A novel user-friendly Jupyter-based tool for analysing orbital subsurface sounding radar data.

Giacomo Nodjoumi[1], Sebastian Emanuel Lauro[2], and Angelo Pio Rossi[1]

[1]Constructor University Bremen, Bremen, Germany (gnodjoumi@constructor.university),

[2]Dipartimento di Matematica e Fisica, Università degli studi Roma Tre, Rome, Italy.
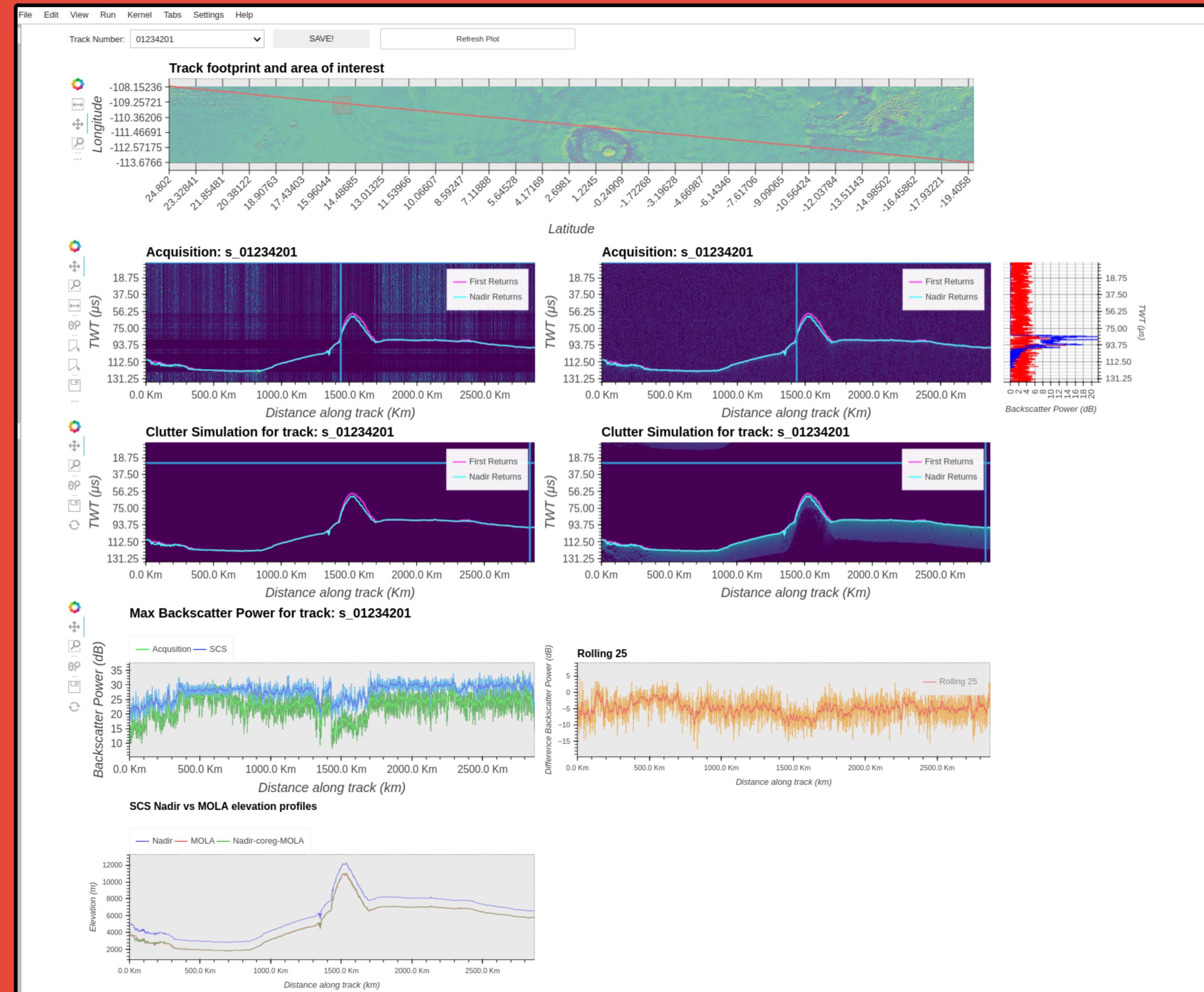
gnodjoumi@constructor.university

