MARSSAM

MArine Rock and Sediment SAMpling group

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Oregon State University
College of Earth, Ocean, and Atmospheric Sciences

What is MARSSAM

Provides expert advice to scientists seeking to sample the seafloor. This expertise is provided before and after the proposal writing phase.
Maintains and repairs new coring and dredging equipment for use on ARF vessels.
Provides shipboard support for sampling operations and facilitates coordination with shipboard technical groups and operators regarding winch capabilities, weak link systems, overboarding requirements, and compliance with UNOLS Appendix A safety guidelines.
Provide archival materials and related pooled equipment (e.g. extruders for multicores, rock saw for dredge samples, etc.), shipboard instrumentation (e.g. multi-sensor track for shipboard logging of sediment physical properties, core CT-scanner) and training in the operation of those instruments
Provides logistical support involved in shipping and staging sampling equipment, and returning and archiving samples to an NSF repository of the PI’s choosing

2025 Operations

MARSSAM
Marine Rock and Sediment Sampling Facility
@ Oregon State University

Provided Service for 13 Cruises

9 Cruises with onboard Technician Support

236 Sailing Days

- Included Equipment Supplies, operation and expertise in:
  - Jumbo Piston Coring (x1)
  - Multicoring (x4)
  - Gravity Coring (x4)
  - Dredging (x3)
  - CT-MST or X-Ray-MST Van (x2)
  - Porewater Van (x1)
  - Rock Corer (x2)

- Supplied Equipment (w/o technicians) for:
  - Multicoring (x4)
  - Gravity Coring (x1)
  - Rock Corer (x1)

2025 Growth

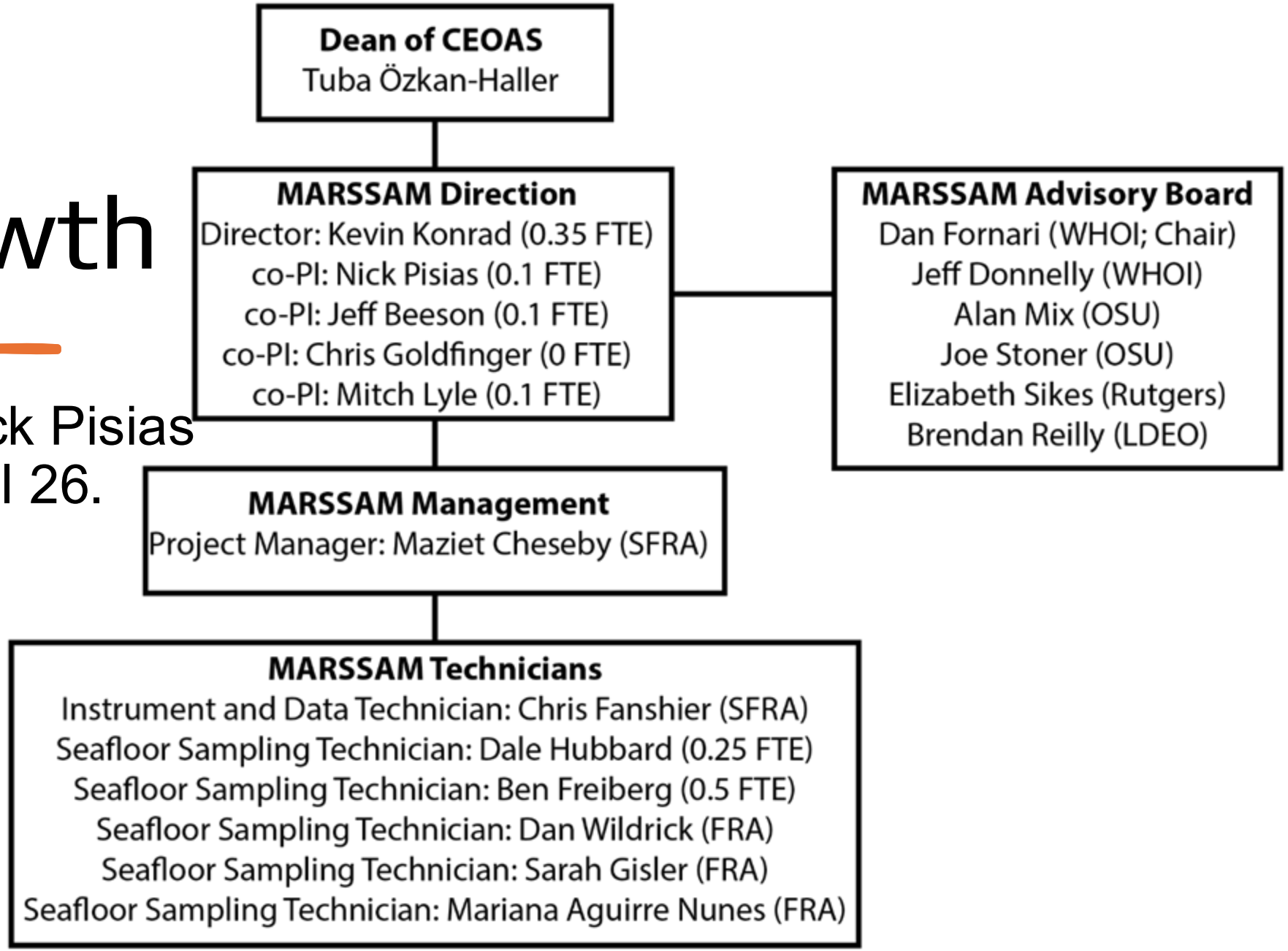
- Hired a new marine technician, **Mariana Aguire Nunes**
- **B.S. and M.S. in Oceanography**
- Started Nov, 2025

2025 Growth

- Hired a new co-director of sediment coring **Cedric John**
- His research covers carbonate geology, geochemistry, and field studies with artificial intelligence, with a strong focus on climate change—both past and present—and energy transition solutions.

2025 Growth

- Cedric to replace Nick Pisias and Mitch Lyle in Fall 26.



Some Advancements in Coring and Dredging

- AT50-36: East Pacific Rise eruption
- MC400 used as TowCam: MISO system, real-time video, two 4k cameras, 2 remote Niskins, CTD package, USBL, PMEL MAPR, Electrochemical analyzer

The New York Times

Volcanic Eruption in Deep Ocean Ridge Is Witnessed by Scientists for First Time

Researchers diving in a submersible in the eastern Pacific realized that the landscape they had studied the day before had been glassed over by fresh lava.

