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2D to 3D high-resolution seismic data conversion: imaging a shallow water metal bearing mine tailings deposit in Portmán Bay, Spain

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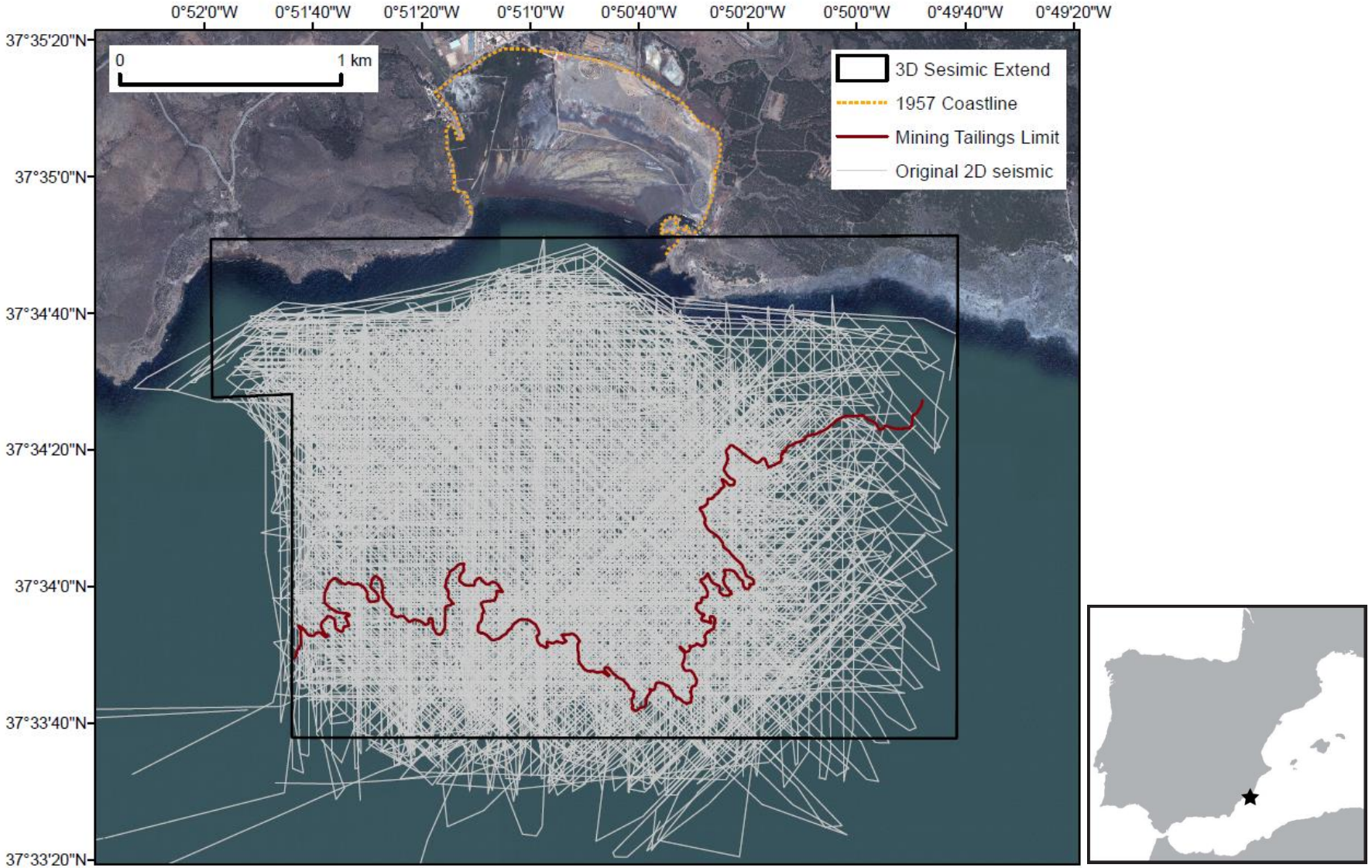
Portmán Bay dataset



