New Techniques and Opportunities for Visualization of Ocean Mapping Data

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NATIONAL OCEAN EXPLORATION FORUM | 2017

OCEAN EXPLORATION IN A SEA OF DATA

2017 Forum Goals

- *Promote Dialog and Collaboration* by bringing Data Science and Visualization Experts together with Ocean Explorers
- *Inspire* new ideas by showcasing Visualization Techniques

2017 Forum Strategy

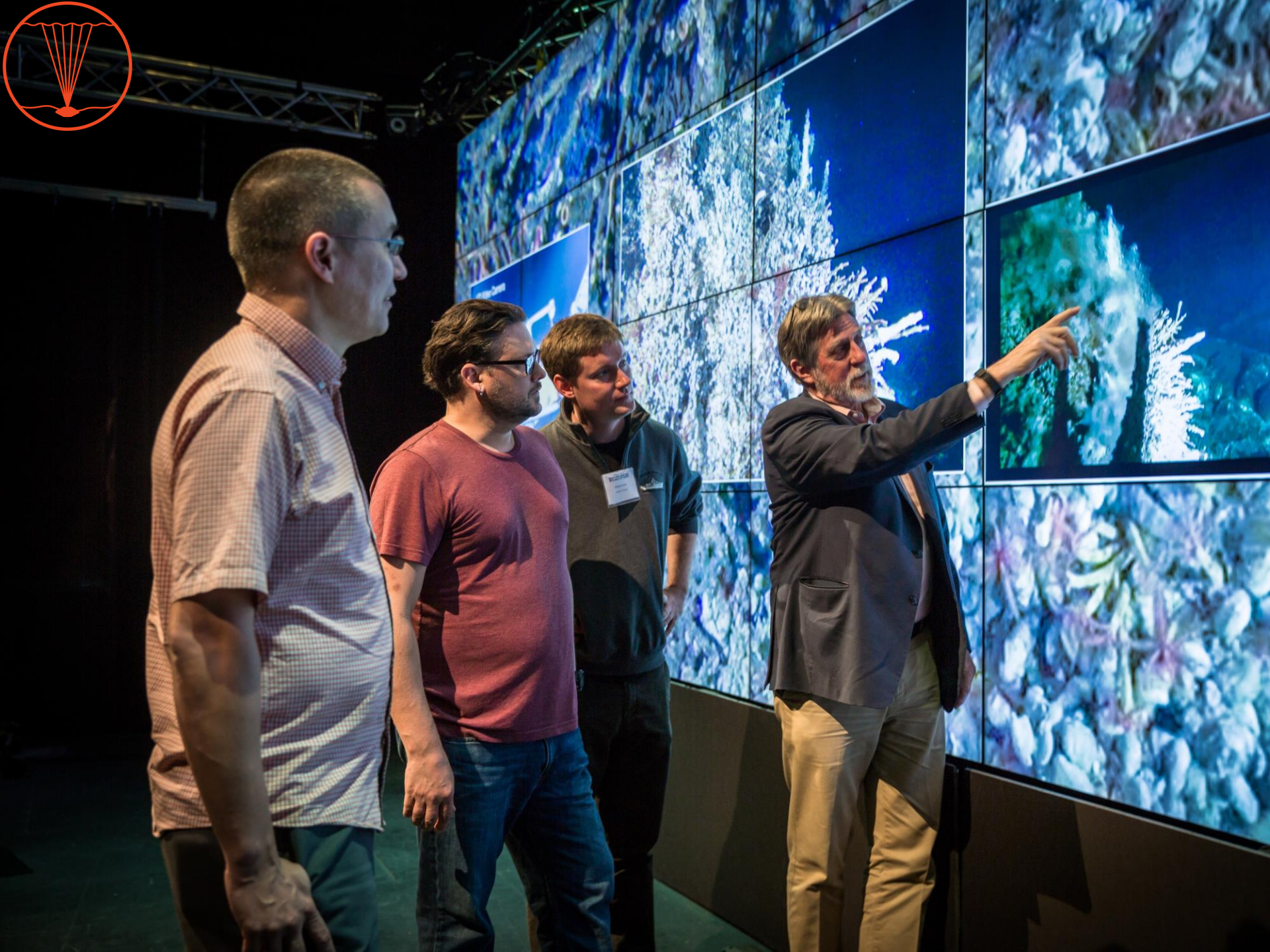
- *Experience* modern and legacy ocean data in new ways
  - What is possible? What can we do with data we currently have?
- *Consider Opportunities*
  - How can these techniques help with science & public engagement?
- *Adapt*
  - How we can best prepare for utilizing these tools? Data acquisition, data processing and management, etc.

Demonstrations

- Large ultra-high resolution displays
- Immersive Virtual Reality
  - Cave
  - Headset
- Acoustic Spatialization

Demonstrations

- Ocean Mapping Data
- Airborne Geophysical Data
- Photogrammetry of Coral Reefs
- Ocean Observation data live-streamed from the seafloor
- Acoustic representation of data (tsunami, marine mammals)




Media Commons
Add Standard Media
Add Pano Image(s)
Remove All From Dock
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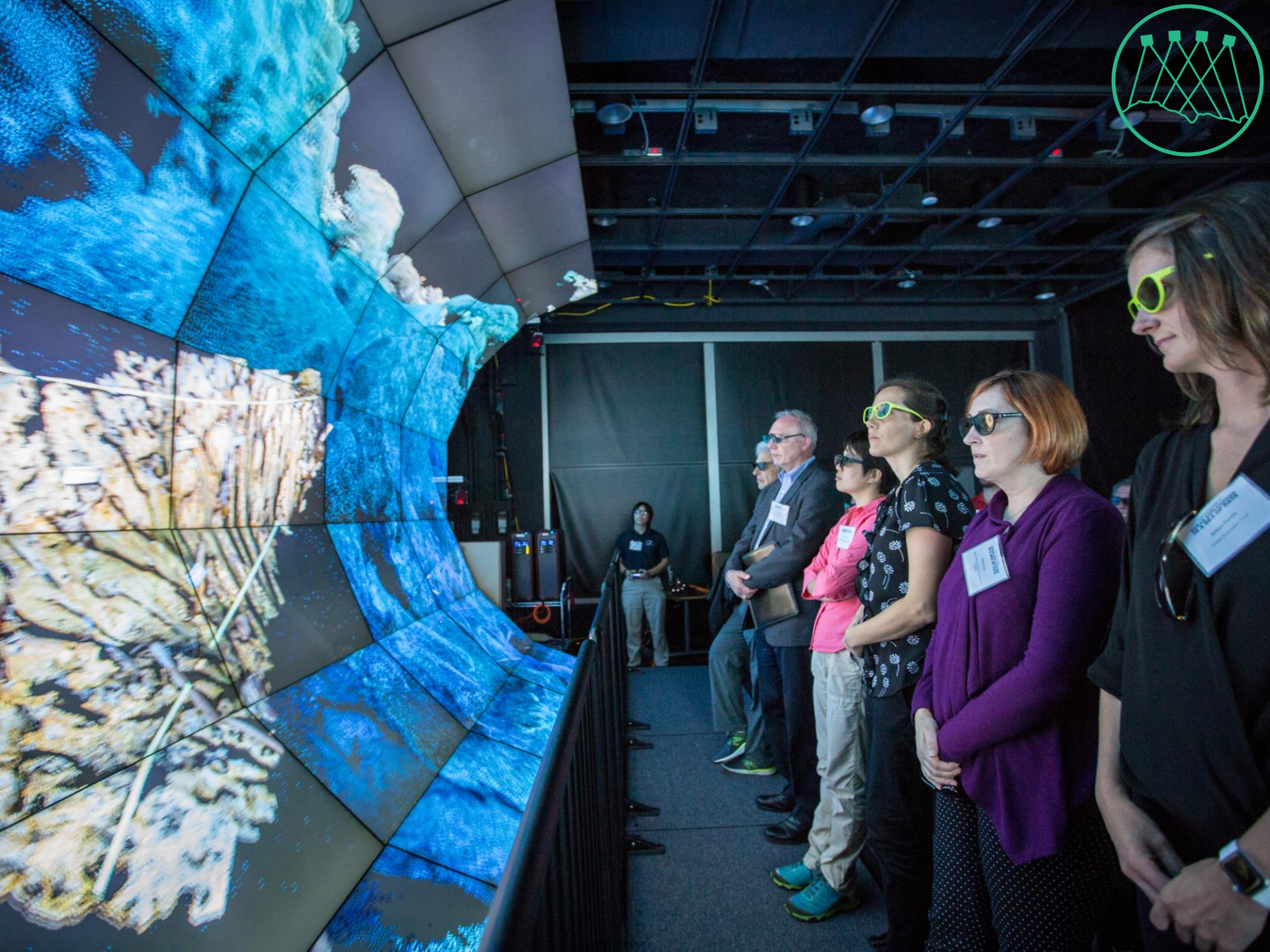
Remotely Operated Vehicle
Acoustic Node
Universal Manipulator
Autonomous Exploration Swarm
Autonomous Underwater Vehicle
Lights
Ecogenomic Sensor
Imaging Sonar
Lights
Vent Microscope
Acoustic Node
Mobile Exploration Robots
AUV Docking Station
Junction Box
Acoustic Node
High Definition Camera
High Bandwidth Cable