Some Advancements in Coring and Dredging

- SKQ2025-12 –RV Sikuliaq (Tessin-Steen PIs)
- Expanded the coring railroad track an additional 20’ in order to attempt 80’ (24m) cores off the stern
- Utilized three sensors on core logging (more information later)

Some Advancements in Coring and Dredging

- RR2504 – Revelle (Hines)
- First deployment of our porewater processing van and nitrogen generator van
- Met science goals but received some complaints on comfort

Some Advancements in Coring and Dredging

- RR2504 – Revelle (Hines)

Advancements in Coring and Dredging

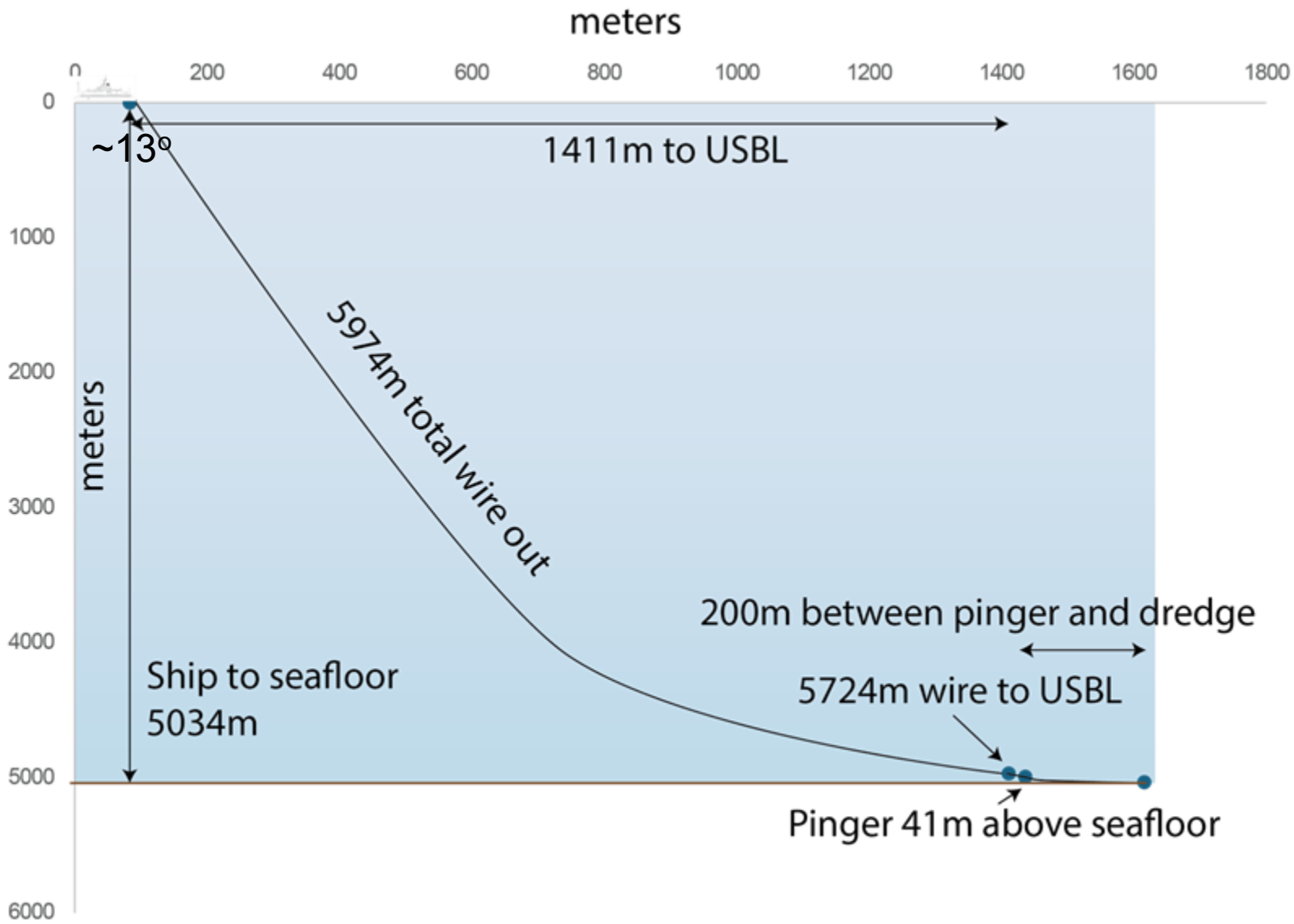
- RR2509 – Ongoing; R/V Revelle (Jessica Warren PI)
- Currently running a Pinger at 300m from the dredge and a USBL at 350m from the dredge and an accelerometer in the dredge

Advancements in Coring and Dredging

- RR2509 – Ongoing; R/V Revelle (Jessica Warren PI)
- USBL has greatly improved safety and efficiency of dredging
  - When stuck, we know where the dredge is and the angle of the wire
  - Allows the captain to move the ship back in one fluid step until above the dredge, then pop the dredge out by pulling upwards on it
  - No stress or concerns from the bridge
- Only ~30% of the planned dredge track is actually traversed
- Dredge coupling becomes poor at 150m scope