Main Features and Capabilities

- Free and Open Source
- Developed in Python 3
- Based on Jupyter Notebooks and standard Python packages
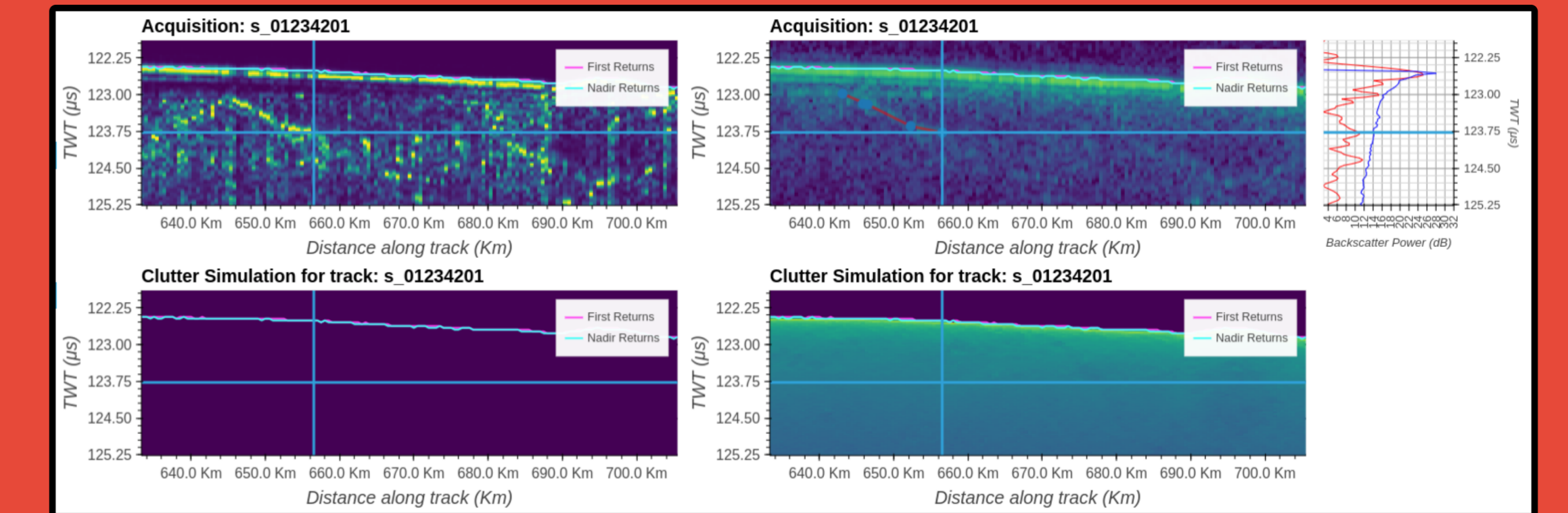- Deployable as standalone docker container or in JupyterHub environments

Capabilities:

- Search and Download Radargrams and relative Surface Clutter Simulations (SCS)
- Synced visualitazion of:
  1) Track footprint, basemap and region of interest
  2) Radargrams and SCS + Enhancements
  3) Radargrams and SCS backscatter power profiles
  4) Elevation Profiles extracted from WCS services
  5) Real-time on-mouse cursor position Radargram and SCS backscatter power profiles slices
- Precise subsurface layer manual trace design with assisted auto-picker
- 3D visualization of subsurface traced layers
- Subsurface layers grouping and characterization (time-depth conversion)
- Generation of 3D mesh
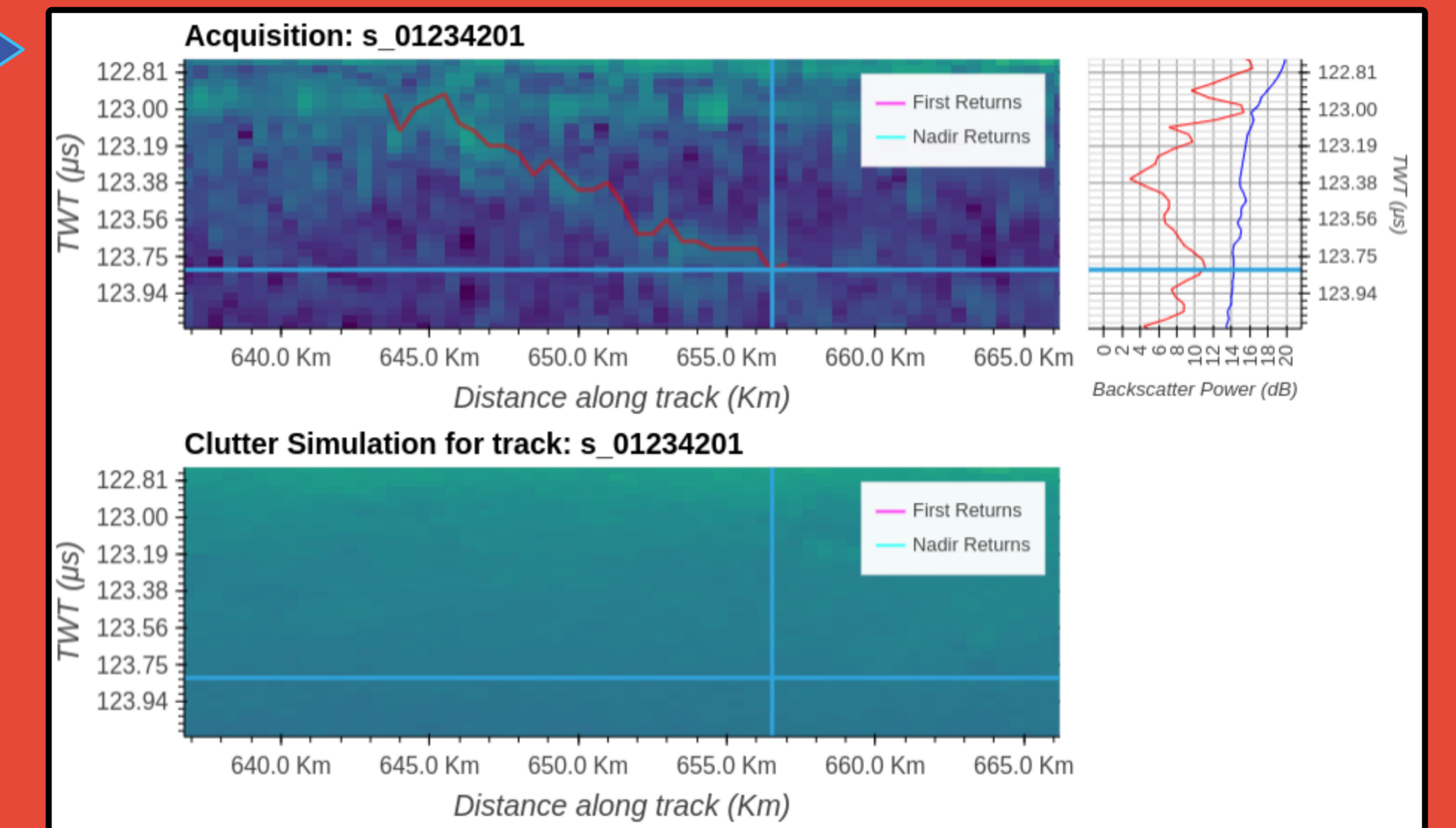- Hierarchical Data Format (HDF) support

