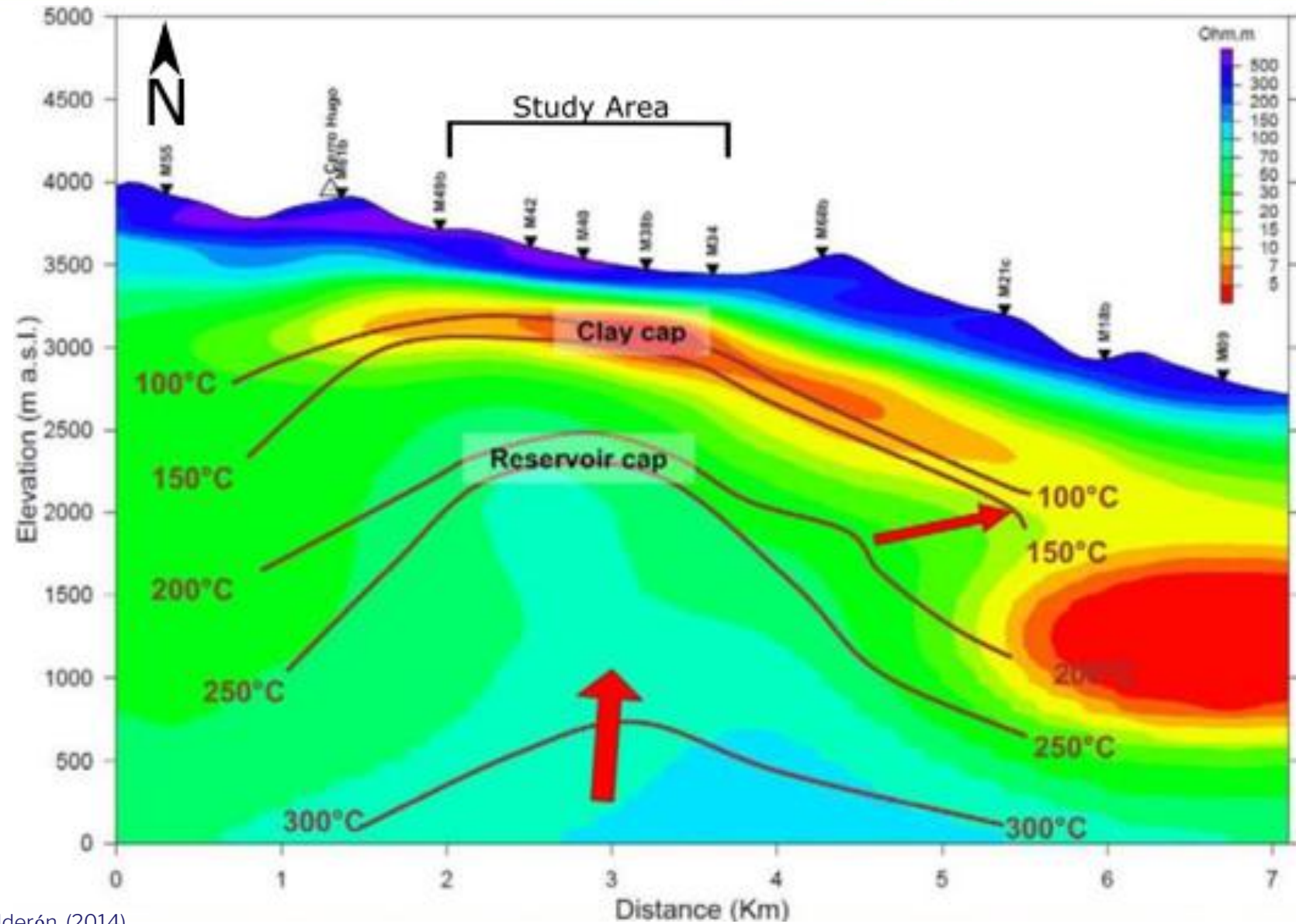
Legend: I.A.V. = Inter Andean Valley

- Plates interaction
- Andean Cordillera
- Several geothermal prospects
- Chachimbiro