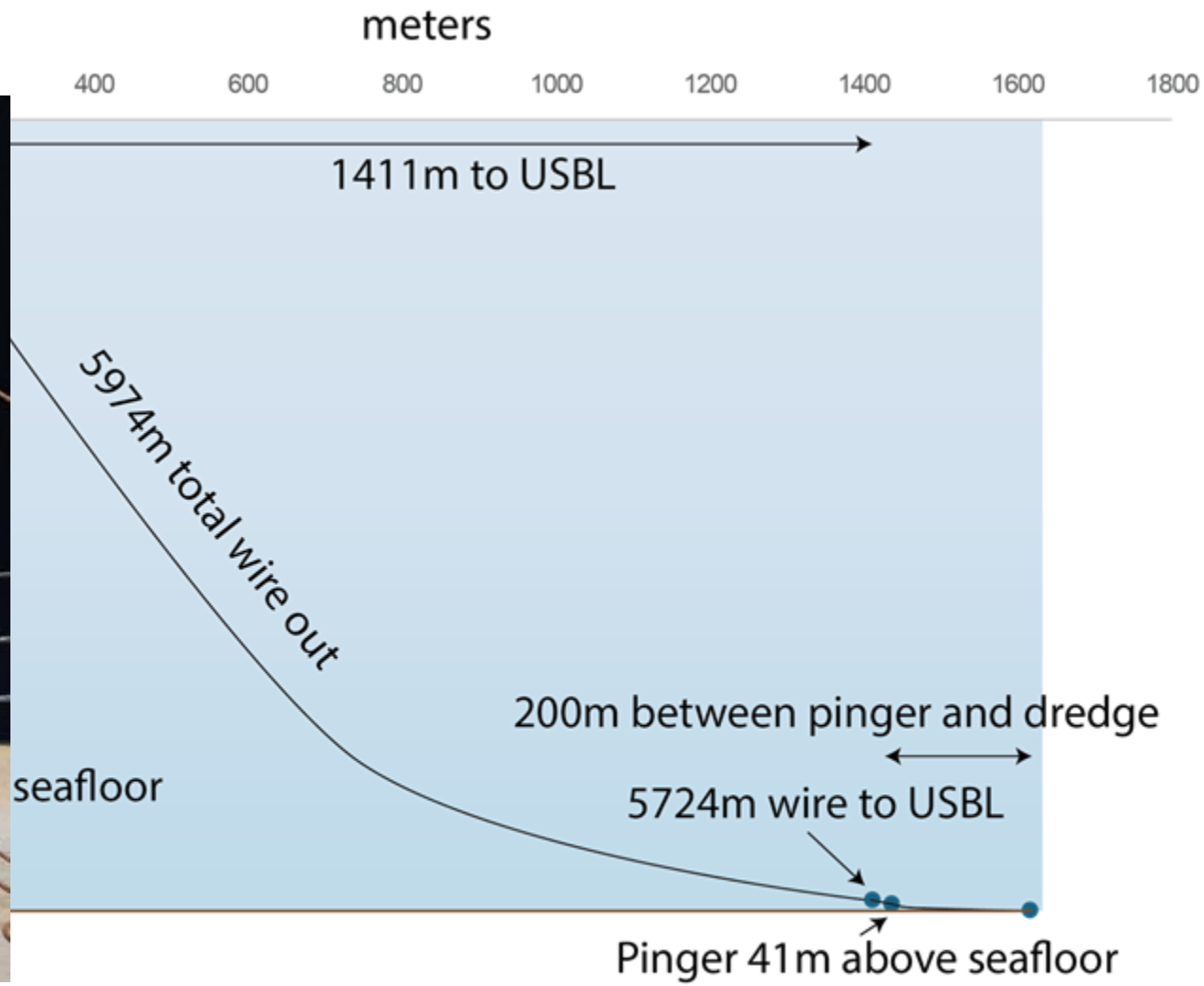
Advancements in Coring and Dredging

- RR2509 – Ongoing



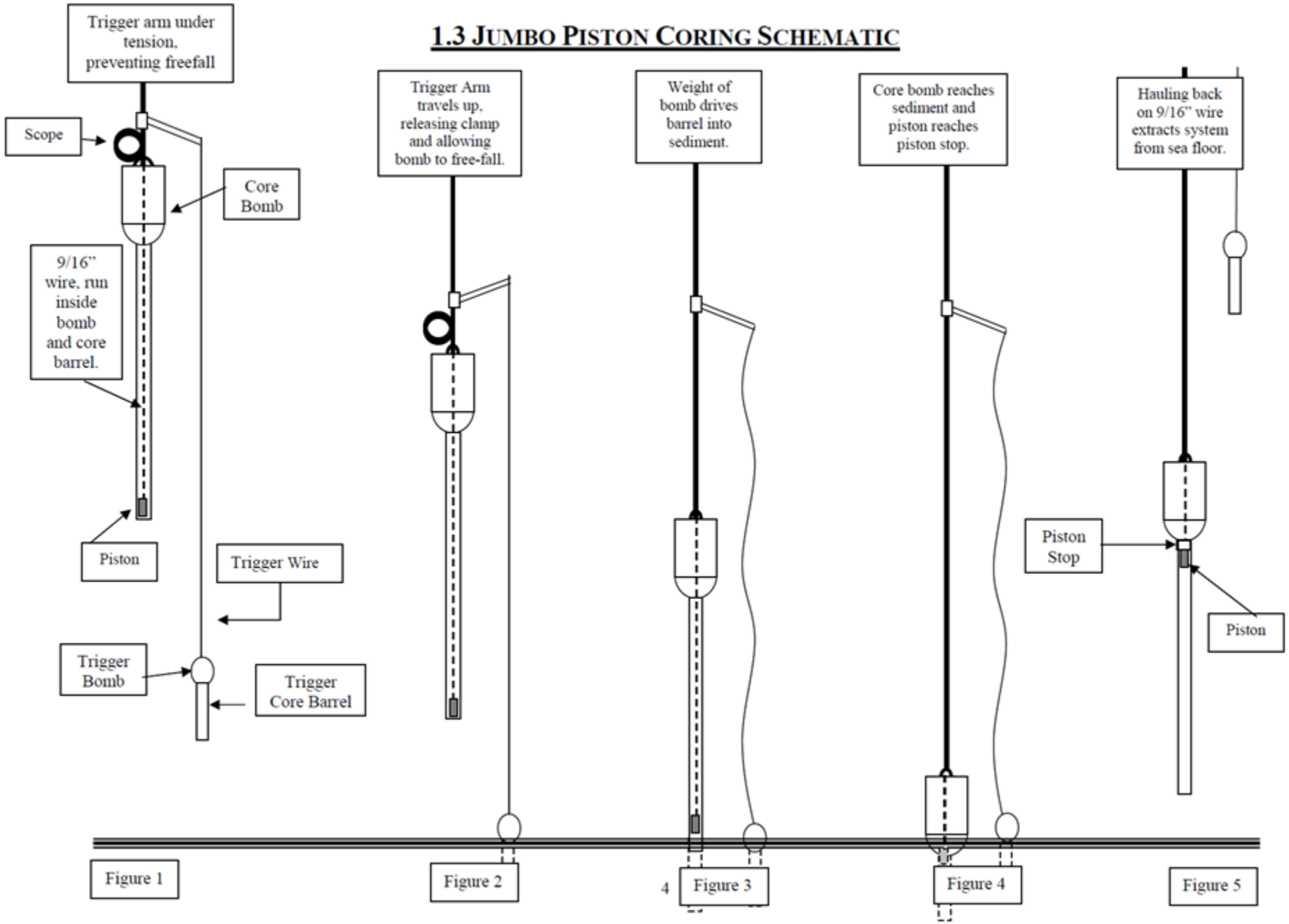
Advancements in Coring and Dredging

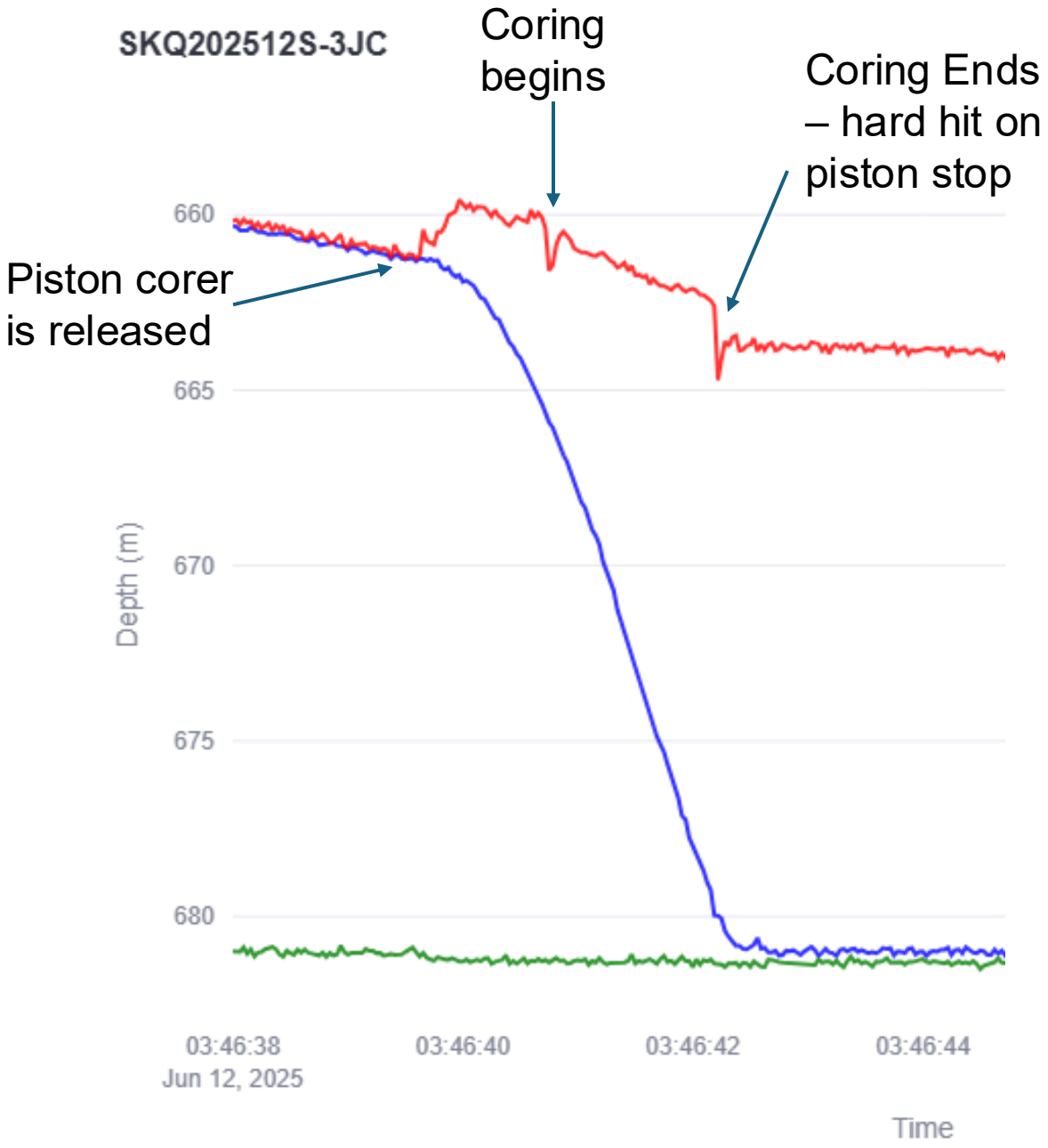
- RR2509 – Ongoing