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snap'n'grab
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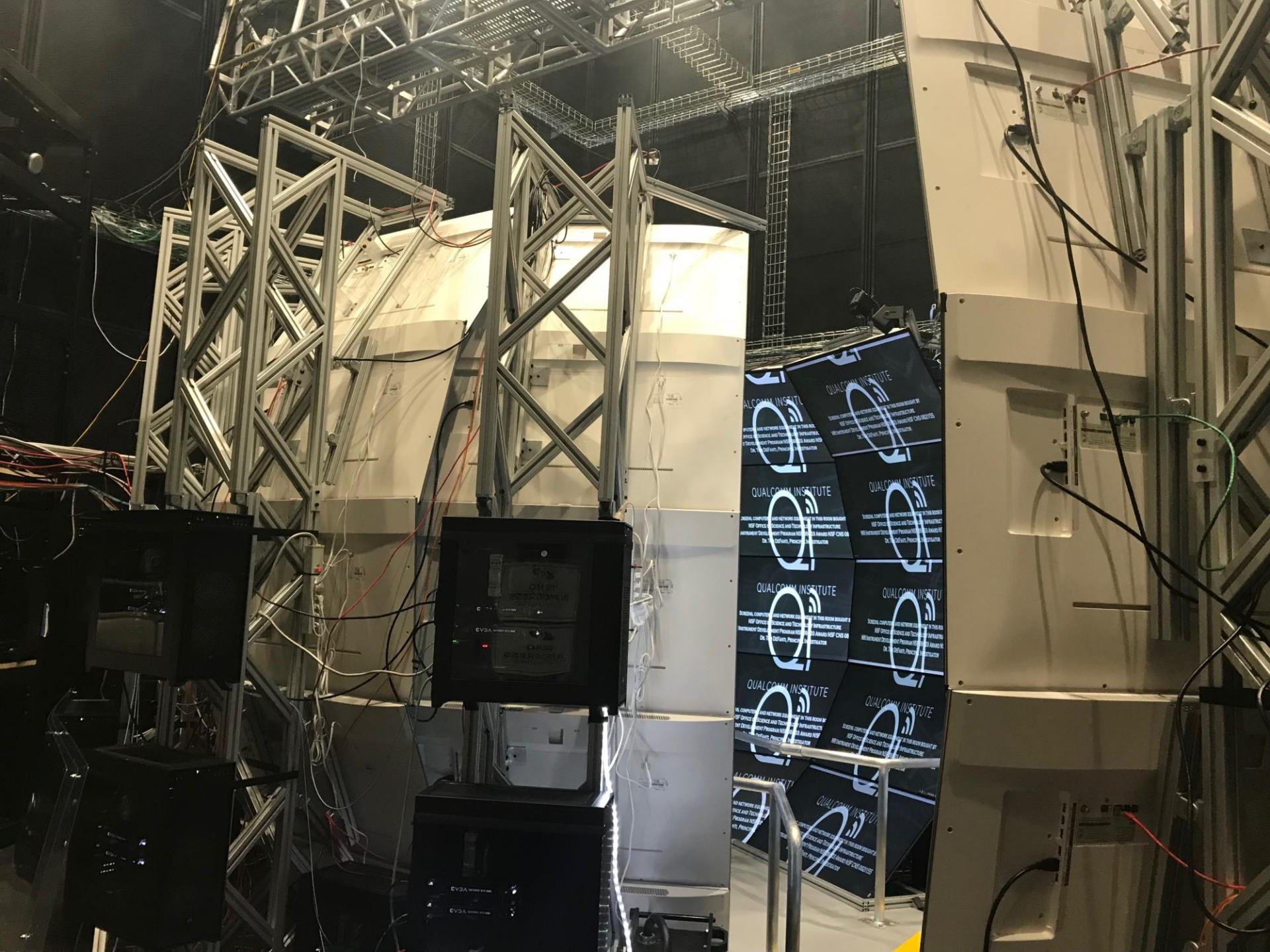
Ocean Mapping Demonstration: *Goals*