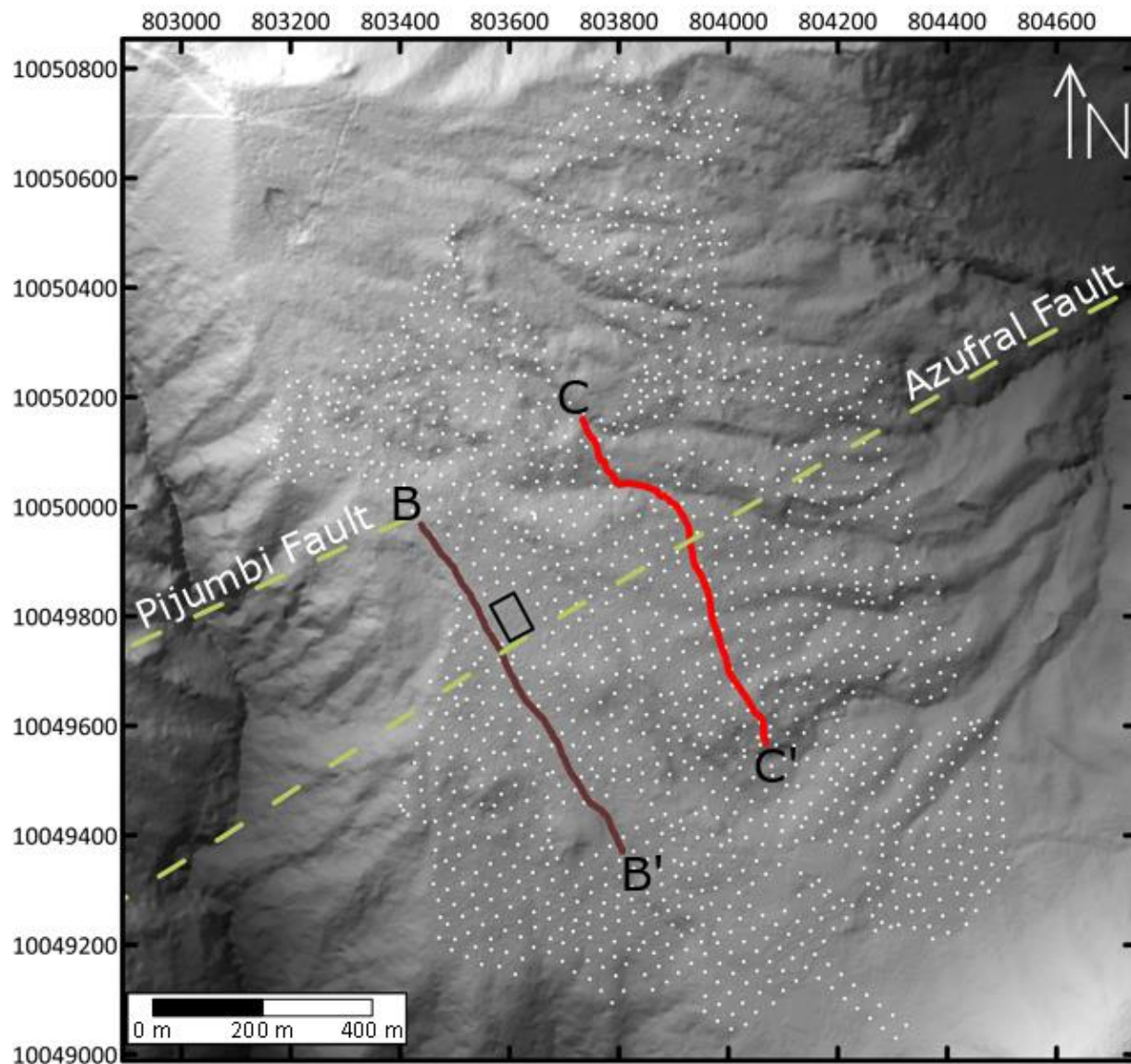
GEOLOGICAL SETTING



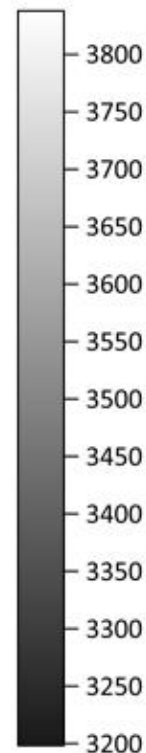




METHODOLOGY



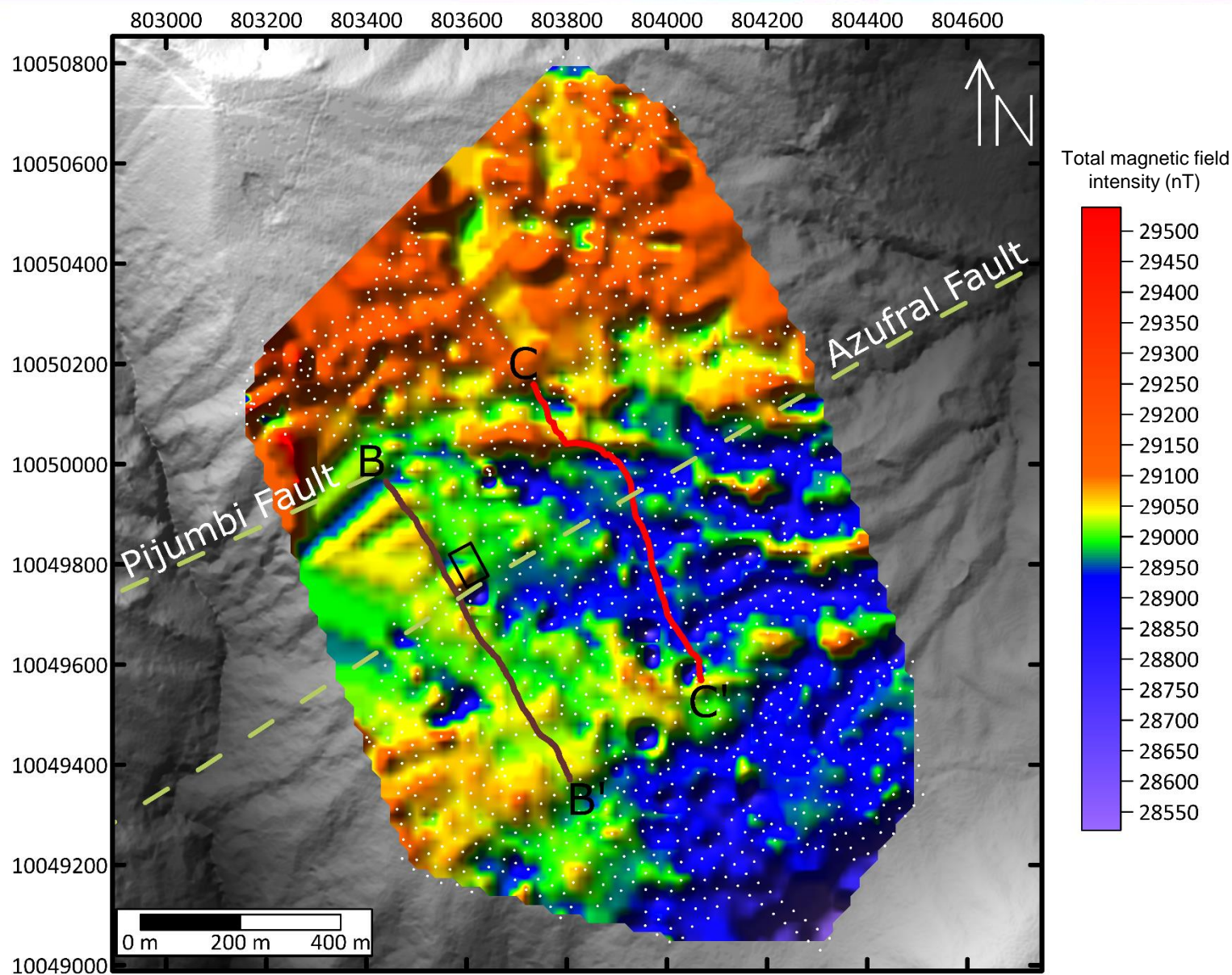
Elevation (m)

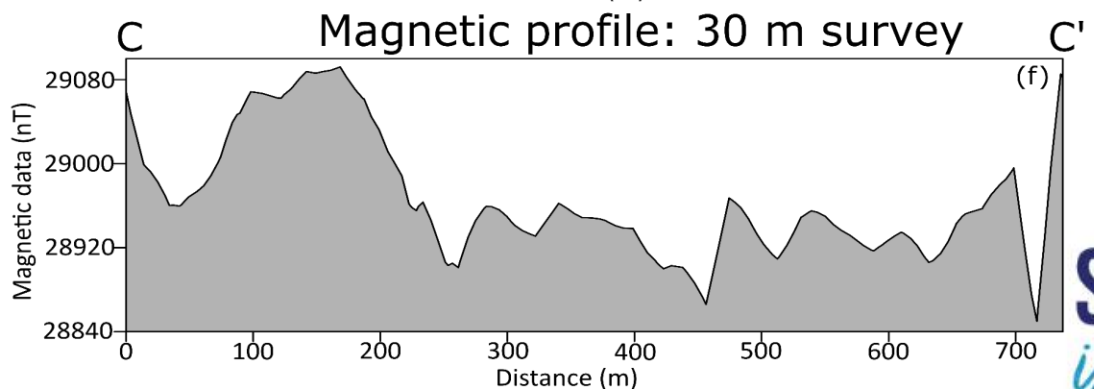
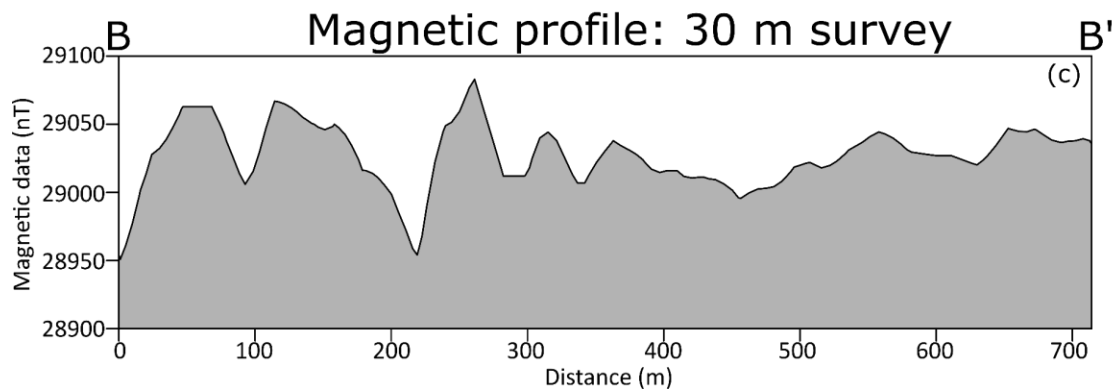
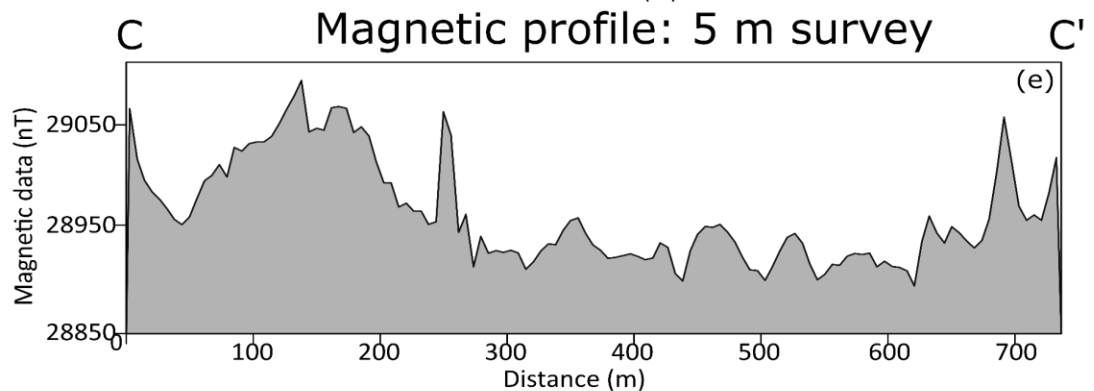
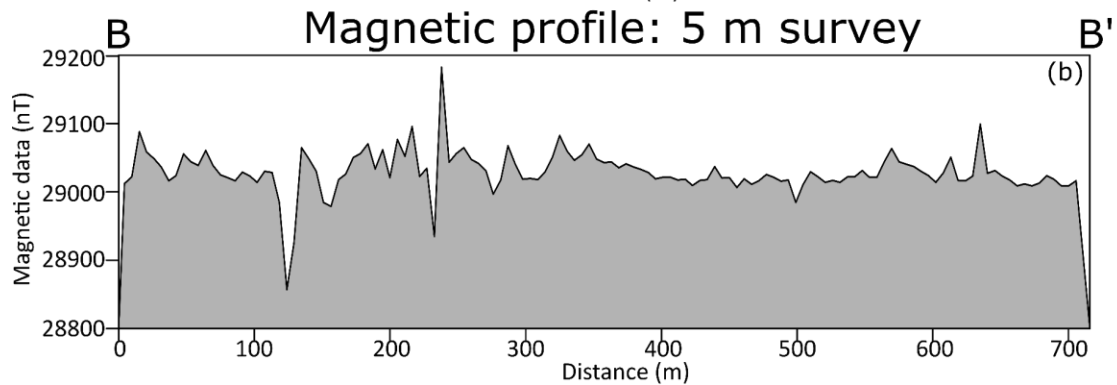
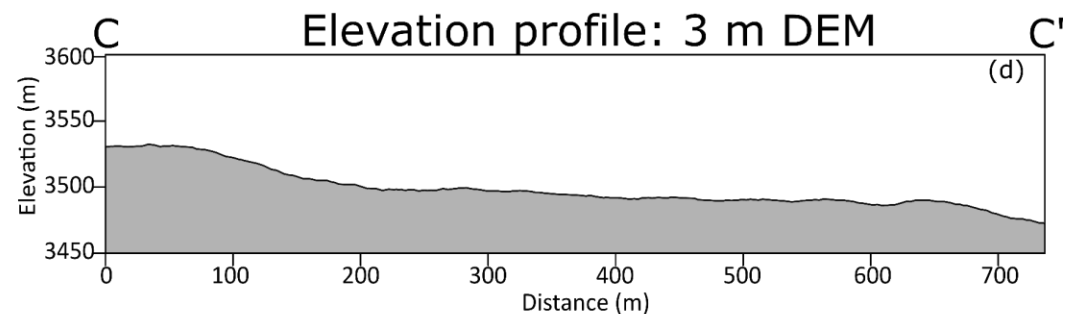
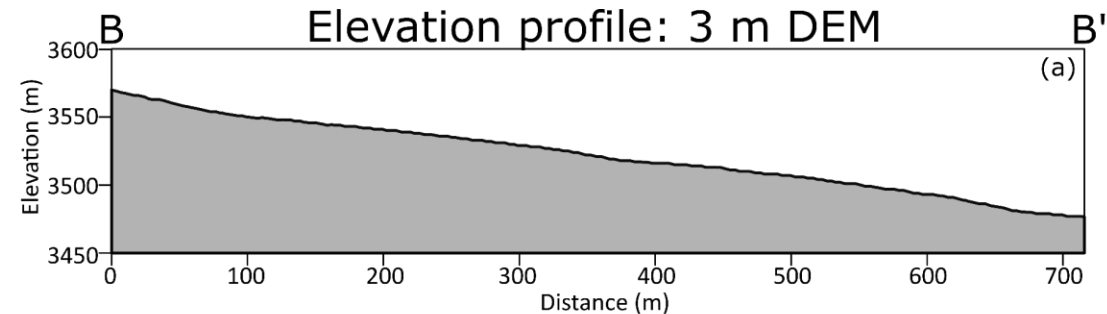


- ~1.3 km width and ~1.8 km length
- ~27 to ~35 m distancing between points.
- In total, 1614 points were measured.
- B-B' and C-C' survey lines, points every 5 m.
- Base station measurement every 1 to 2 hours.