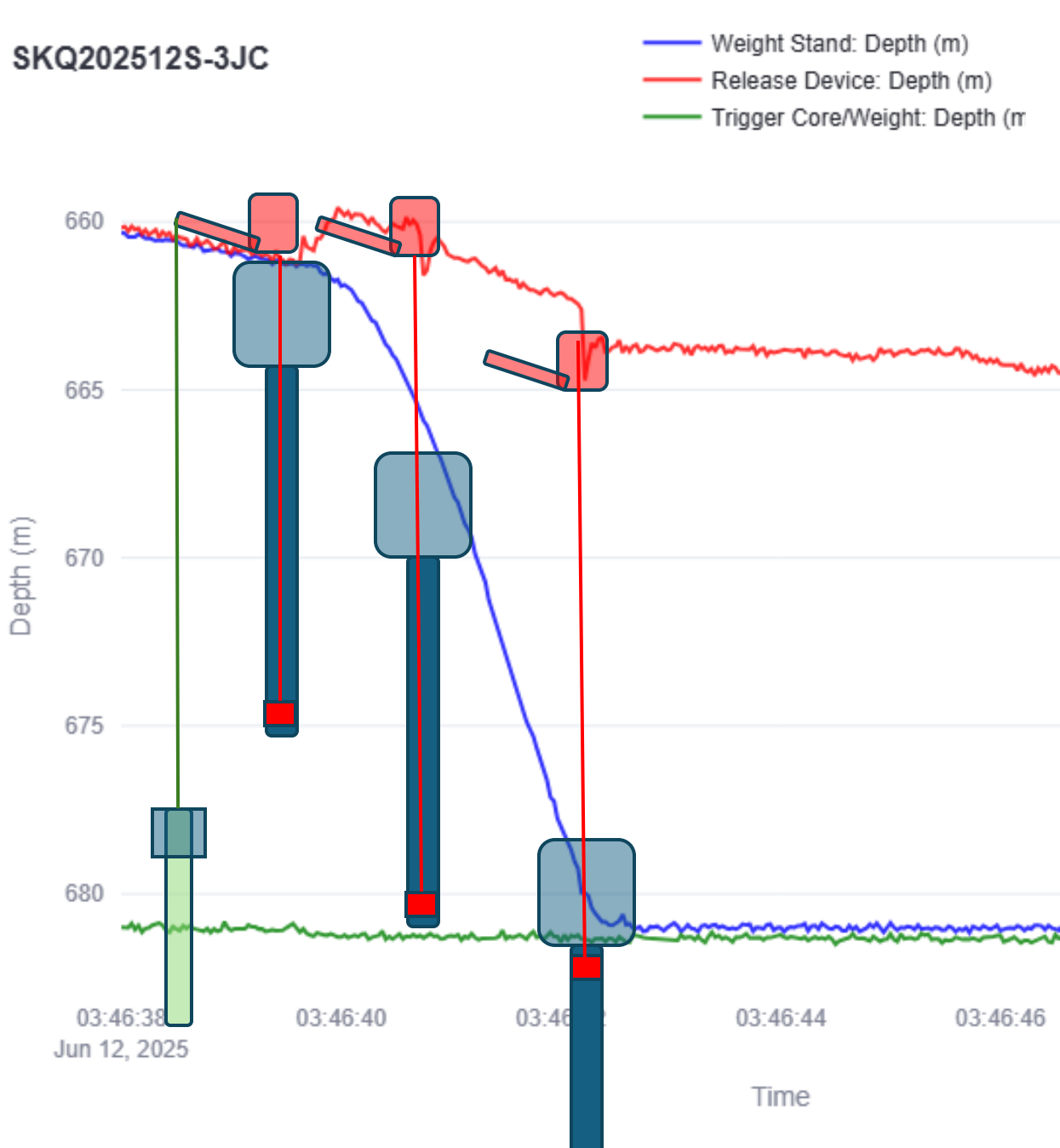


Sensors & Scanning

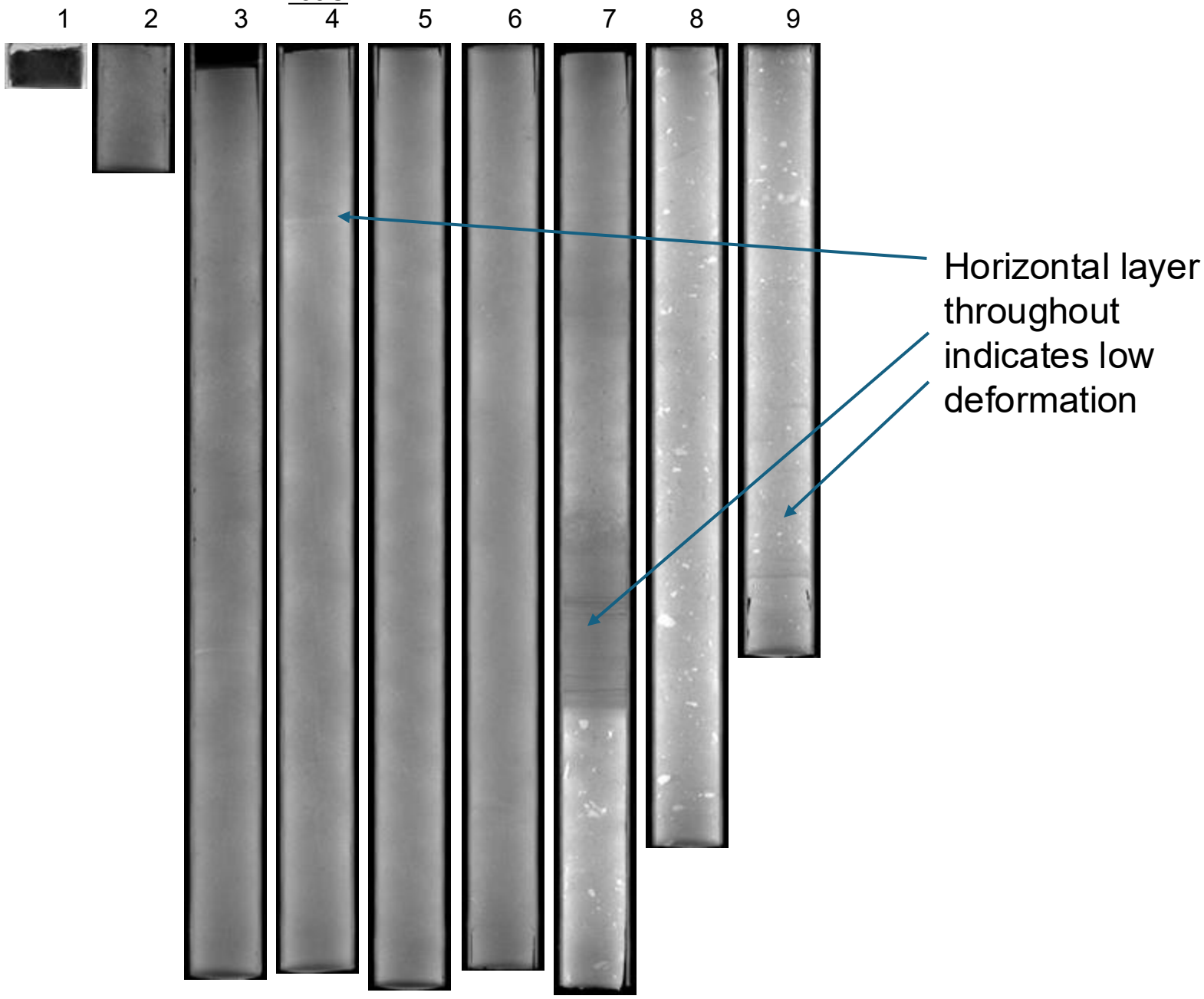
1.3 JUMBO PISTON CORING SCHEMATIC

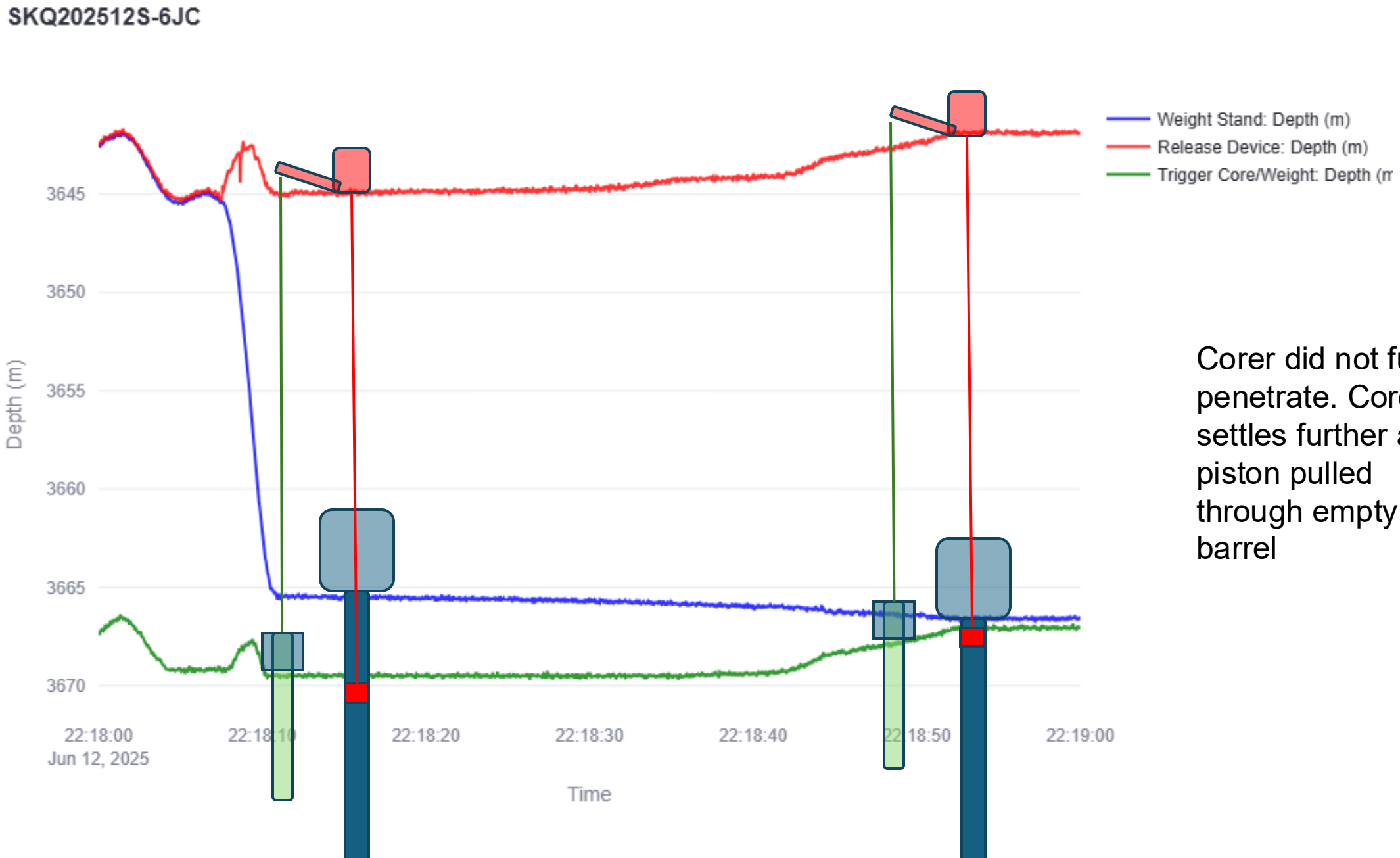



SKQ202512S-3JC
Coring begins
Coring Ends – hard hit on piston stop
Piston corer is released
660
665
670
675
680
Depth (m)
03:46:38
Jun 12, 2025
03:46:40
03:46:42
03:46:44
Time


SKQ202512S-3JC
Weight Stand: Depth (m)
Release Device: Depth (m)
Trigger Core/Weight: Depth (m
660
665
670
675
680
Depth (m)
03:46:38
Jun 12, 2025
03:46:40
03:46:44
03:46:46
Time

