

SeismoScan

Developing machine learning tools to map
active faults in bathymetry data

Team:

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Mentor:

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Clients - NAU School of Earth and Sustainability

- They are Professional Geologists and Seismologists
- They study the impact of faults and how they impact important geological processes
- To study this, faults need to be mapped, which is a challenging process...



Dr. Donna Shillington
Professor of Geology



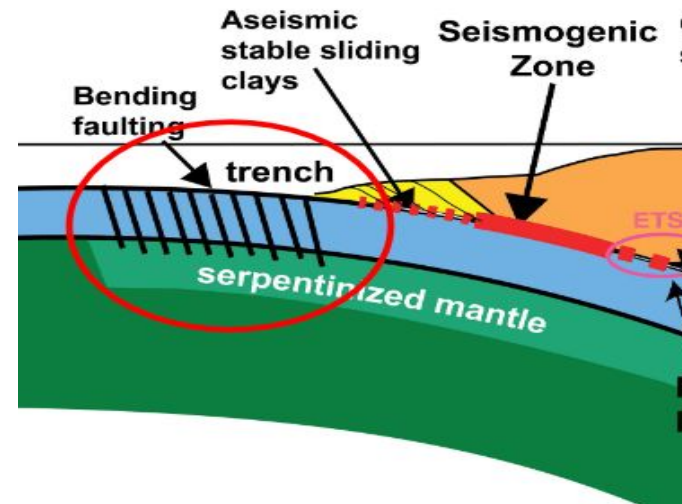
Dr. James Gaherty
Professor of Geology

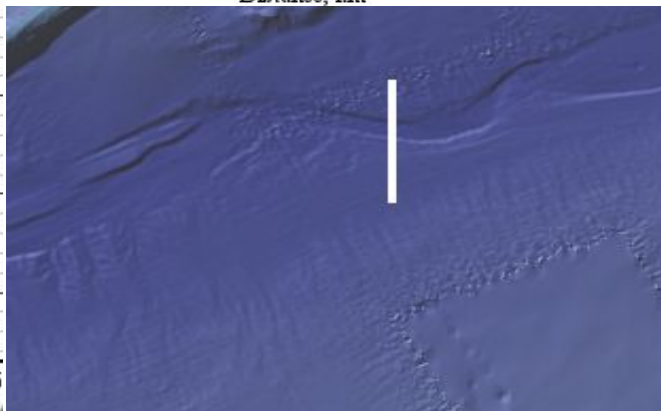
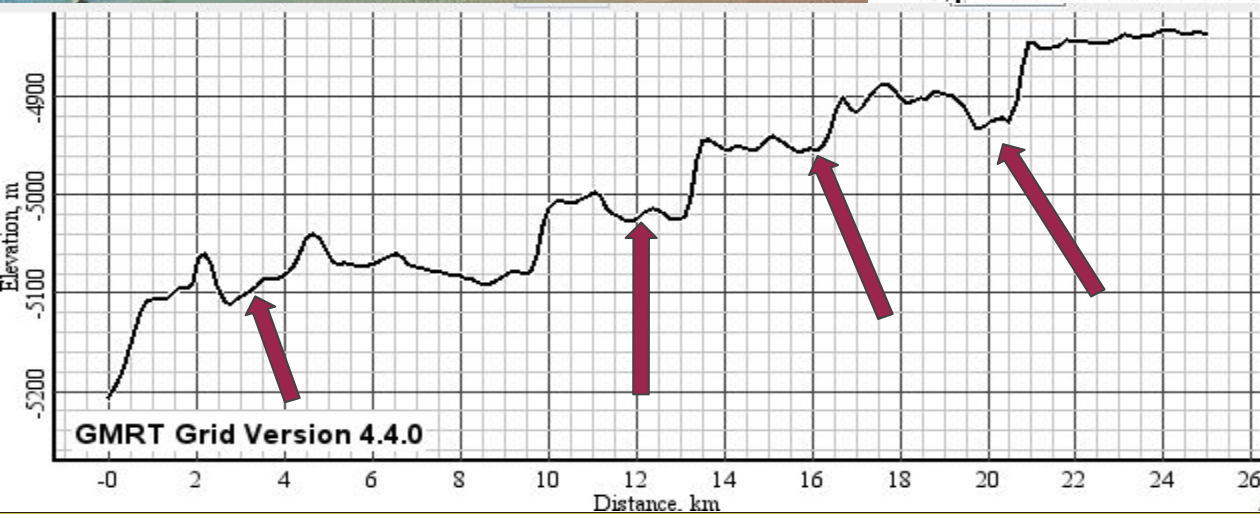
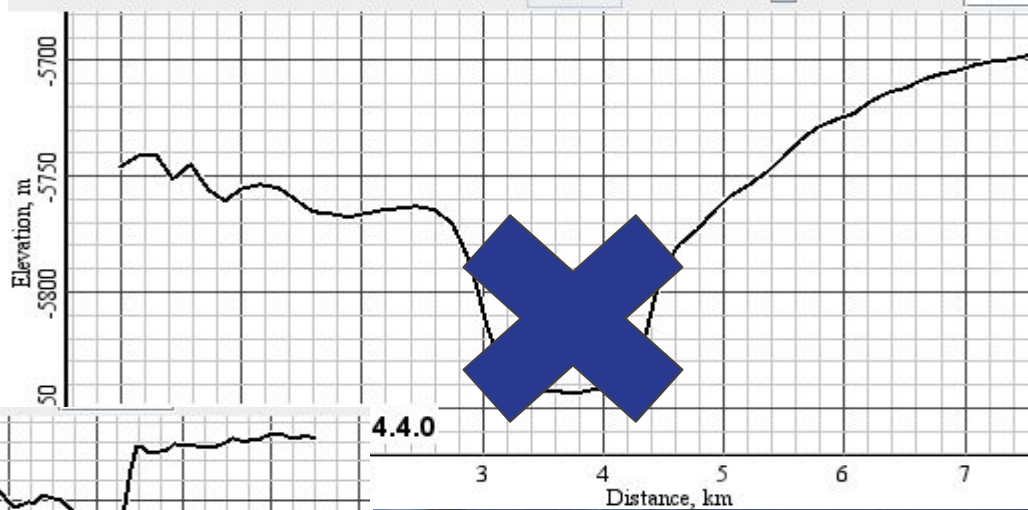
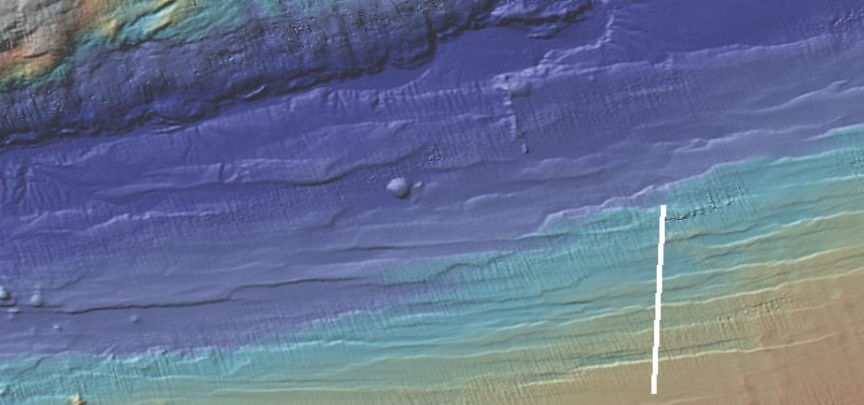


Dr. Christine Regalla
Associate Professor of Geology

The Problem

- Mapping faults is time consuming
 - 80-hours for an area of size 40,000 square kilometers
- Fracture Zones make up ~5 million square kilometers (**2+ years of mapping**)
- This is a big time sink, which limits researchers' ability to study geological activity.
 - Deep Water Cycle, Earthquakes





Our Solution

Our solution, as a team, is to:

1. Build and train a machine learning model to map faults
2. Take in data from GeoMapApp
3. Output as a text file with latitude and longitude data
4. This data can be used by other existing tools to map the faults quickly

Development Plan

In order to deliver this project we will:

1. Research different applicable ML methods
2. Learn data formats from GeoMapApp
3. Work with the Clients to assess different fault identification strategies to train our model on

Conclusion

- We are working with an Fracture Zone off the coast of Alaska, with the hope that this can be scaled through the rest of the world
- This will improve the ability for researchers to investigate important unknown geological processes

References

- Clarke, Jacob, et al. "Controls on Bending-Related Faulting Offshore of the Alaska Peninsula." *Geochemistry, Geophysics, Geosystems*, vol. 25, no. 3, 2024, p. e2023GC011271, <https://doi.org/10.1029/2023GC011271>.
- Condie, Kent C. *Earth as an Evolving Planetary System*. 4th ed., Elsevier, 2021.

Thank You!

Questions?