RESULTS

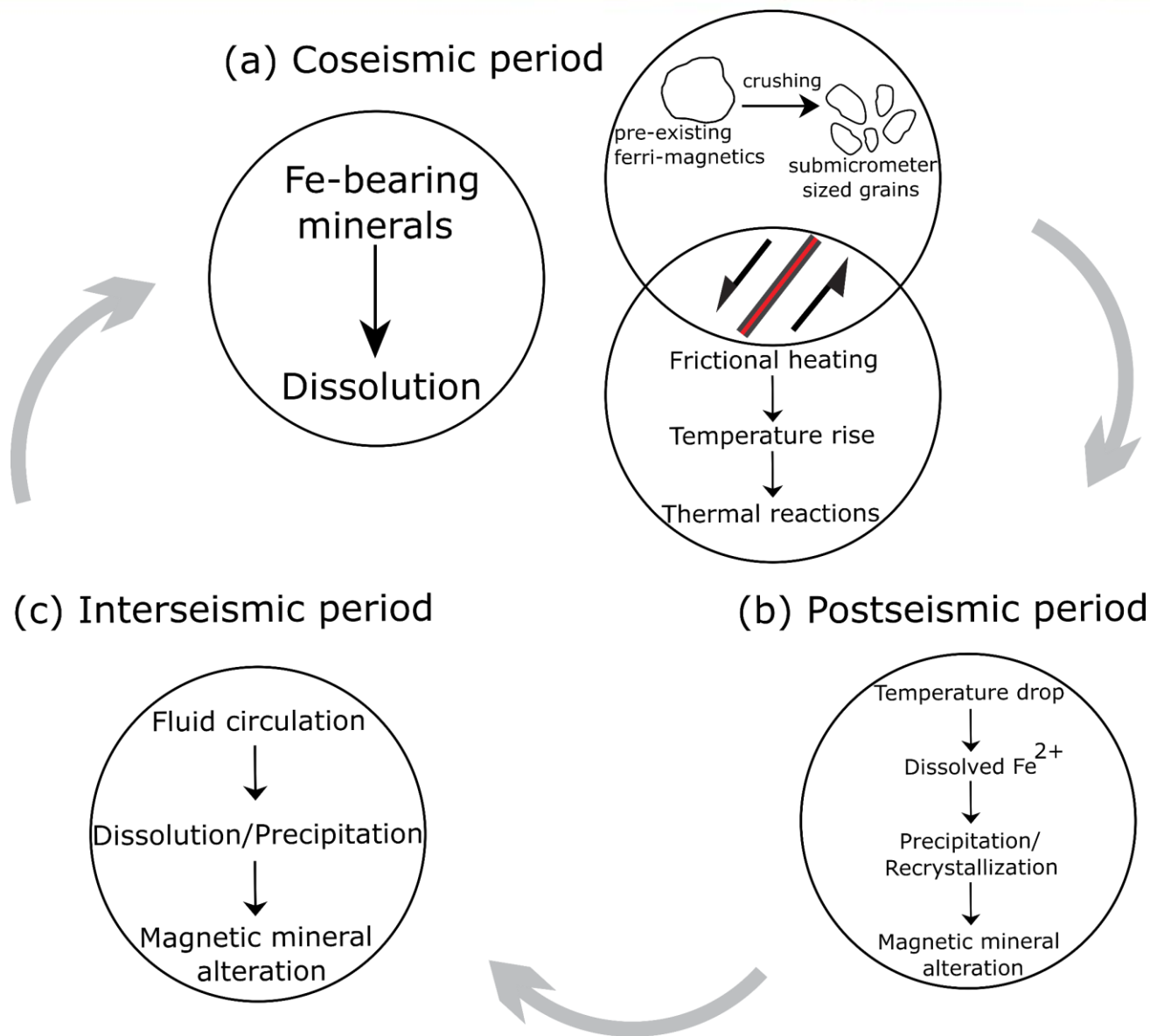






DISCUSSION

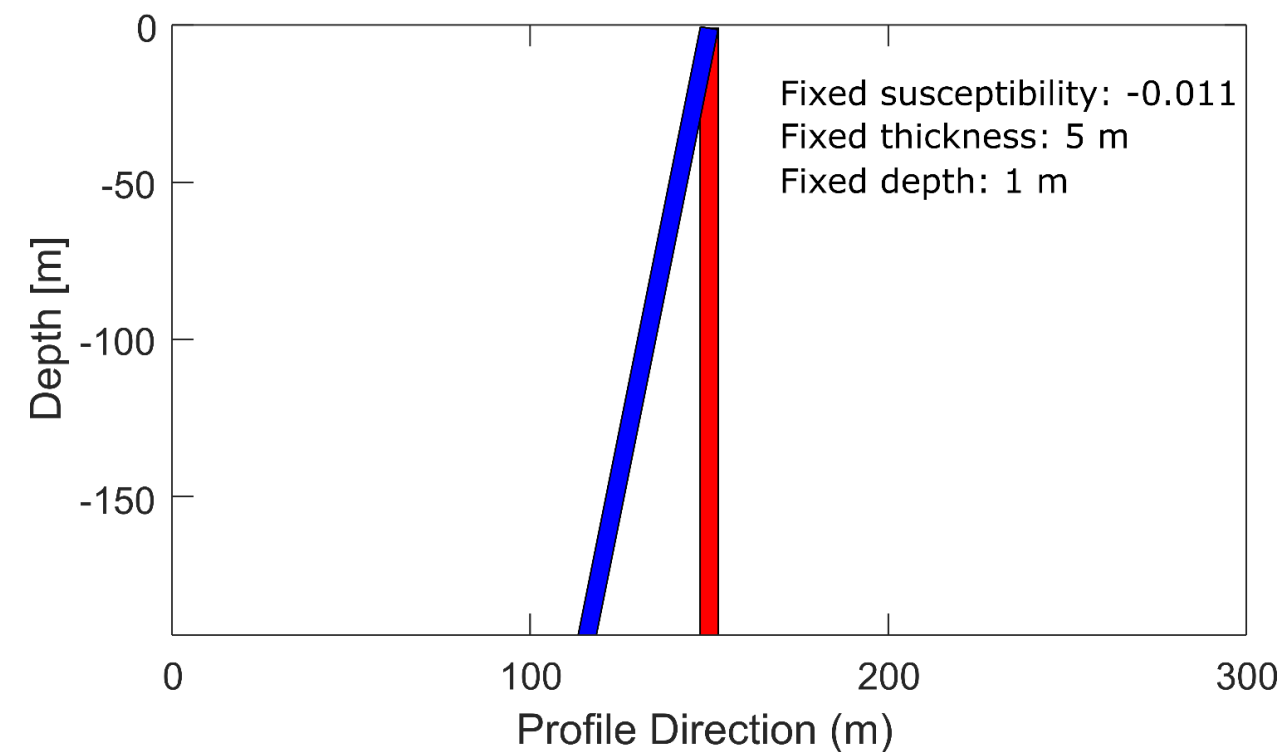
Faulting and hydrothermal alteration effects on magnetization