Integrated data search and download

Based on ODE-GDS REST interface and Geo-Planetary Tools

Map-based search and downlod of Radargrams ans Surface Clutter simulations (if available)
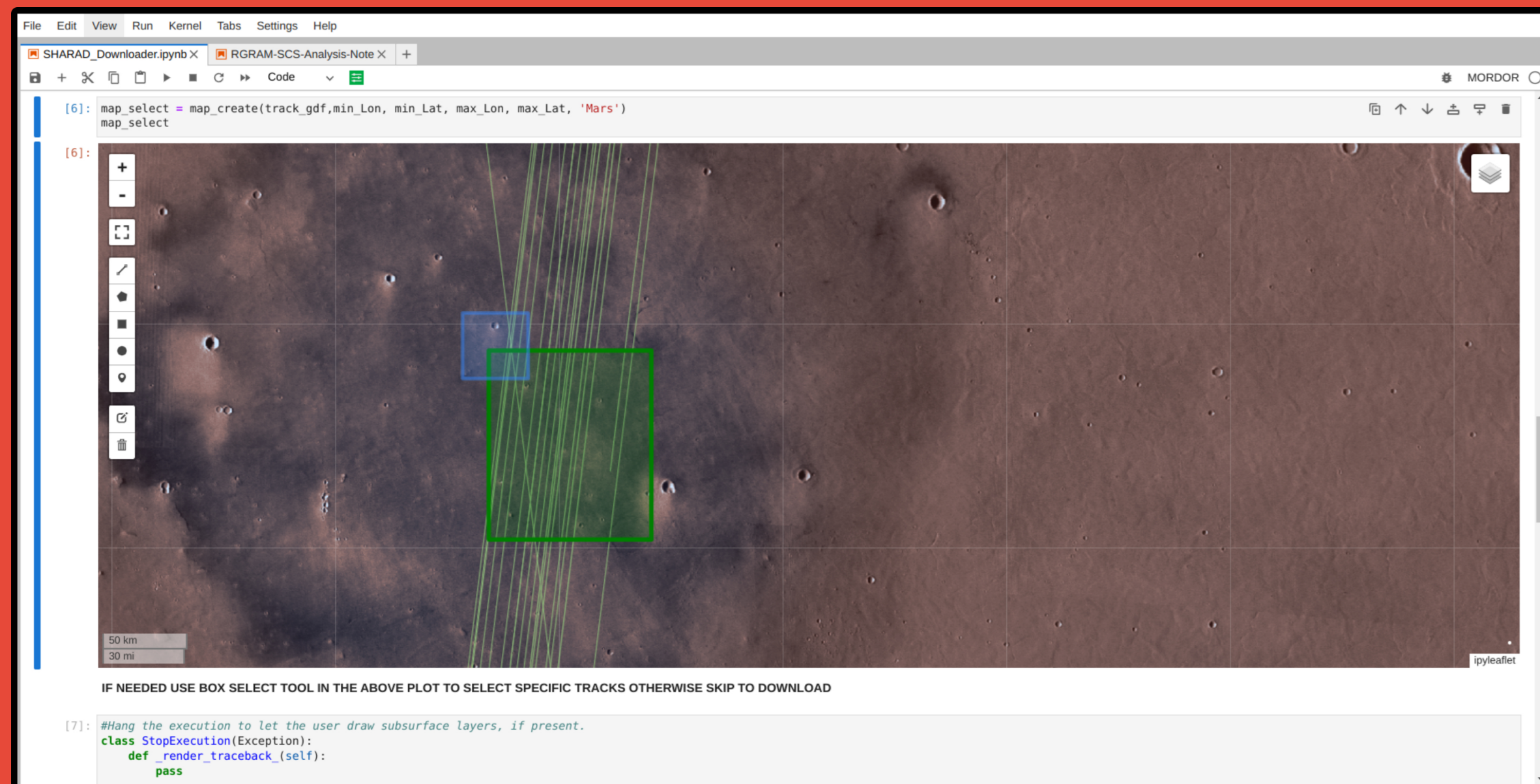
Search&dowload Jupyter notebook usage example for SHARAD USRDRv2 and US SCS.