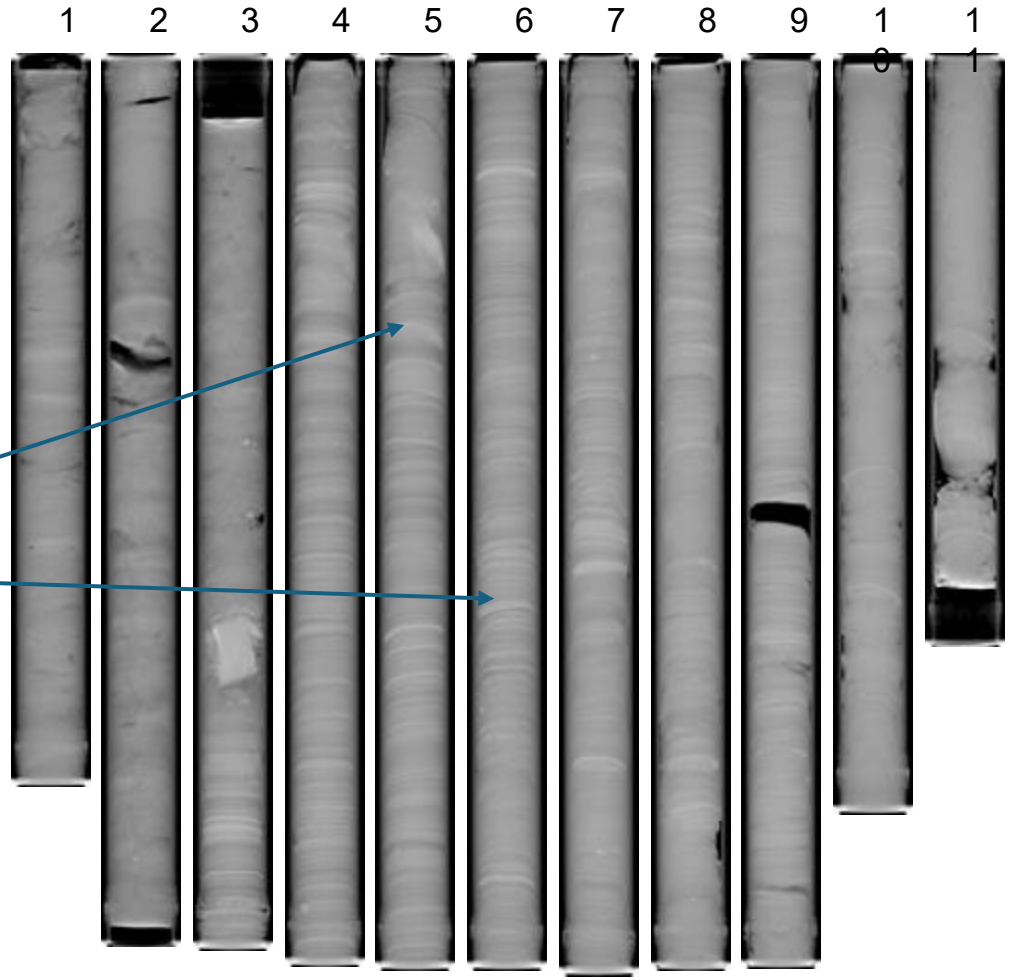
SKQ202512S
-3JC





Corer did not fully penetrate. Corer settles further as piston pulled through empty barrel

