Oceanic Crust

- **Why it matters? Ocean crust covers 70% of Earth's surface and lies beneath all the oceanographic phenomena.**

- **Discoveries of the origin, nature and behavior of oceanic crust enable us to address, e.g.:**

"What is the geophysical , chemical, and biological character of the subseafloor environment and how does it affect global elemental cycles and understanding of the origin and evolution of life?"
[Sea Change: 2015-2025 http://nap/nationalacademies.org/21655]

Origin:

Plate tectonics

- Magmatism/*a*magmatism at rift/Mid Ocean Ridges
- Seafloor spreading/geodynamo recorder
- Outer core-mantle-surface volcanism connection

Nature:

The largest continuum medium/aquifer

- Heat and fluid fluxes
- Chemical cycle
- Deep biosphere

Behavior:

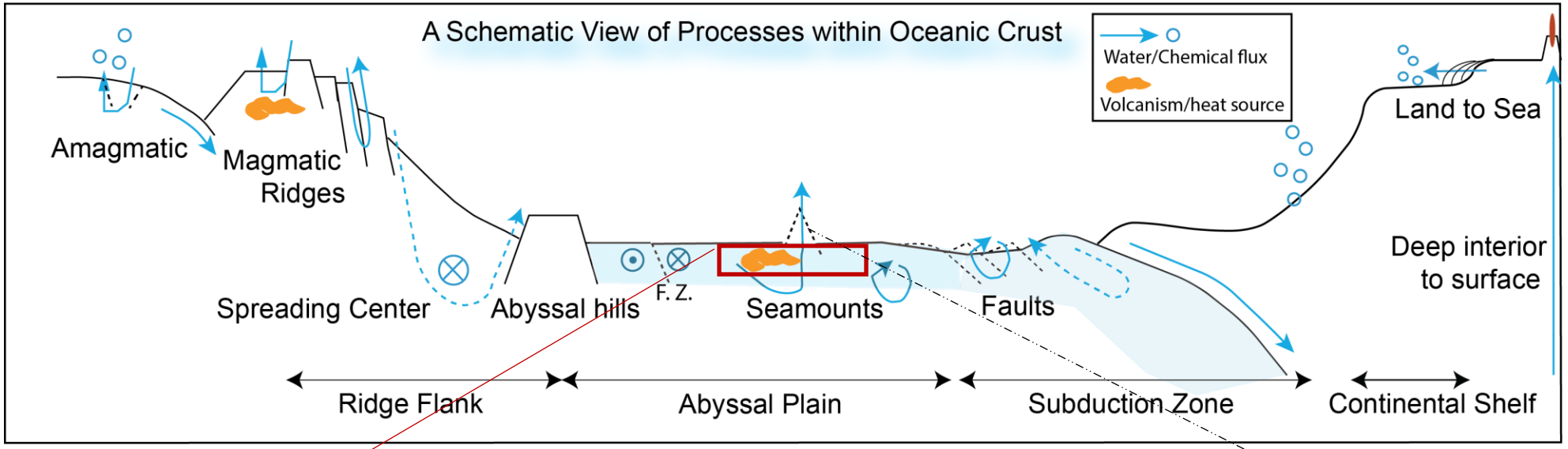
Strengths and stability

- Fracture zones/tectonic boundaries
- Intraplate volcanism/seamounts
- Subduction zones
- Forecast geohazards

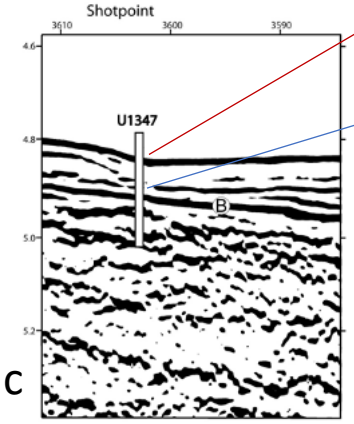
Accessing Oceanic Crust

to address "*the processes that control the formation and evolution of ocean basins*"

[Sea Change: 2015-2025]

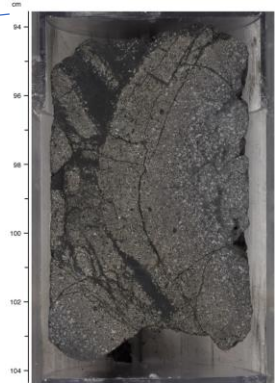


Geophysics (signals Indicating sediments and volcanic basement)

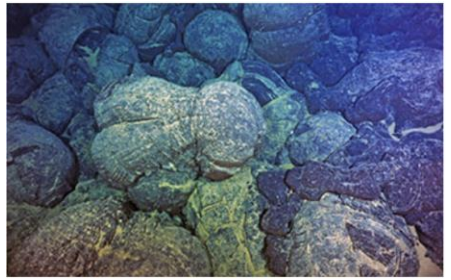


Deep crustal Downhole observations (μ-resistivity imagery of pillow lavas)

Core samples from ~ 300mbsf (a pillow lava)