Conclusions

- Novel user-friendly application
- Integrated data collection and analysis
- Improved spatial correlation of nearby tracks
- Improved analysis reproducibility
- Export of the surface meshes as georeferenced DTMs (GIS compatible)
- Volumetric and morphometric mesh analysis
- In active development

Main Interface - SHARAD USRDRv2/USSCS
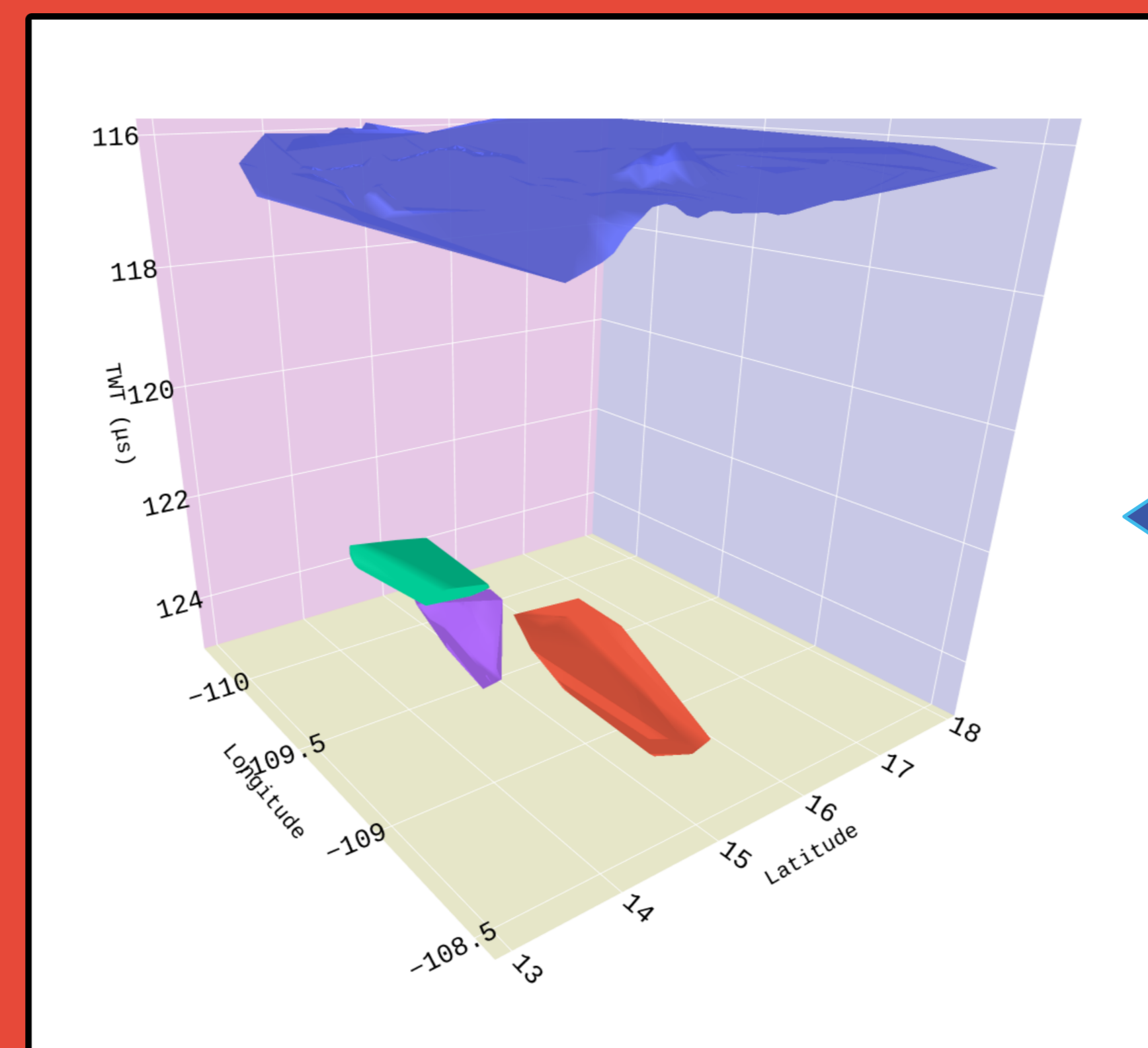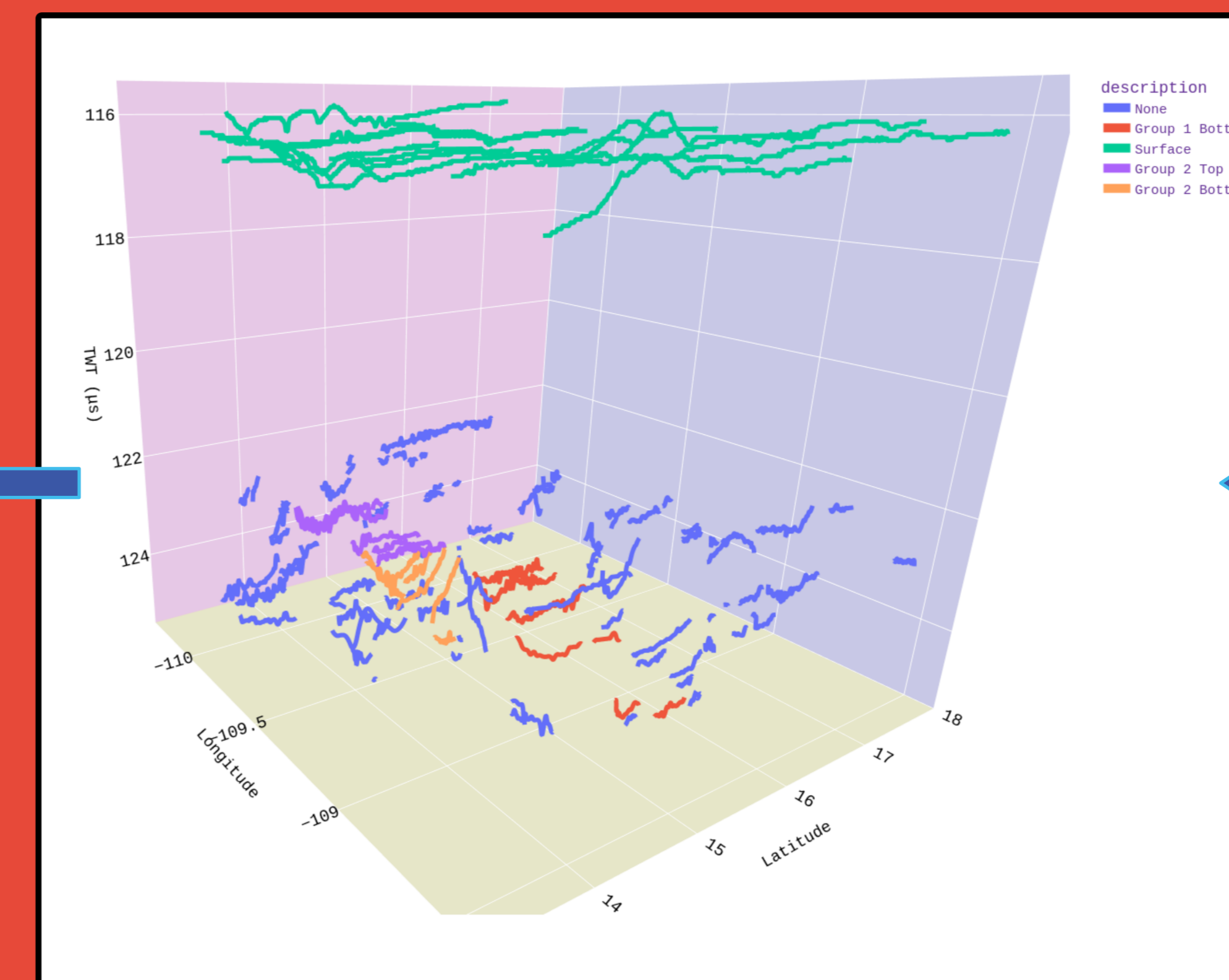