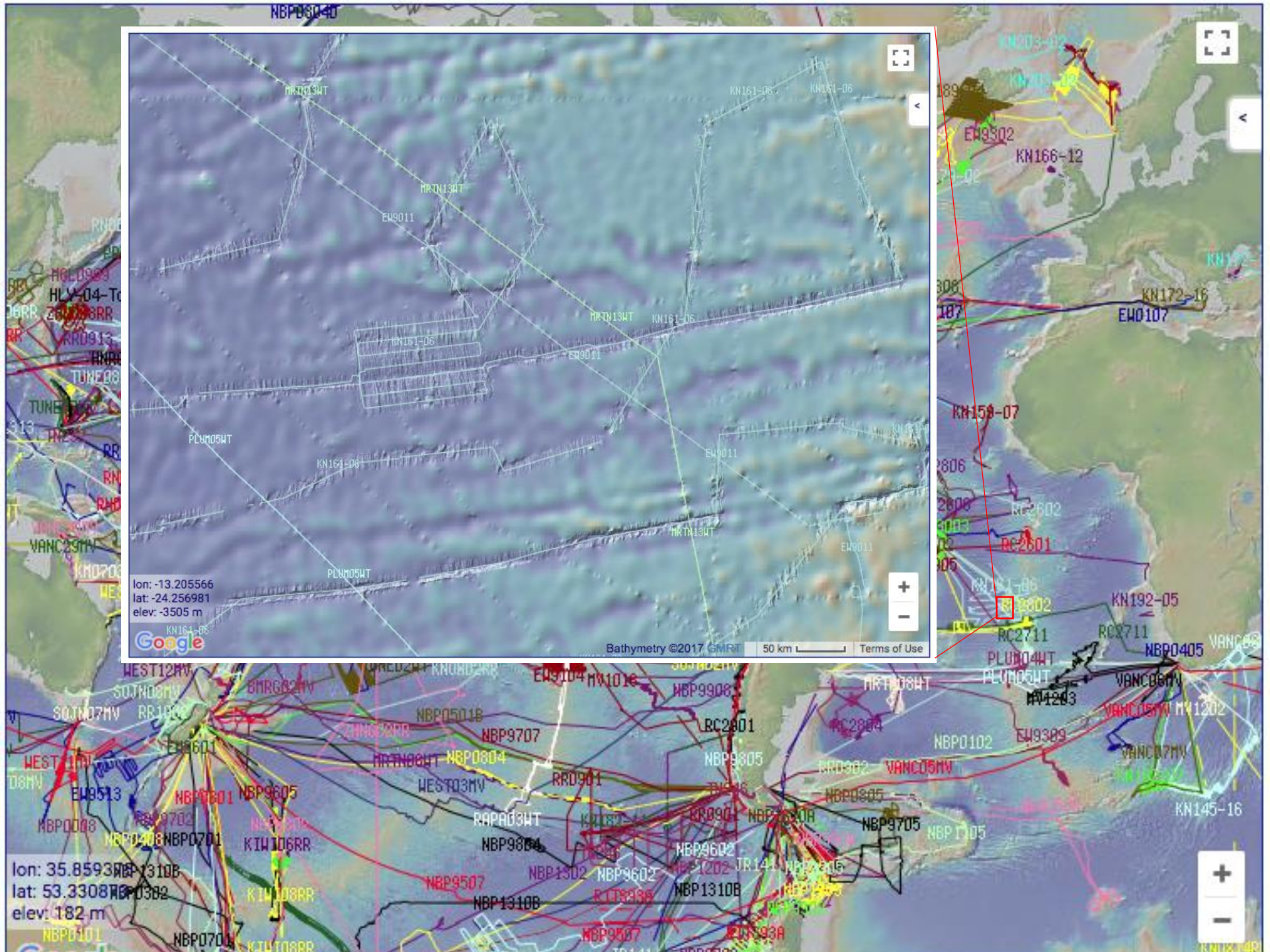
- How can we experience a better sense of scale?
  - magnitude of ocean and how little is mapped
  - magnitude of seafloor features
  - What does it feel like to stand in a submarine canyon?
- How readily can we visualize ocean mapping data with these tools?
- Can we gain new perspectives through immersive visualization of ocean mapping data?

Ocean Mapping Demonstration: *Approach*

- Seek input on how to best present sense of scale of how little of the ocean is mapped
- Explore visualization of bathymetry
  - What is possible? What are the limitations?
  - Visualize gridded data into points
  - Import source data (points)
- Experience data as Immersive Visualization
- Consider next steps