Method

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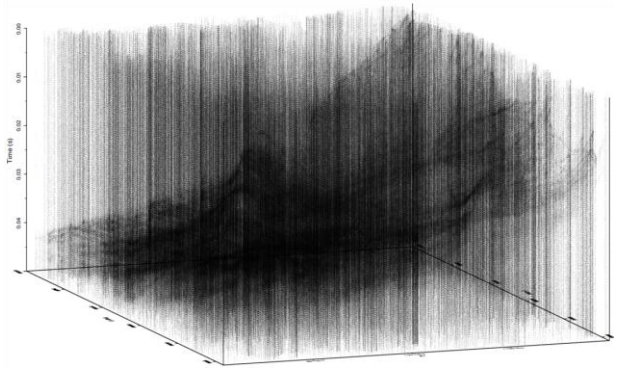
2D dataset preparation

- Define TWT interval of interest
- Clean up 2D seismic data set
- Lower digit count
- Standardize sampling rate

X – Y – Z - A

Trace could



3D Conversion

- Build a regular grid
- Identify near neighbors
- Interpolate

Analysis and discussion

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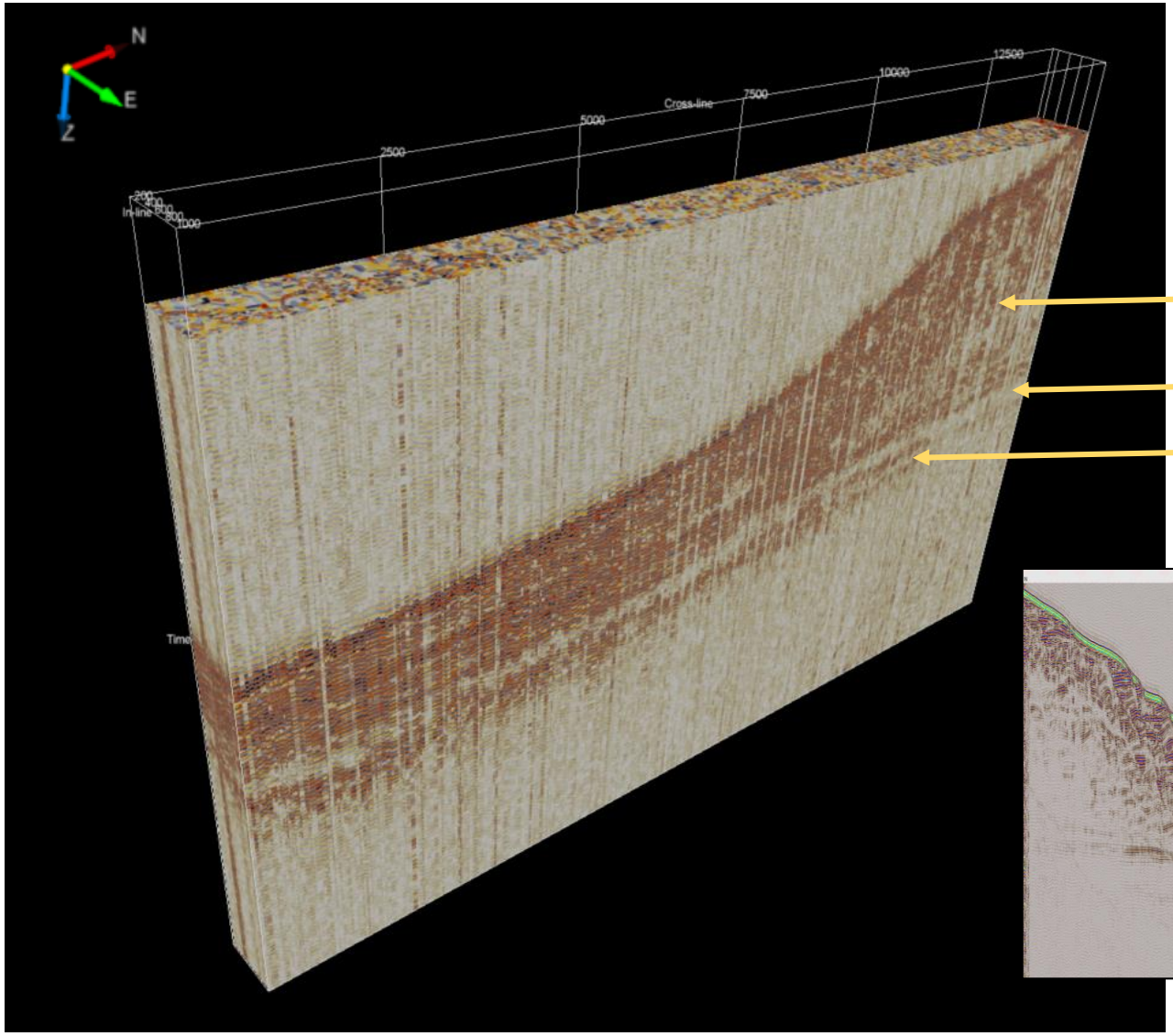
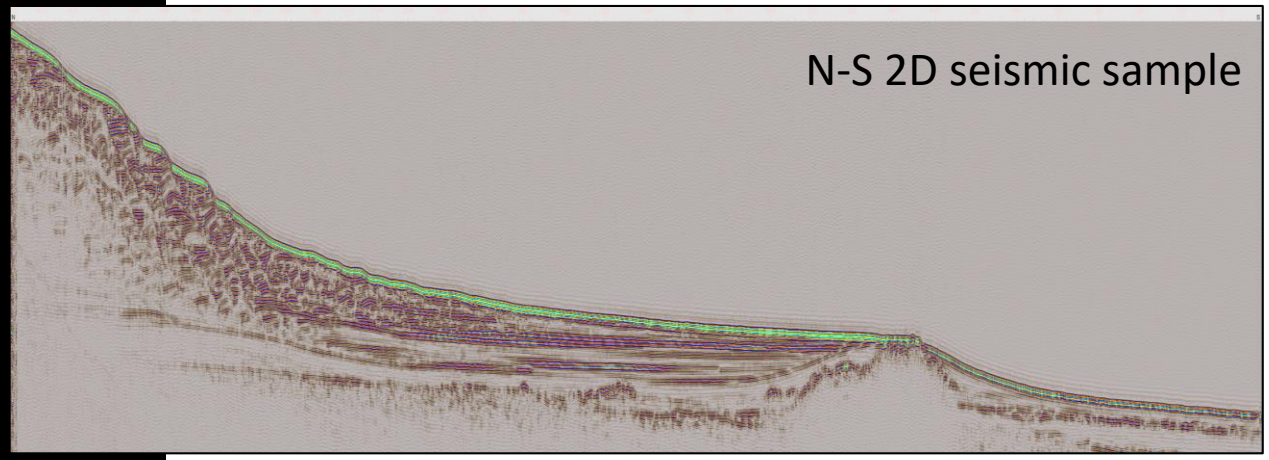


Mine tailings

Pre-tailings marine deposits

Beachrock



Conclusions and recommendations

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- This workflow demonstrates how to **significantly lower the cost of obtaining a 3D seismic cube**.
- The workflow has demonstrated how to achieve **multi-directional visualization** of the mine tailings deposit, as well as **faster characterization** and **more accurate volumetric calculation**.
- Although quality will always be lower than true 3D seismic, in this workflow we have achieved enough **visualization quality** to be able to understand the mine tailings deposit structure in 3D.
- In order to smooth the presented workflow in **future work**, we recommend:
  - Planning a 2D seismic grid as much regular as possible during acquisition.
  - Ensuring standardizing the sampling rate during the 2D seismic grid acquisition.
  - Ensuring no irregular noise interferes seismic acquisition.
  - Applying an advanced 2D seismic clean up before conversion, in order to avoid interpolating noise.
  - Calculating in advance the size of the resulting 3D volume and adequate computational capabilities.