Subsurface layer assisted tracing

Users can draw preliminary subsurface layers using real-time radargram and SCS backscatter power vertical slices, then the auto-picker refine the user trace with high precision.
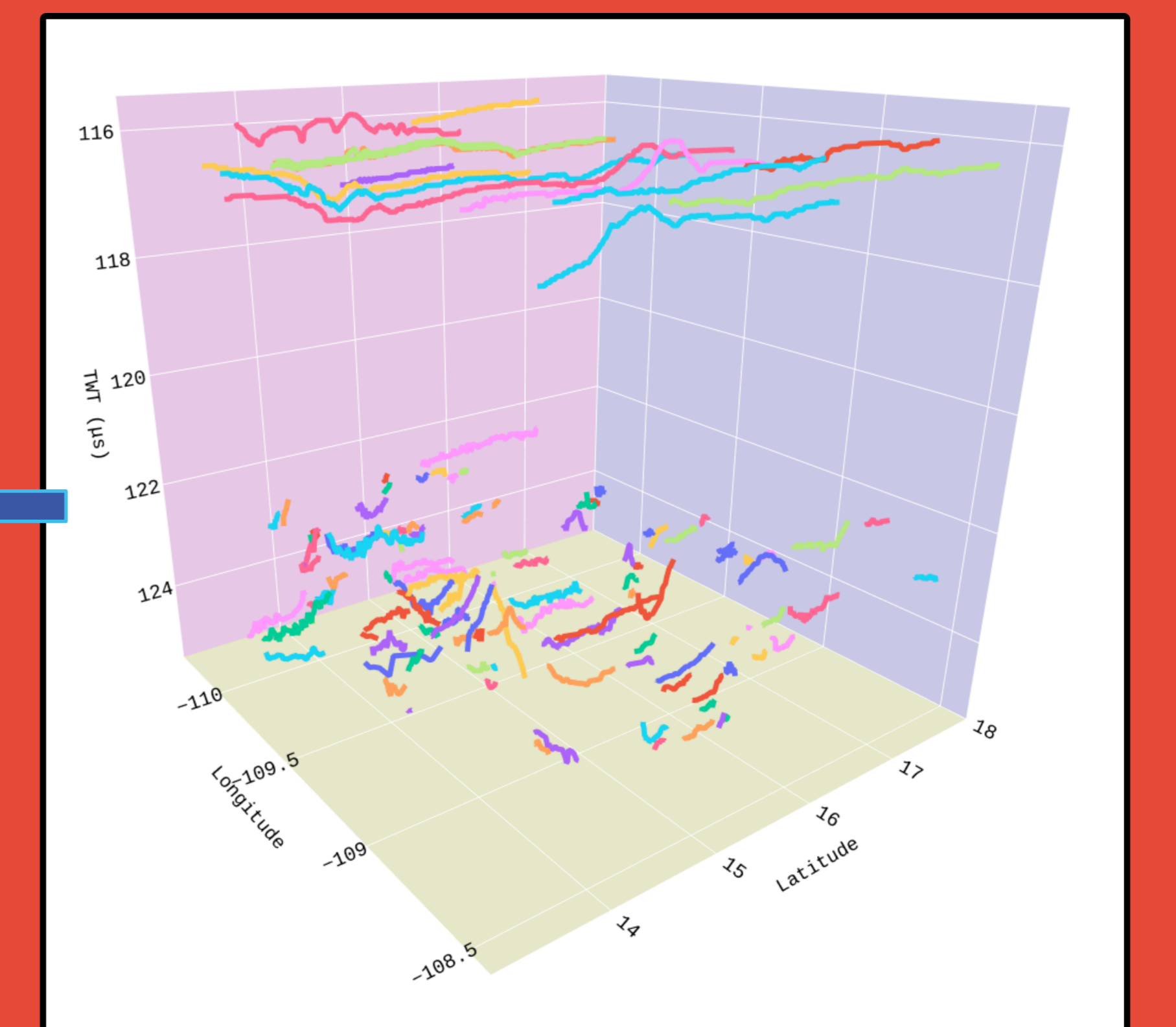

Surface and subsurface trace correlation and analysis in a 3D space

3D Mesh

Surfaces, unclassified and classified subsurfaces

Surfaces and unclassified subsurfaces

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