SunCAVE:
• Immersive VR lab
• 70 4K 3D screens


QUALCOMM INSTITUTE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Bathymetry ©2017 GMRT
50 km
Terms of Use
Google
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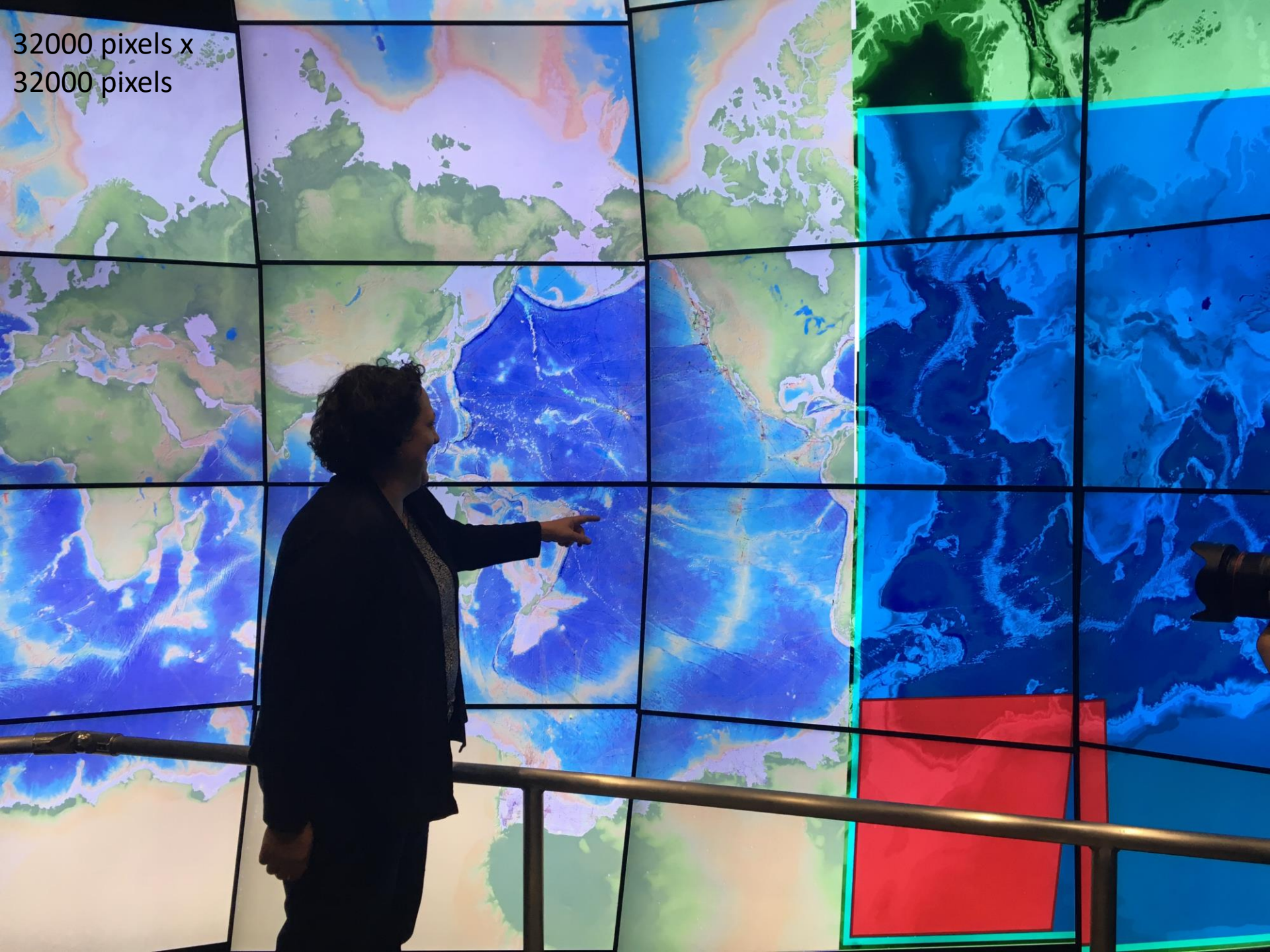
elev: 182 m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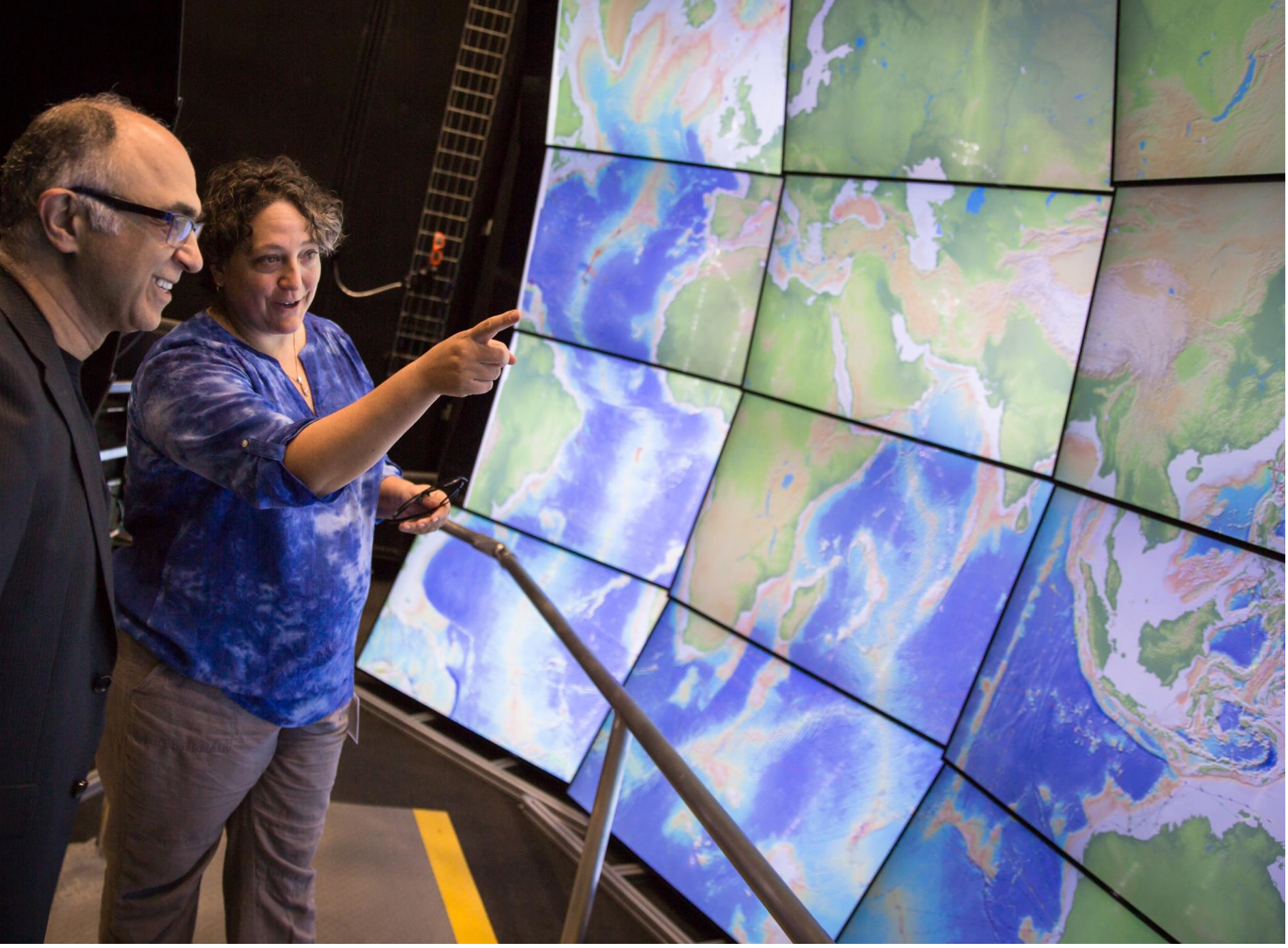