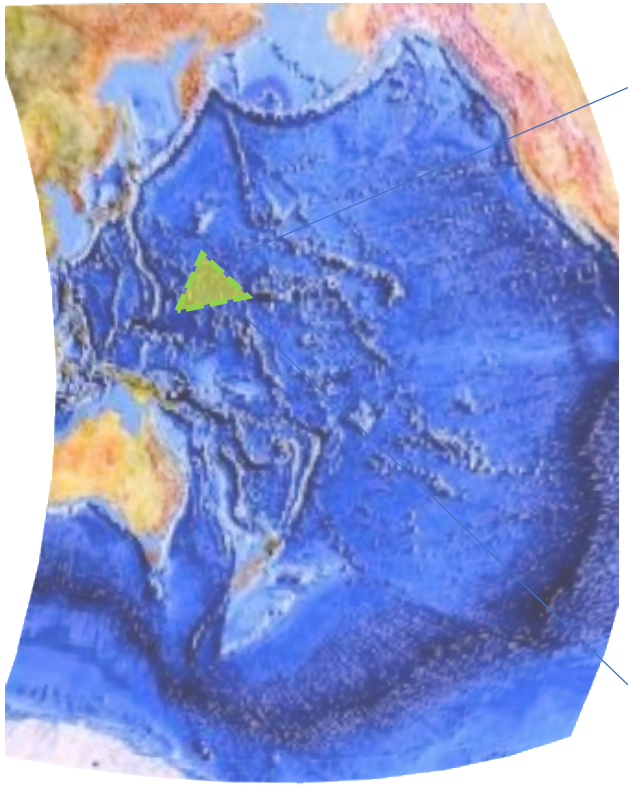
vs. Seafloor visual by deep submergence technology (Pillow lavas)

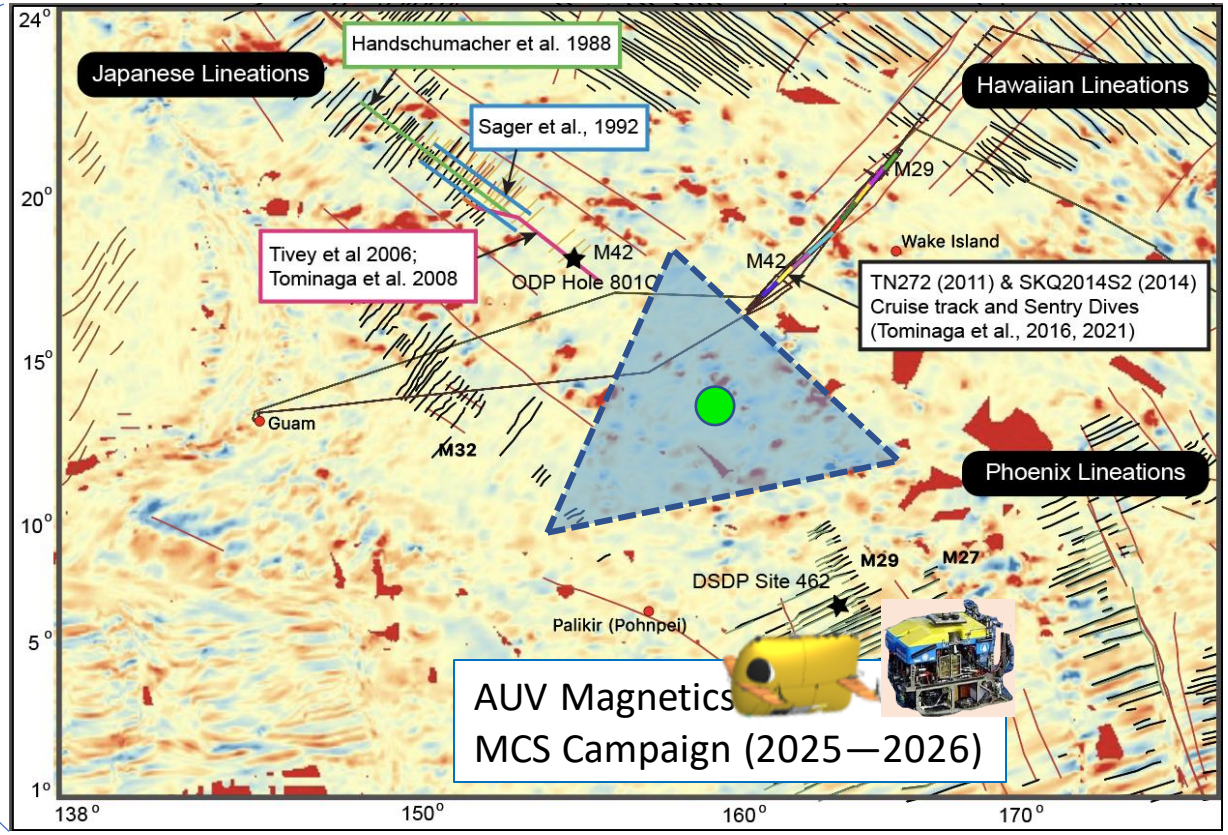


[Exp.374 Proceedings, NSF]

“Plate tectonics mechanisms”

[Sea Change: 2015-2025]





A connector between past and present ocean worlds: heat and fluid flux, chemical cycle from deep mantle to start MORs, climate signals through previous-current tectonic cycles, and biosphere fingerprints from deep.