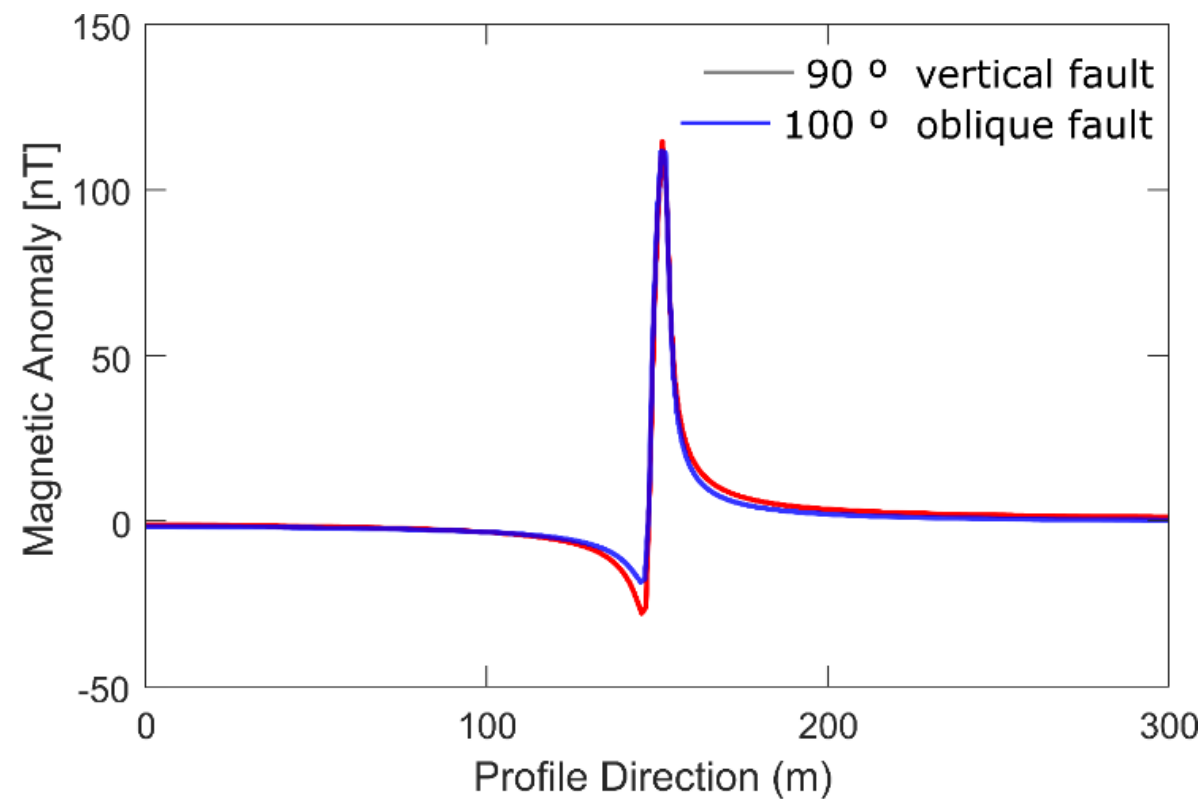


DISCUSSION

Schematic of fault orientation

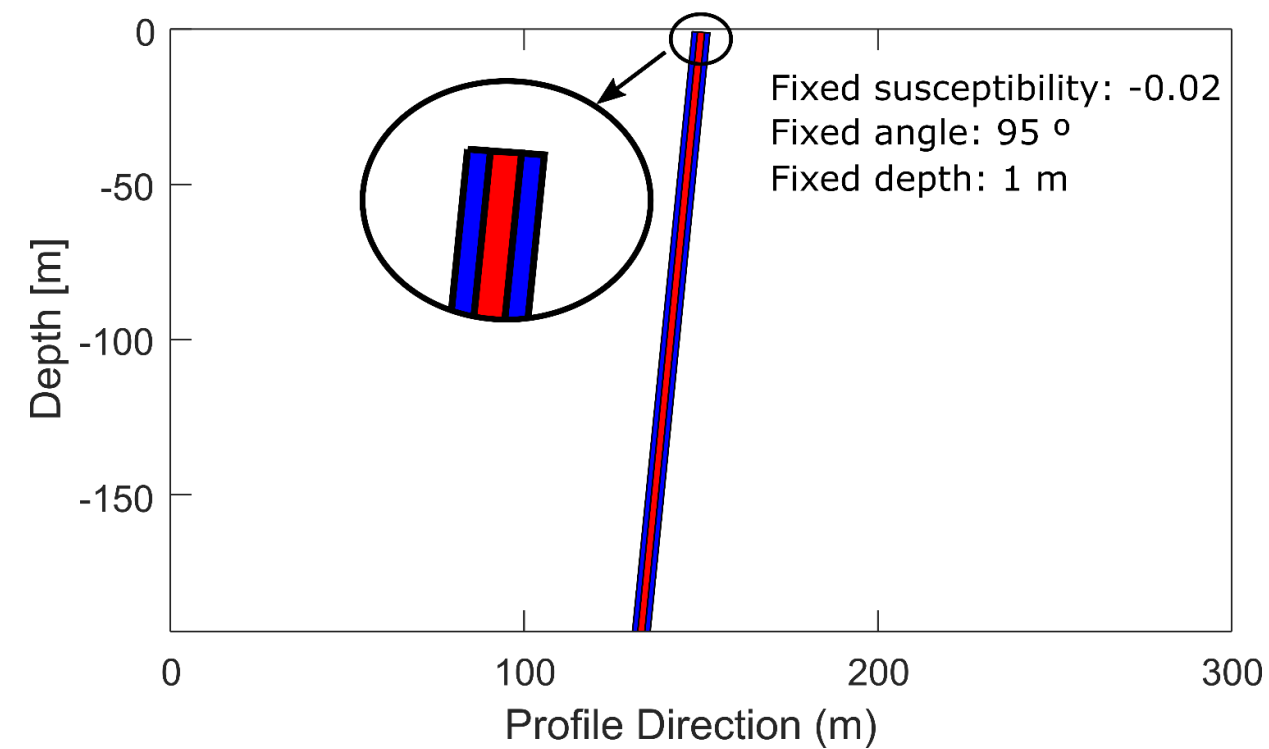


Resulting magnetic anomaly

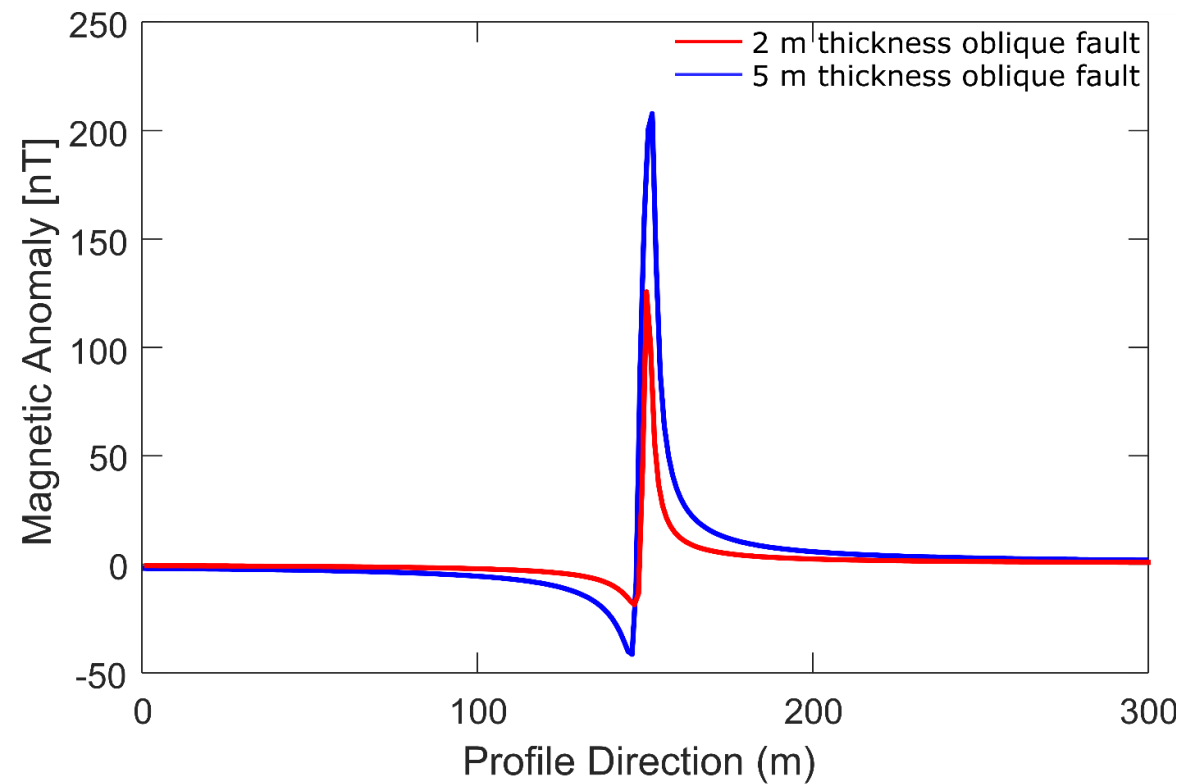