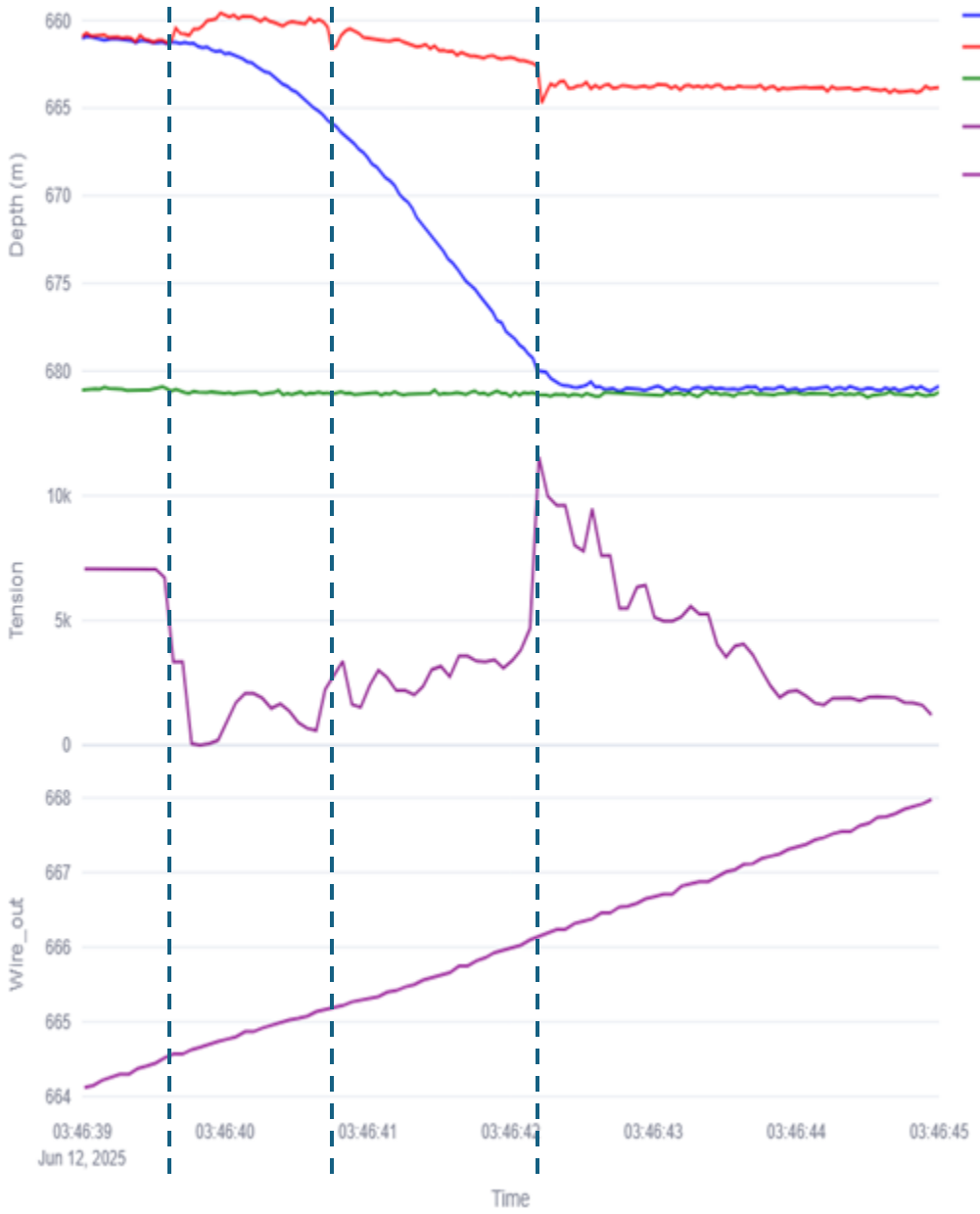
SKQ202512S-6JC



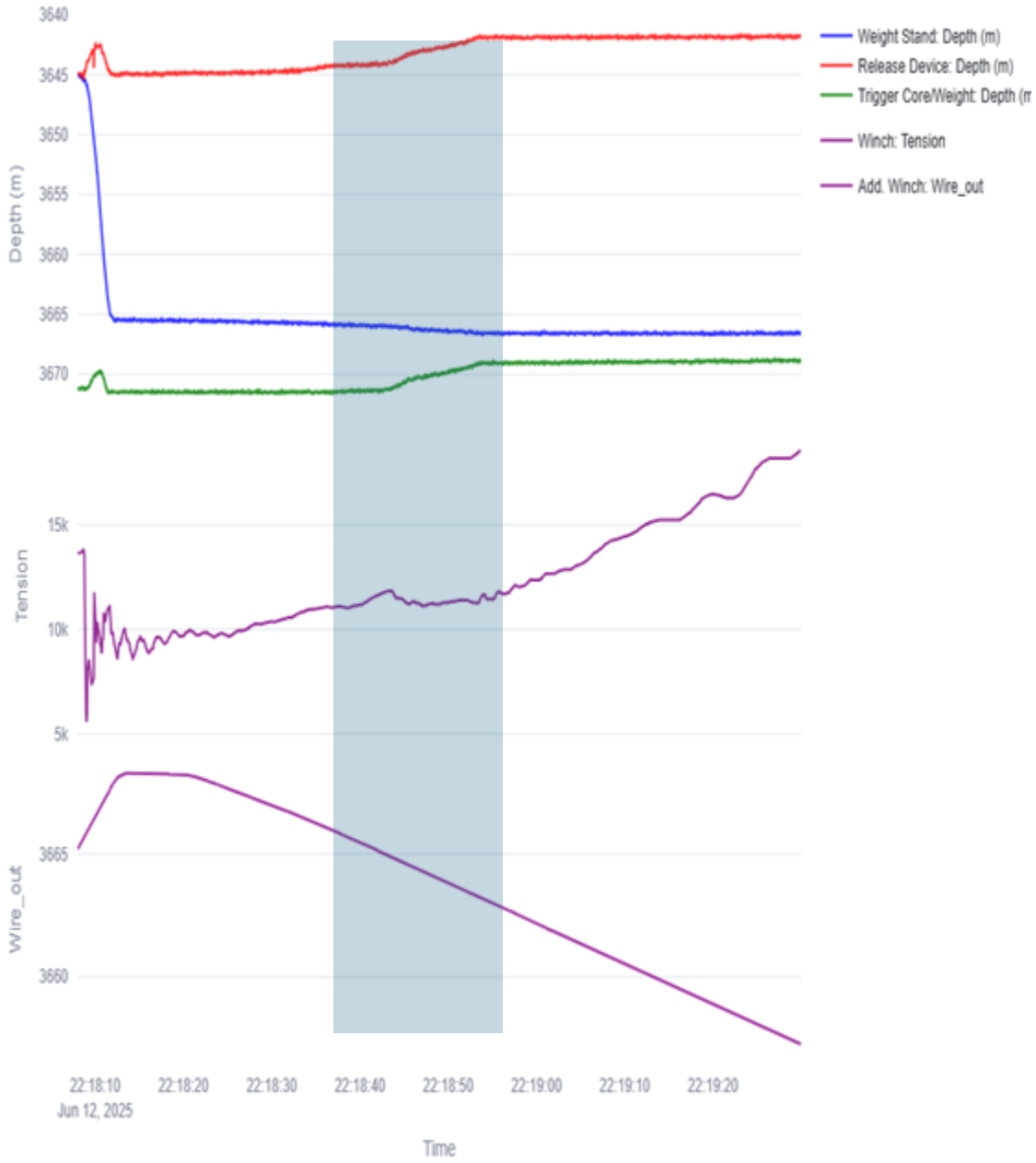
Subtle deformation throughout

Lowest section heavily deformed.

Events discernable from winch data

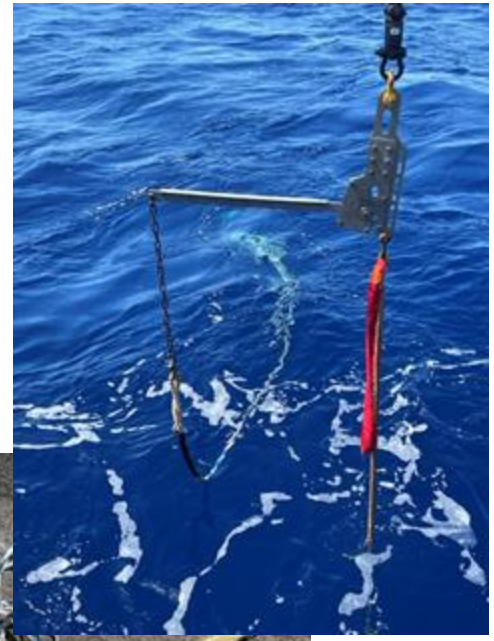


Wire out/tension predicts deformation

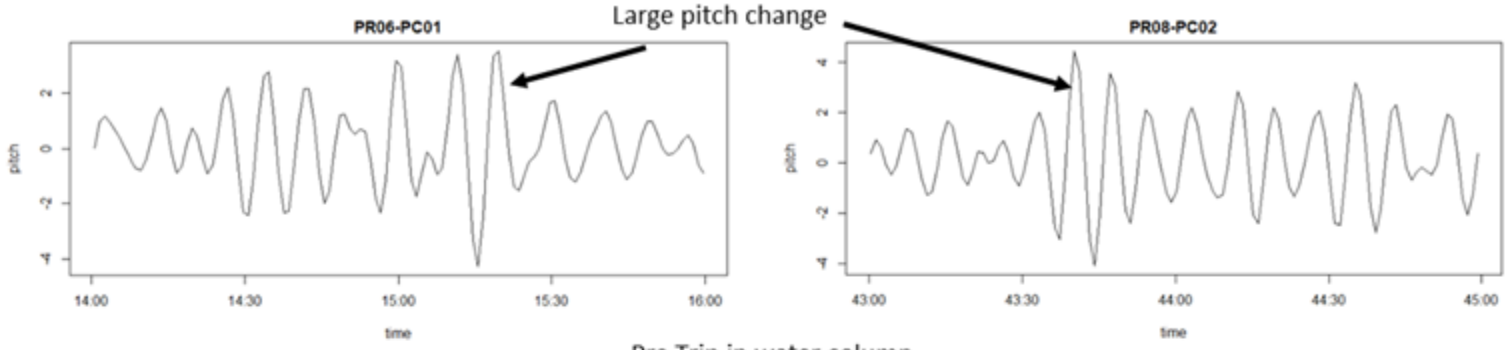


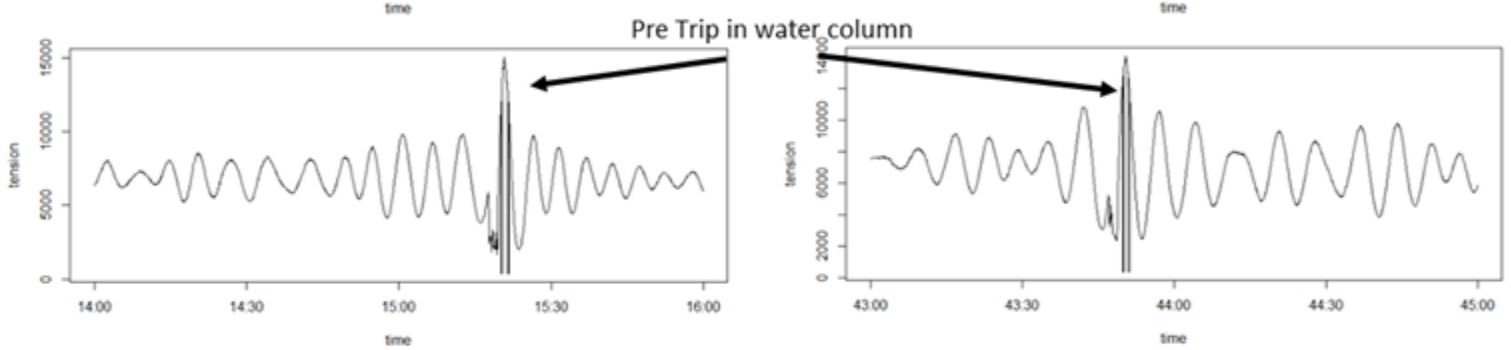
Challenging Water Column Trips

- Not unheard of but rare
- Chris has only seen 2 since 2019, both on the same cruise
- AR64-02 only 3 mechanical trigger arm casts attempted, 2 tripped in the water column, remainder of piston core casts used acoustic release
- R/V Armstrong – stern deployment – greatest relative motion
- This cruise used 9/16 synthetic line (8000m + casts) which has greater elasticity