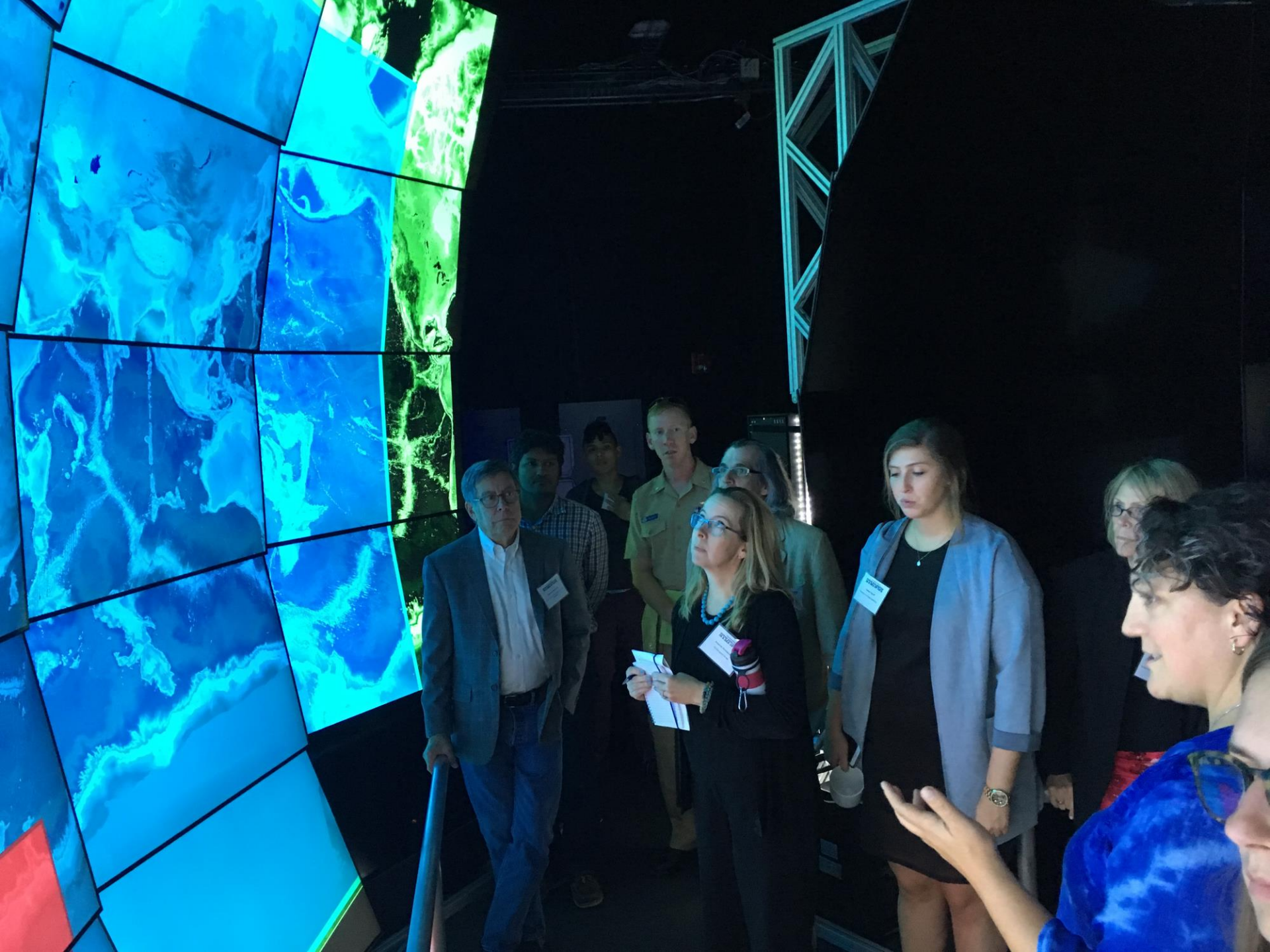
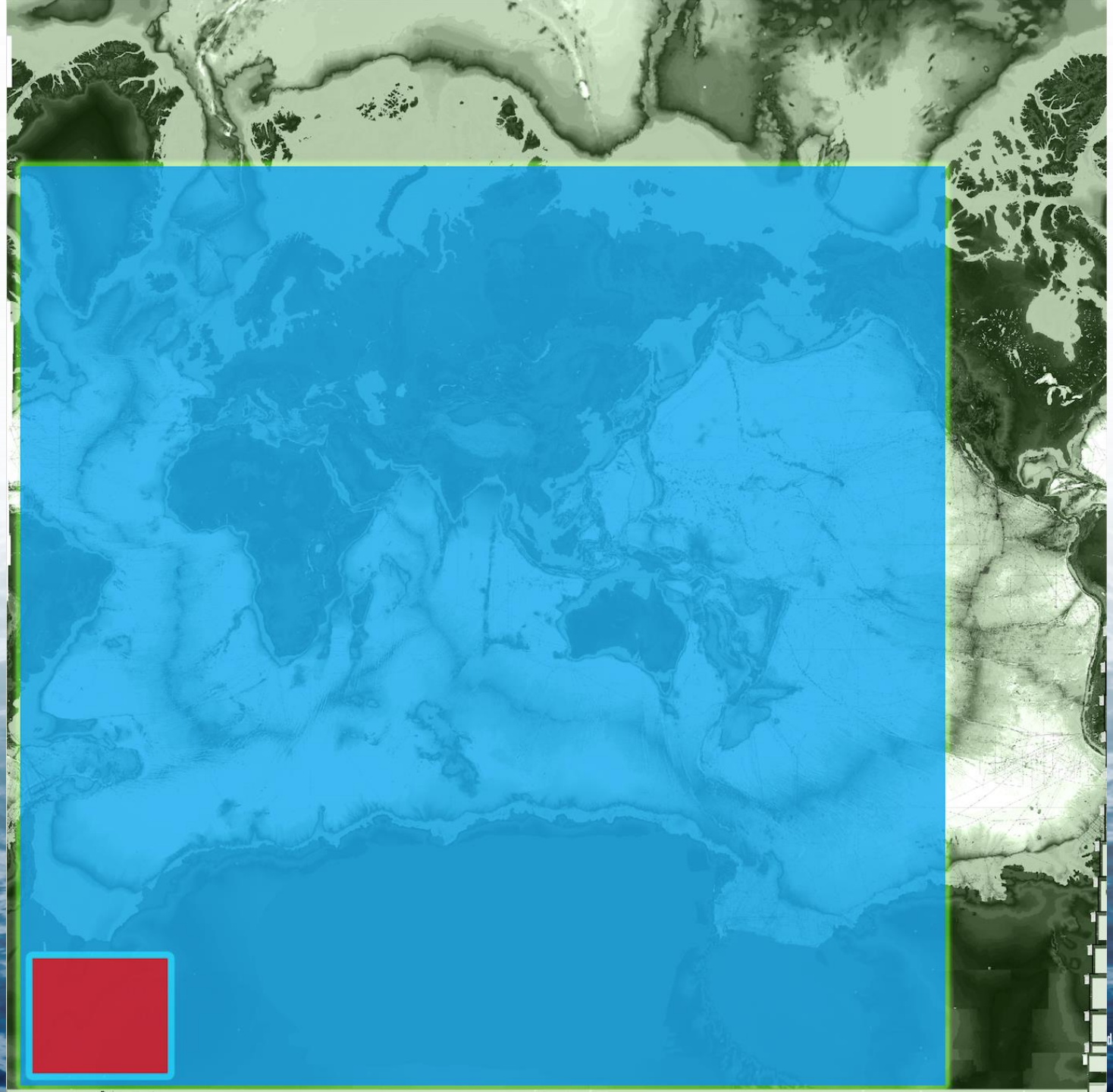
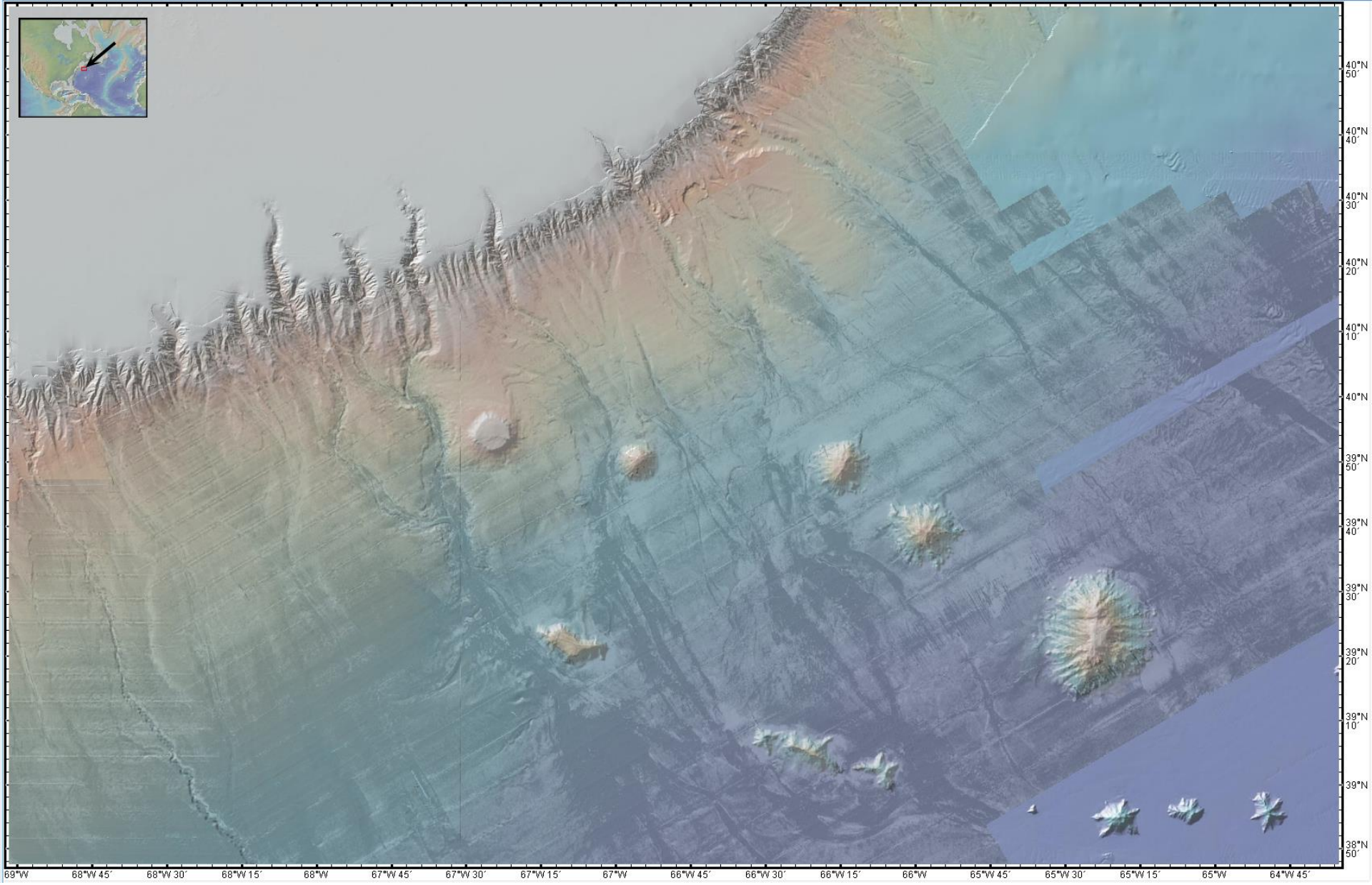
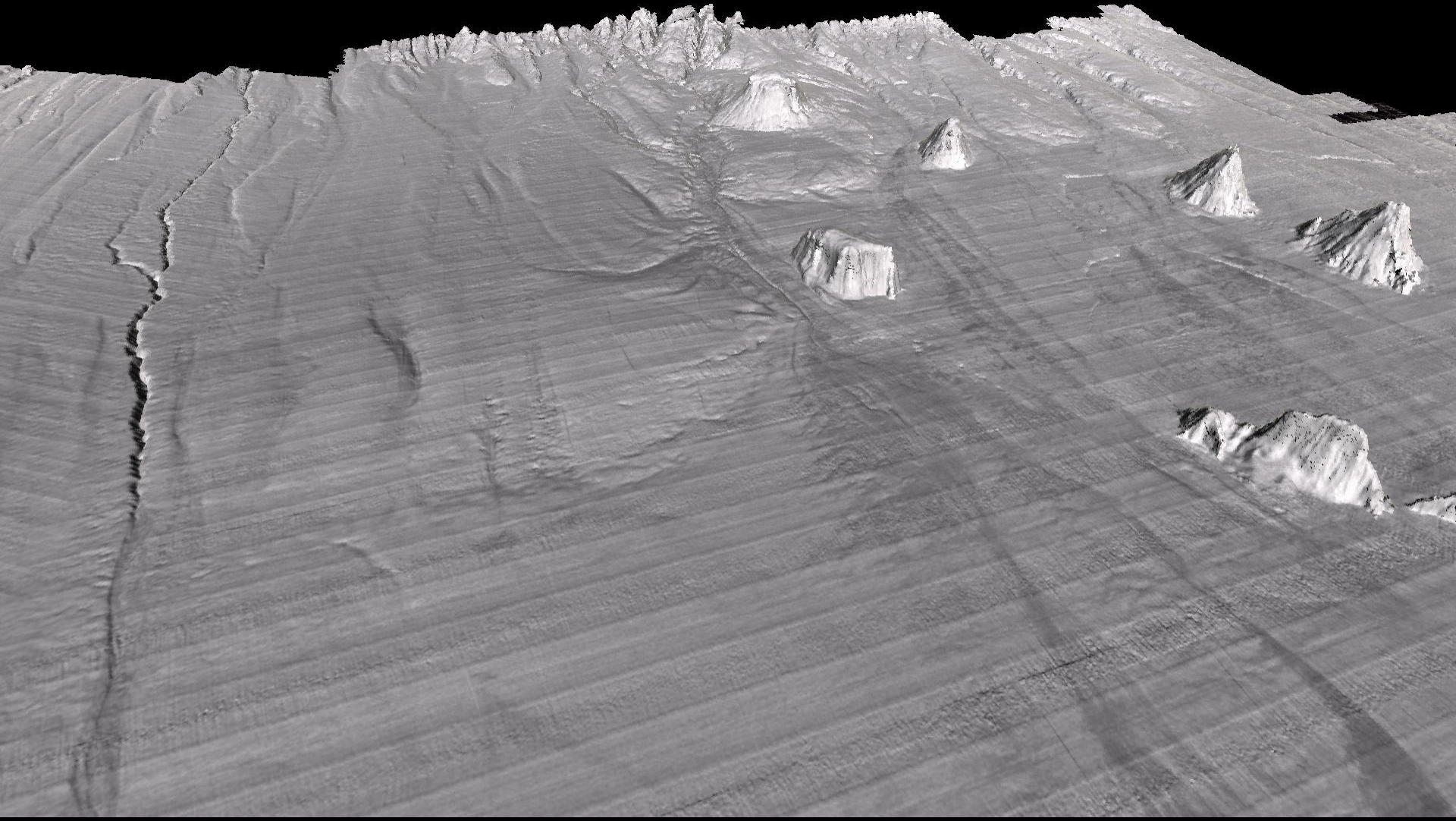