Schematic of fault thickness

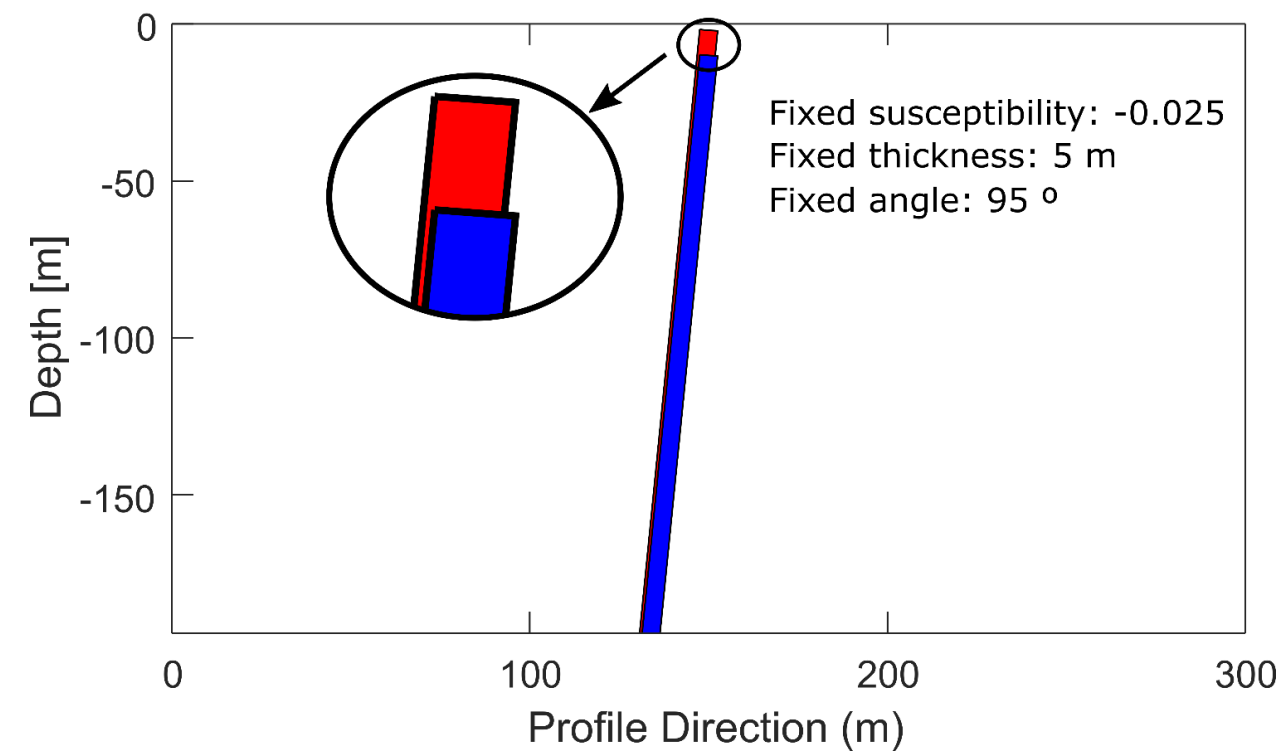


Resulting magnetic anomaly

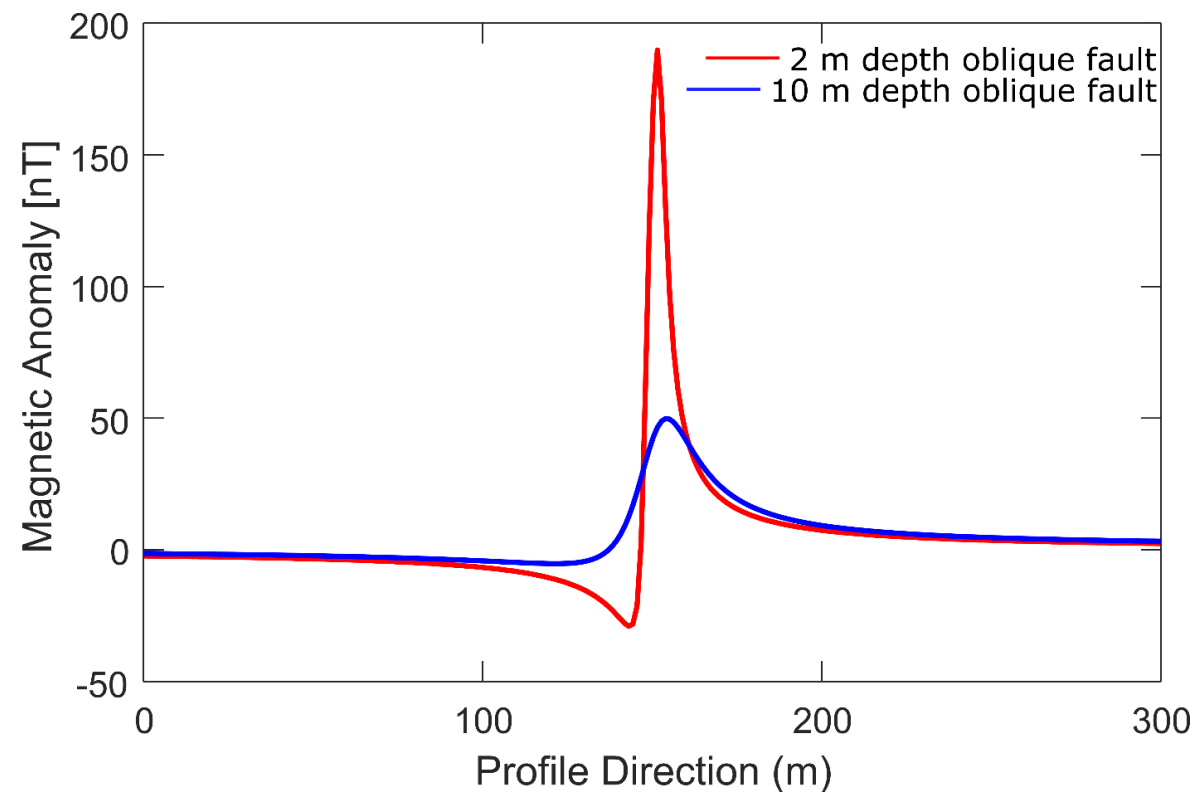




Schematic of fault depth

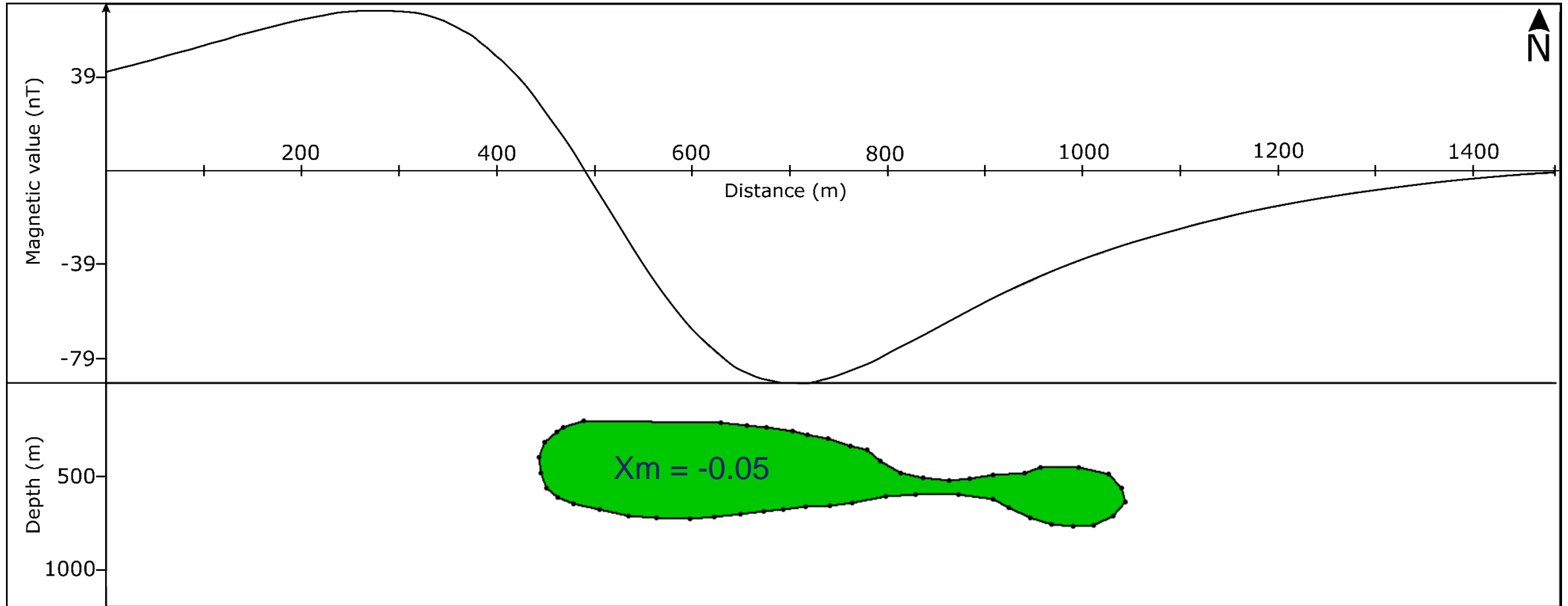


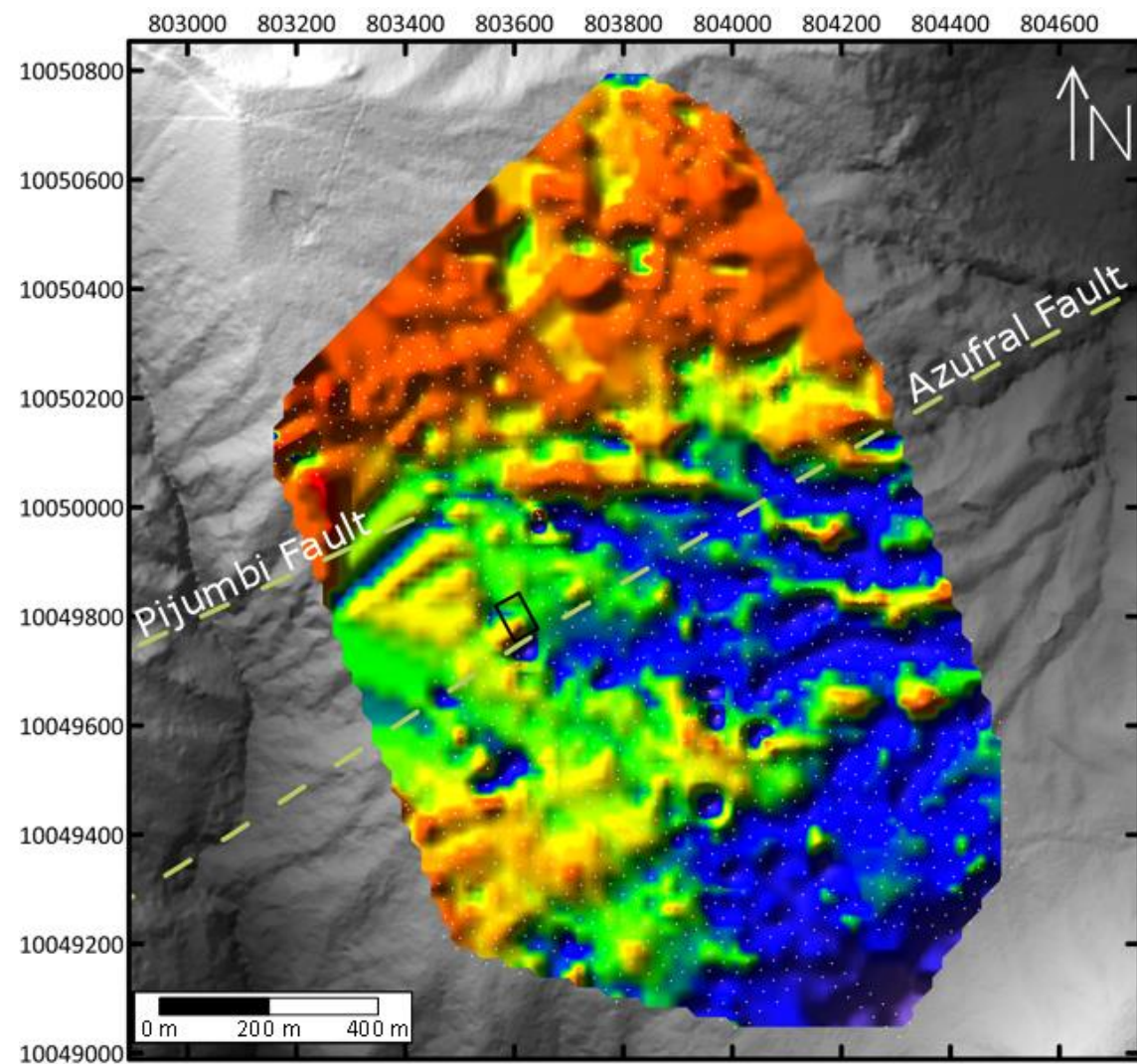
Resulting magnetic anomaly



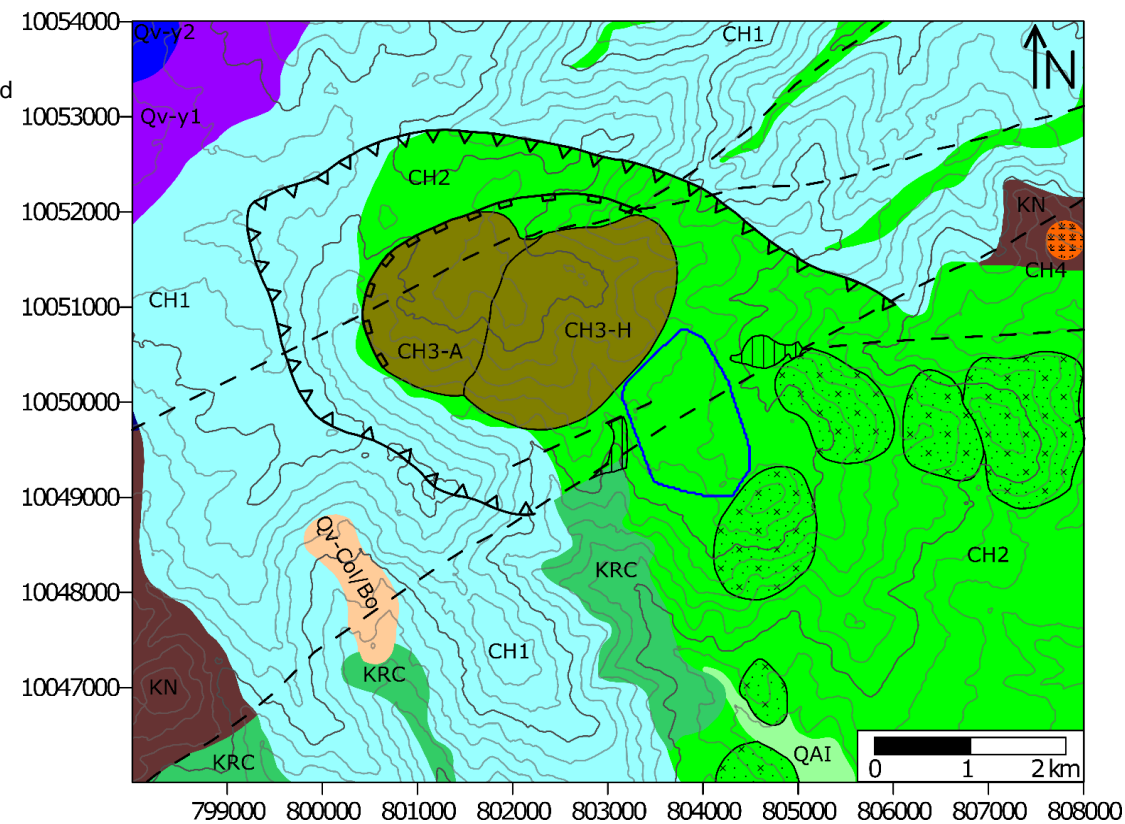
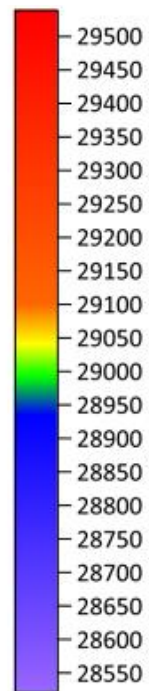