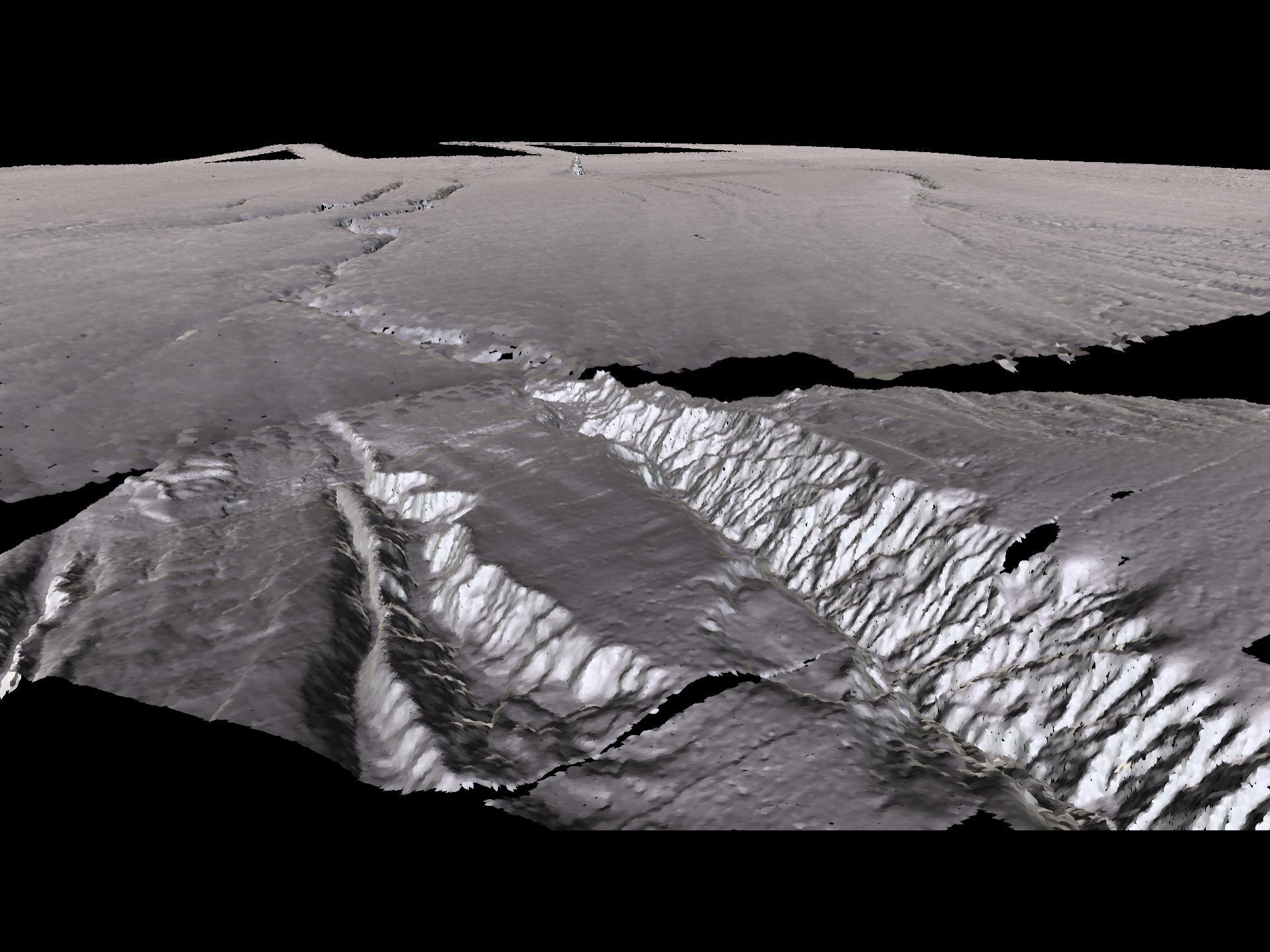


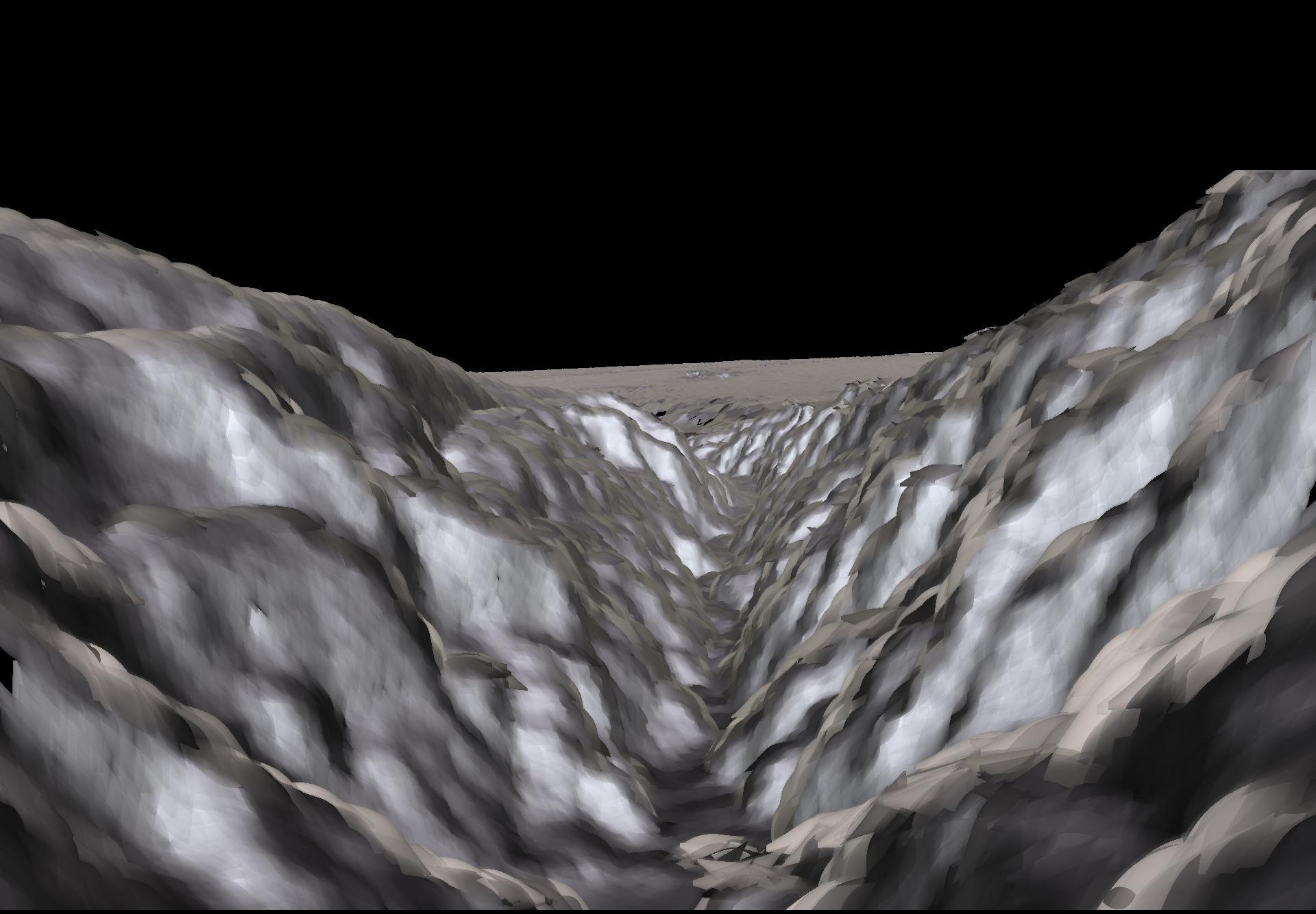


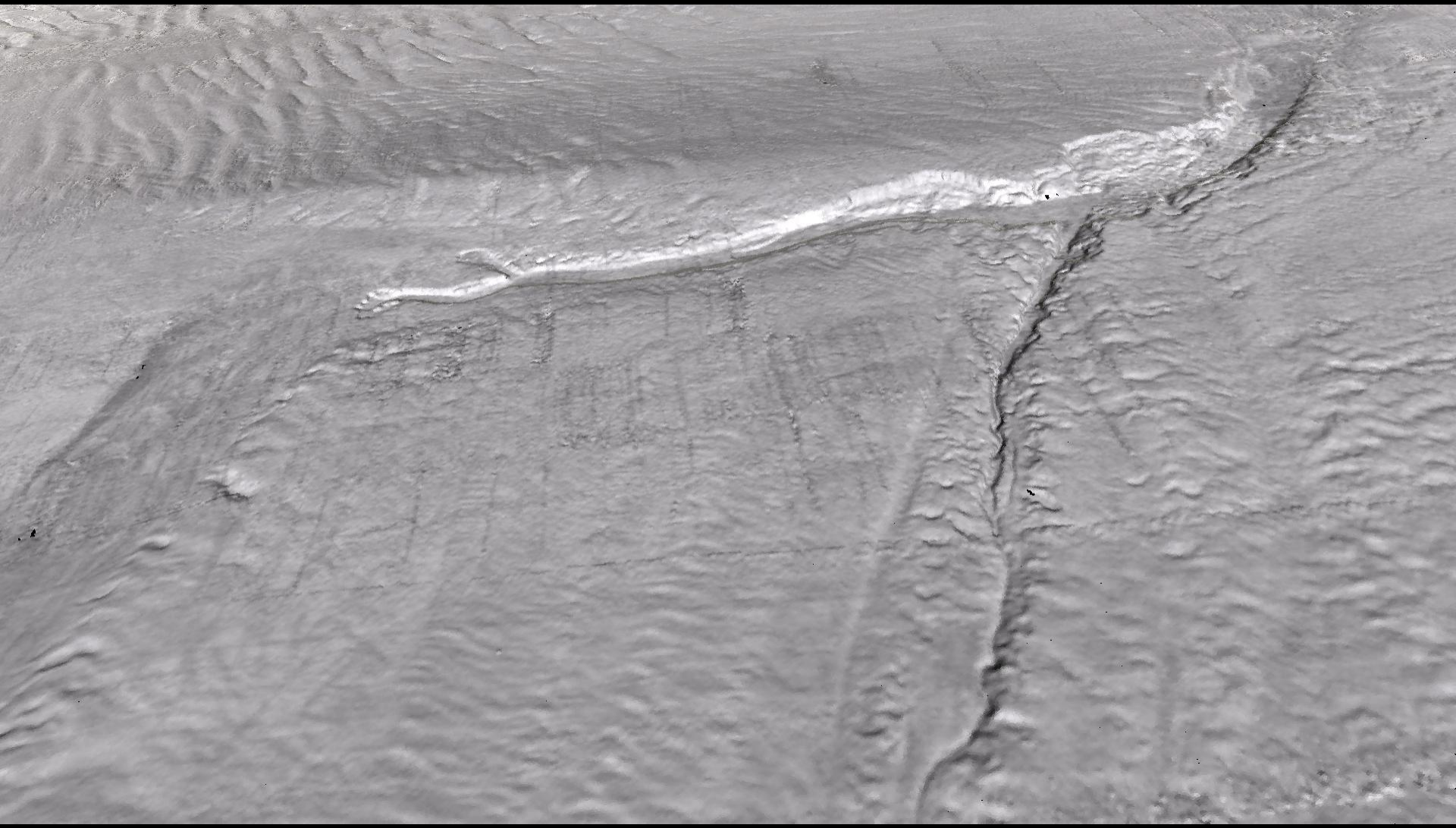


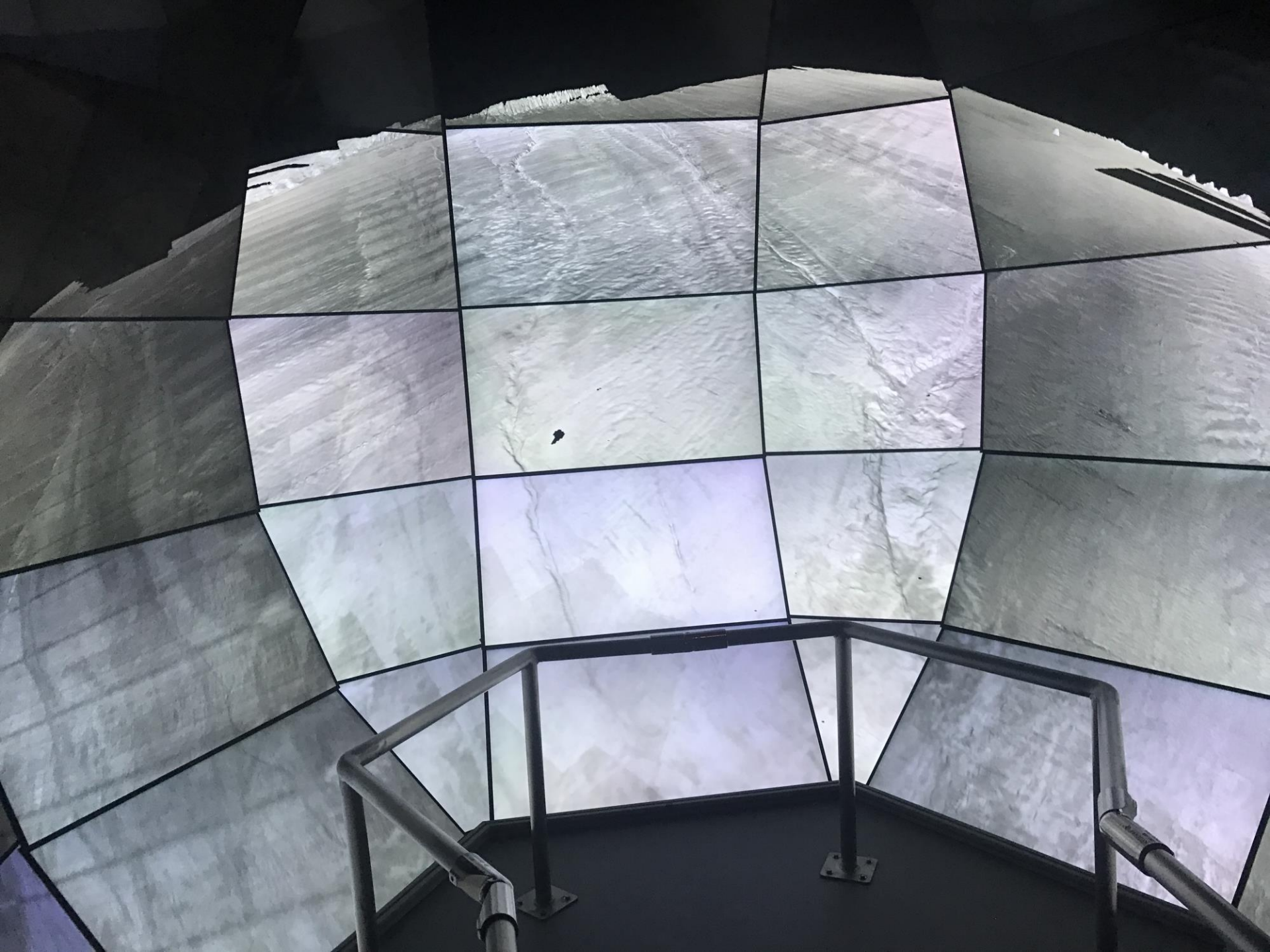
US Atlantic Margin: Bathymetry & Backscatter

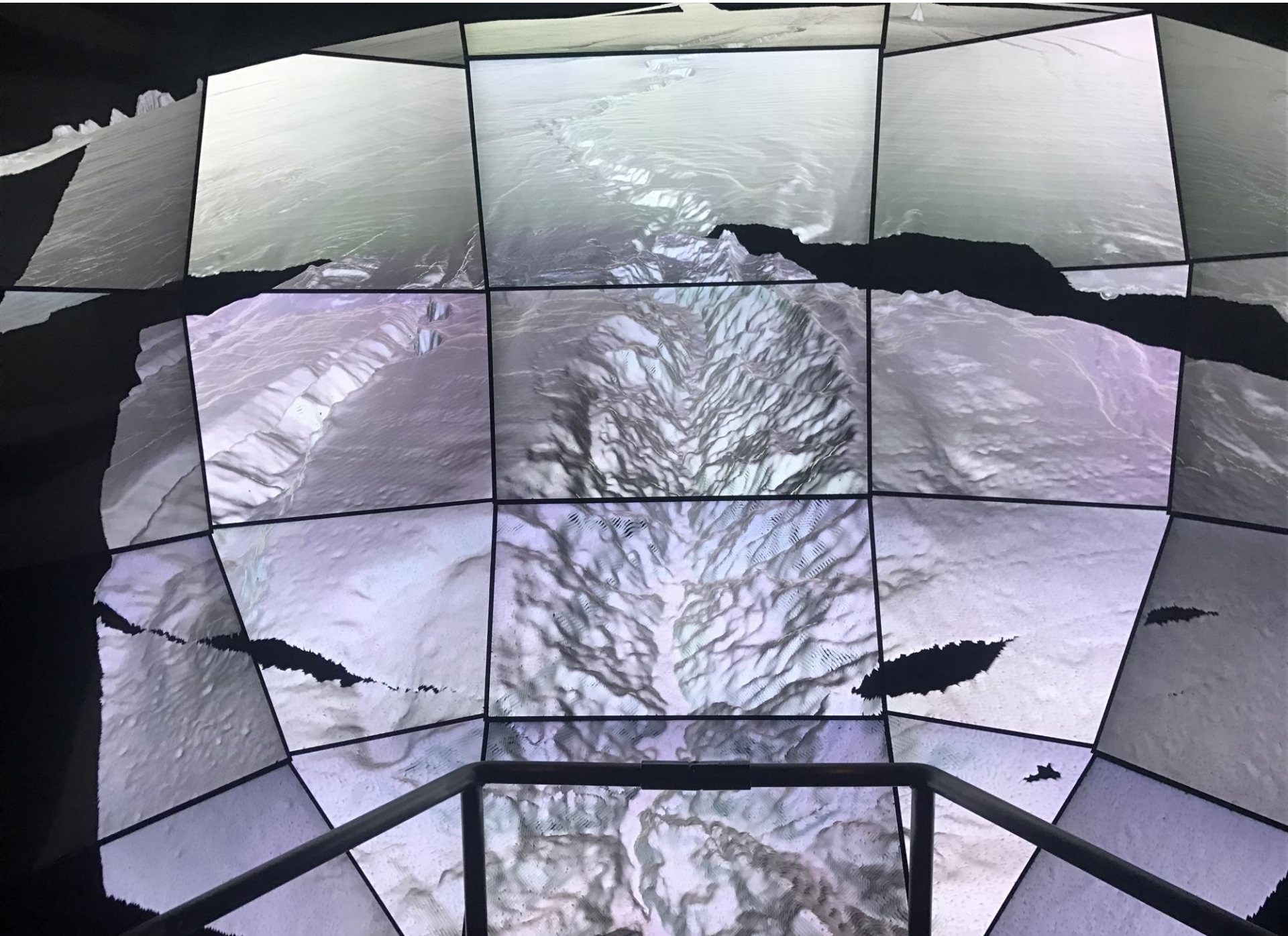












Next Steps…

- Visit UCSD and work with data in SunCAVE (Dec 2017)
- Explore options with importing different data sets into software
- Consider visual analytics

Conclusions

- Collaborating with technologists and data scientists outside our traditional community can yield new insights and opportunities
- New ways of *experiencing* data
  - exceed our common approaches and expectations
  - give us new perspectives and insights and have tremendous potential
- Responsive and performant software can handle billions of points and extend traditional limitations on datasets (e.g. beyond grids)
- The future *is now*!