Potential effect of clay cap

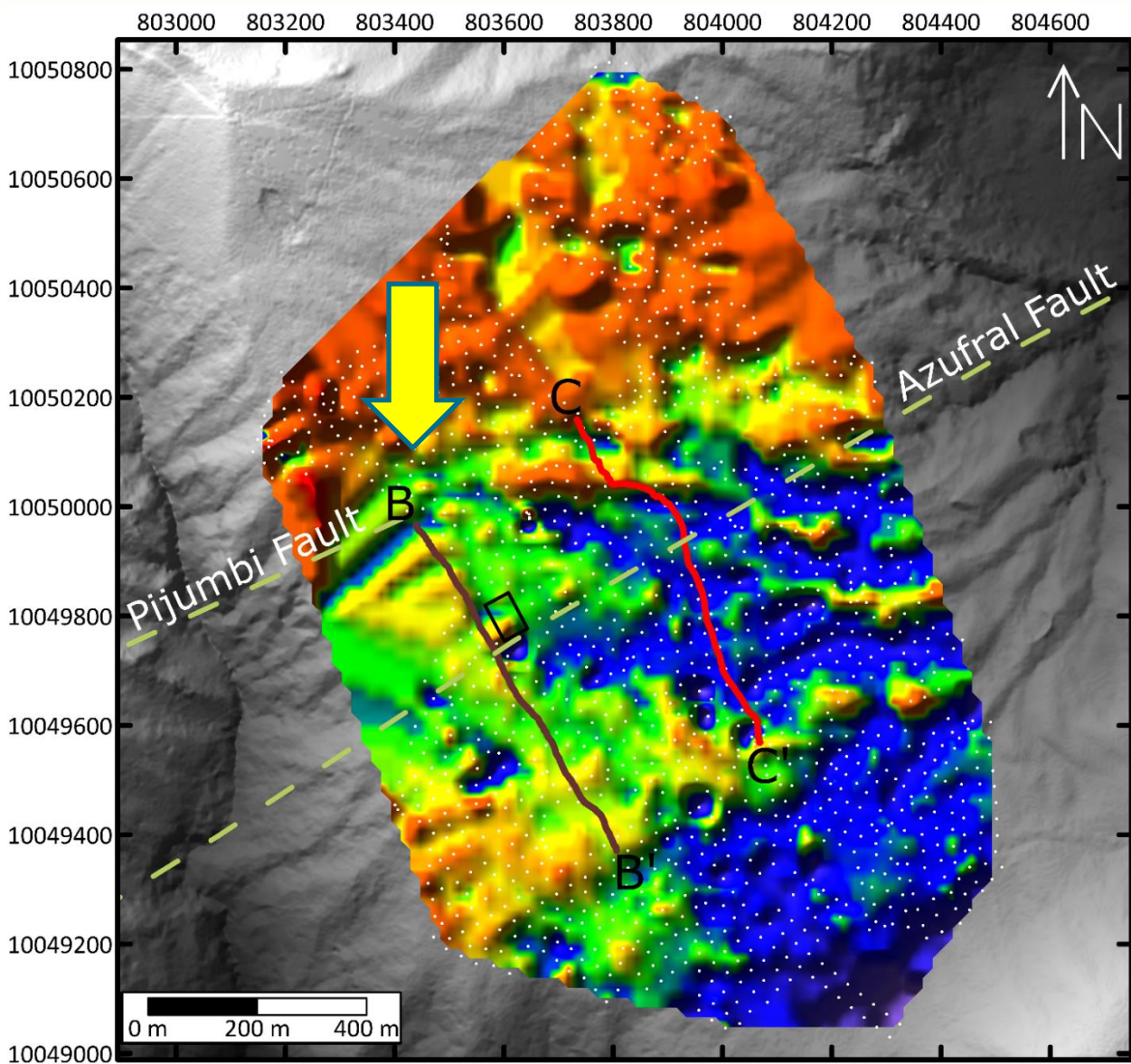




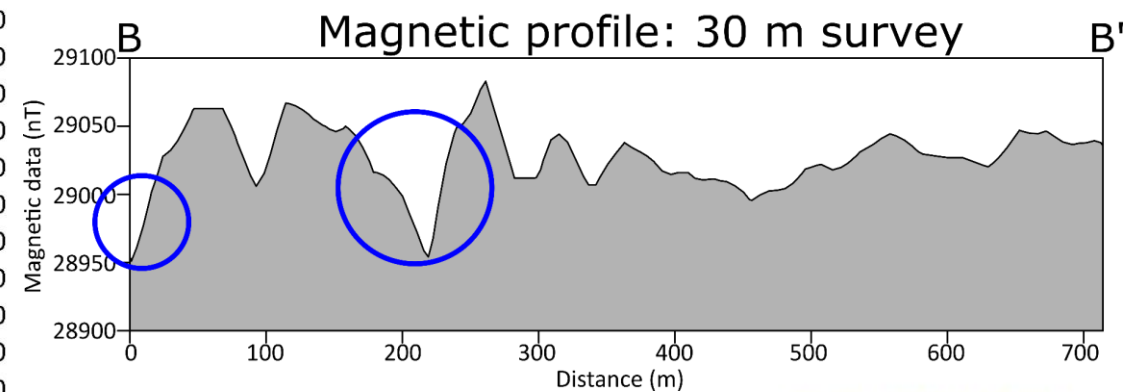
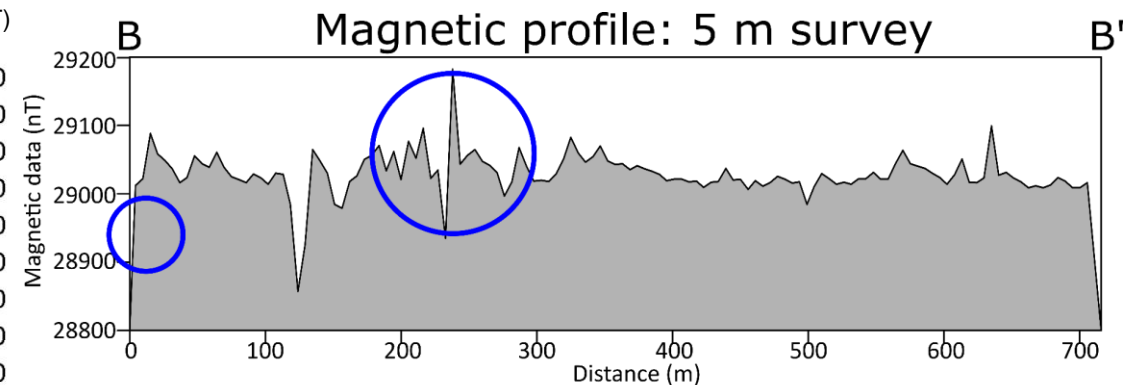
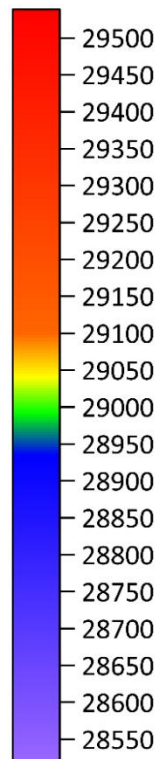
Total magnetic field intensity (nT)

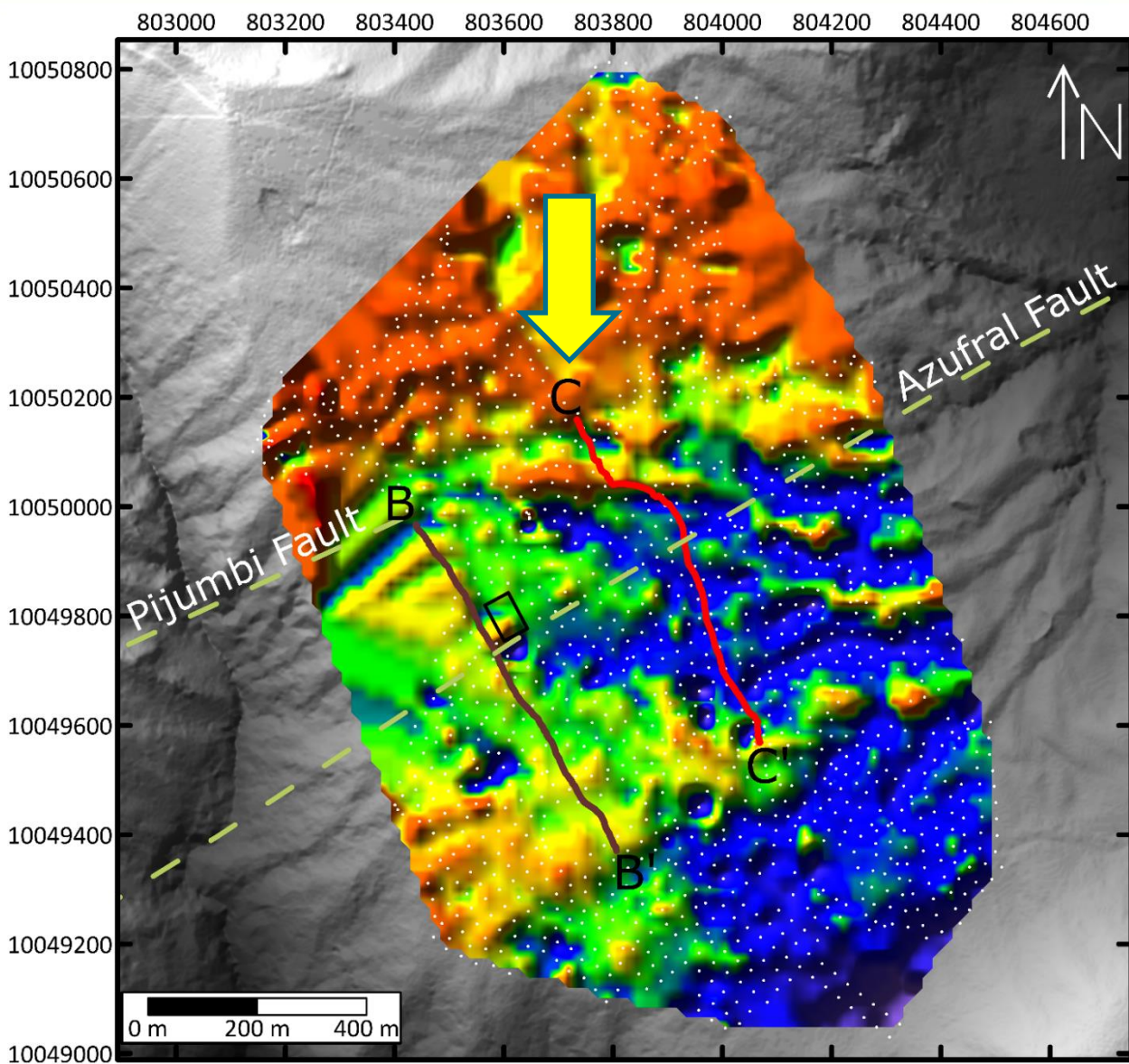


Modified after SYR, (2012)

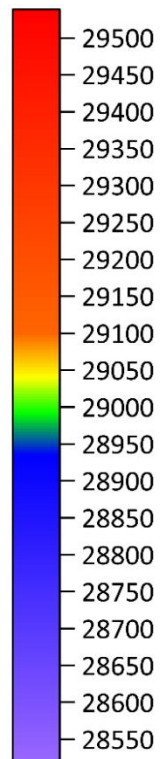


Total magnetic field intensity (nT)

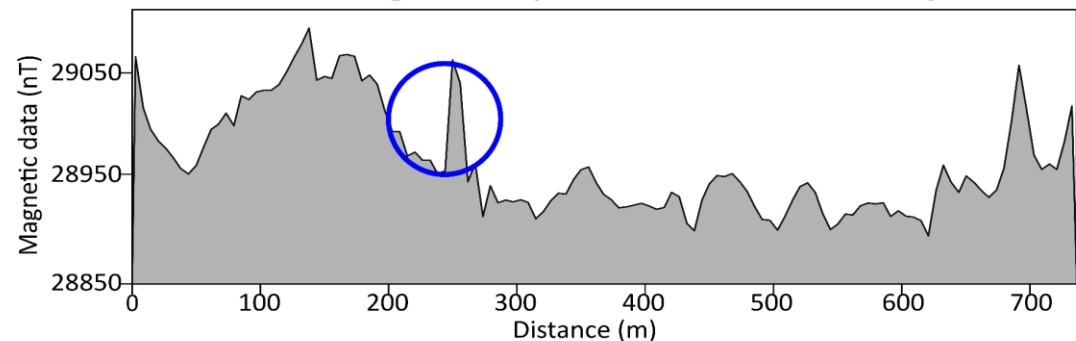




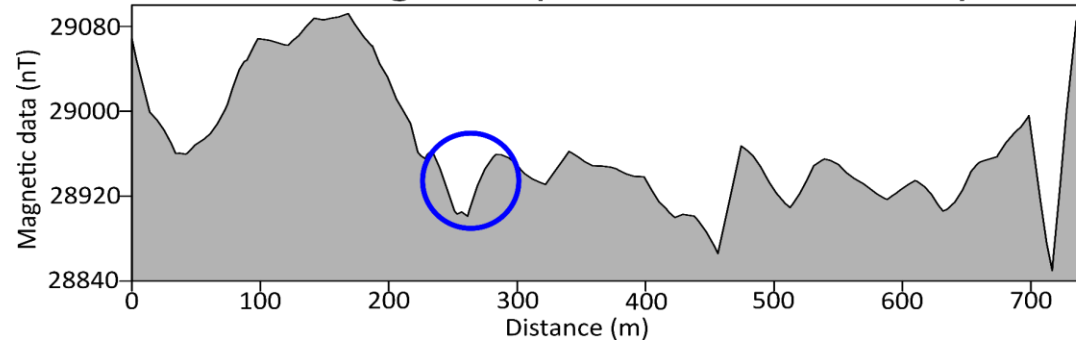
Total magnetic field intensity (nT)

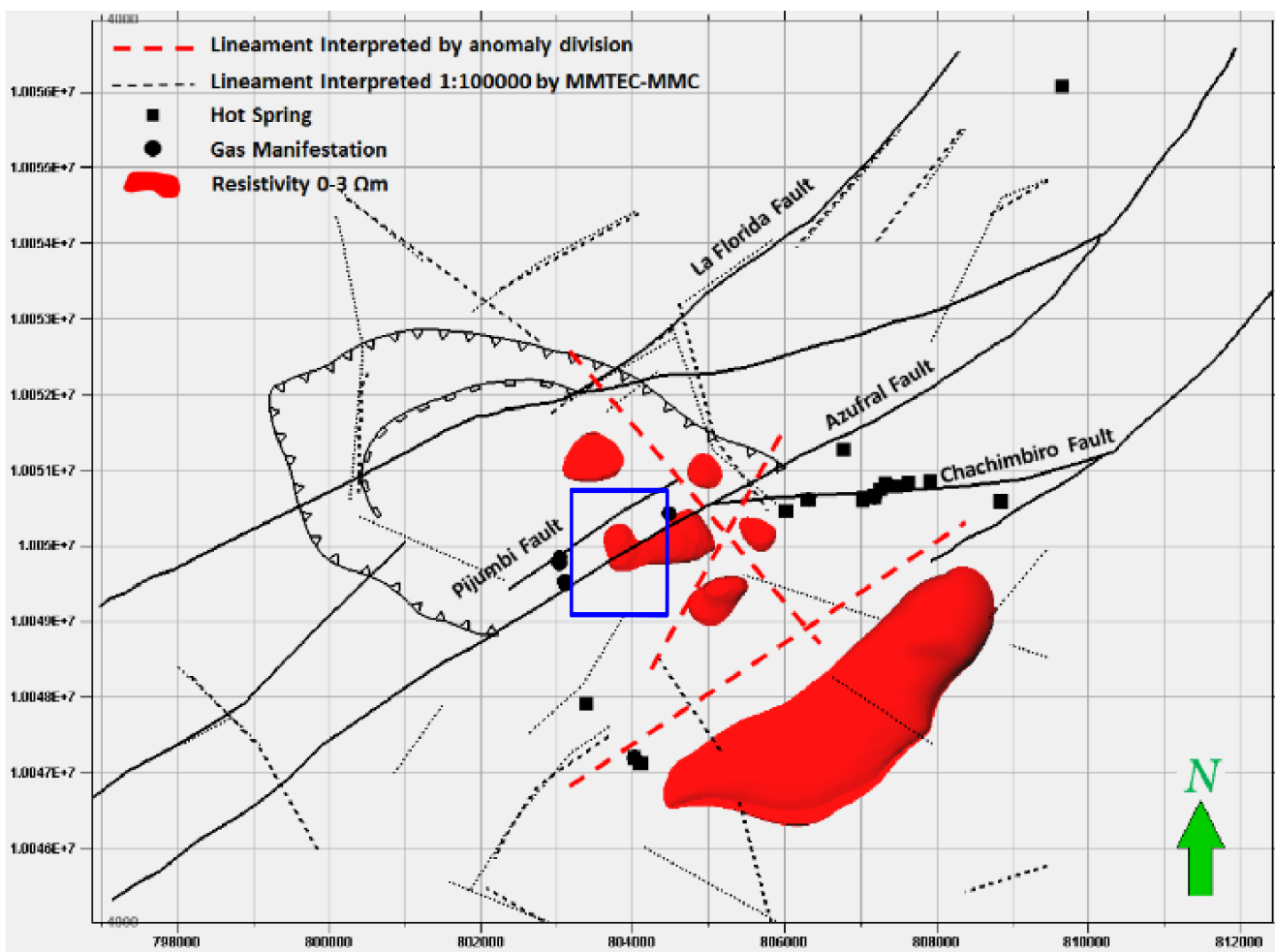


C Magnetic profile: 5 m survey C'

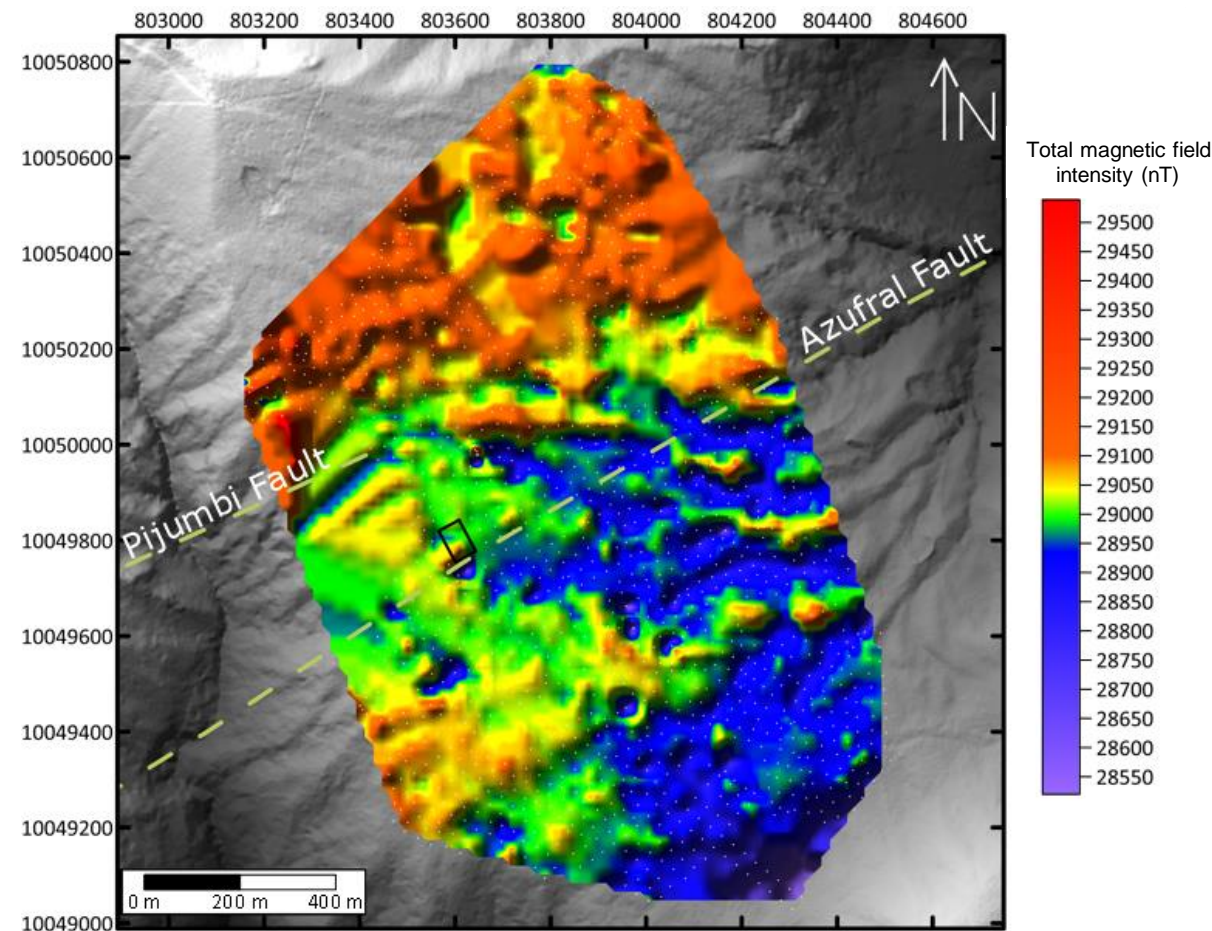


C Magnetic profile: 30 m survey C'





Pilicita, (2016).





CONCLUSIONS

The study shows that the magnetic method is useful in geothermal prospection in Ecuador dominated by andesitic/dacitic rocks.

- Faults where the magnetization surrounding them has been altered to a less magnetic form show up in both high resolution and 30 m grid surveys, suggesting that the fault zone is fairly wide ~5m and close to the surface.
- It is always necessary to compare the magnetic results with topography and geological map in order to be able to interpret the results with higher confidence.
- The large low magnetic anomaly corresponds with the location of the clay cap when compared with the previous model of the geothermal system.

THANK YOU

Questions, suggestions and comments are welcome!

Institutional e-mail: javier.pauta@yachaytech.ec

Personal e-mail: jrpautao@gmail.com

+593 0998963015

AGU FALL
MEETING

SCIENCE
is SOCIETY