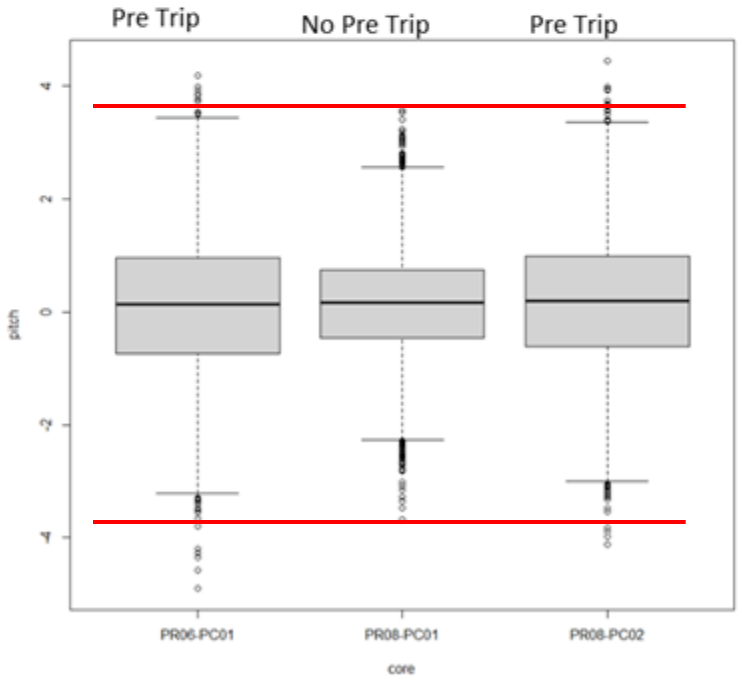


Water Column trips occur right after large pitch change





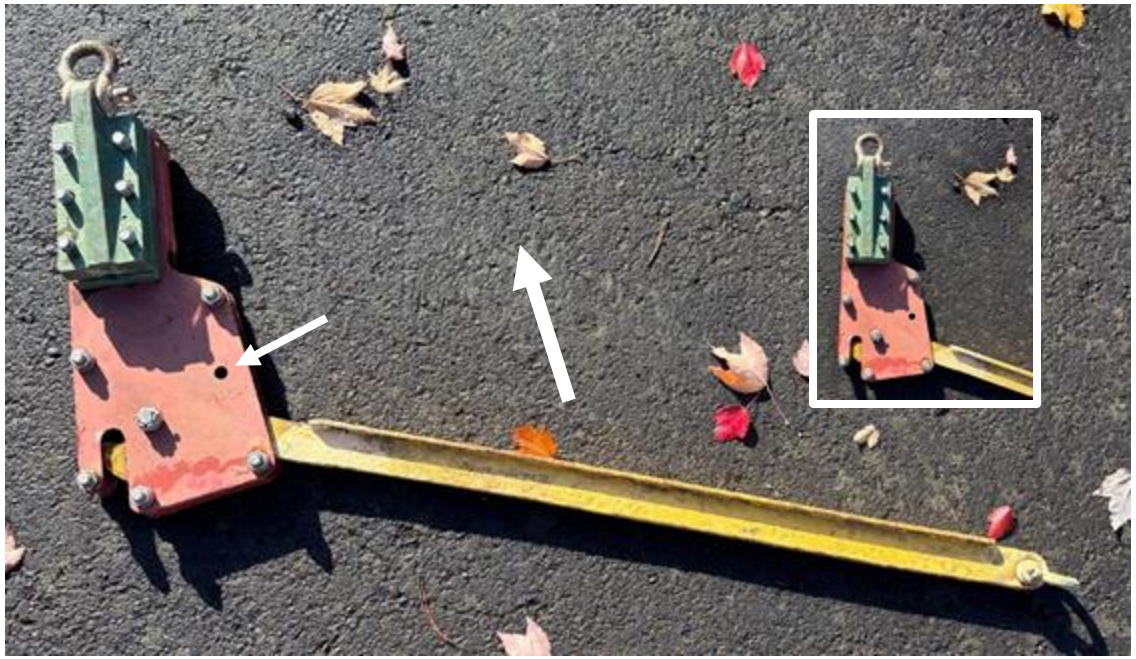
Narrow threshold to pre trip territory

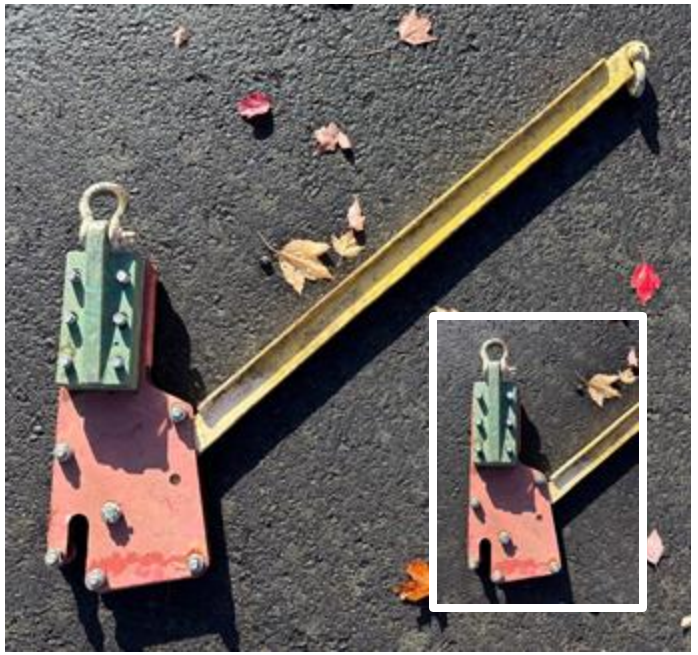


When will we encounter stern deployment and synthetic line again?

Mechanics of a pre-trip

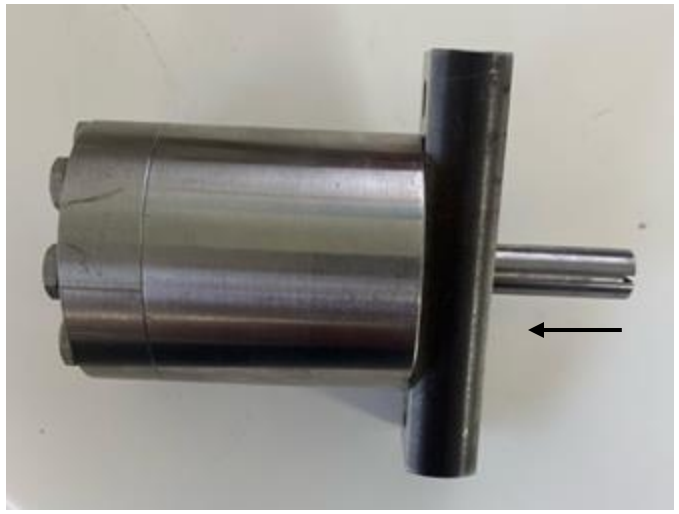
- Weight removed from trigger arm, opens and releases JPC bail

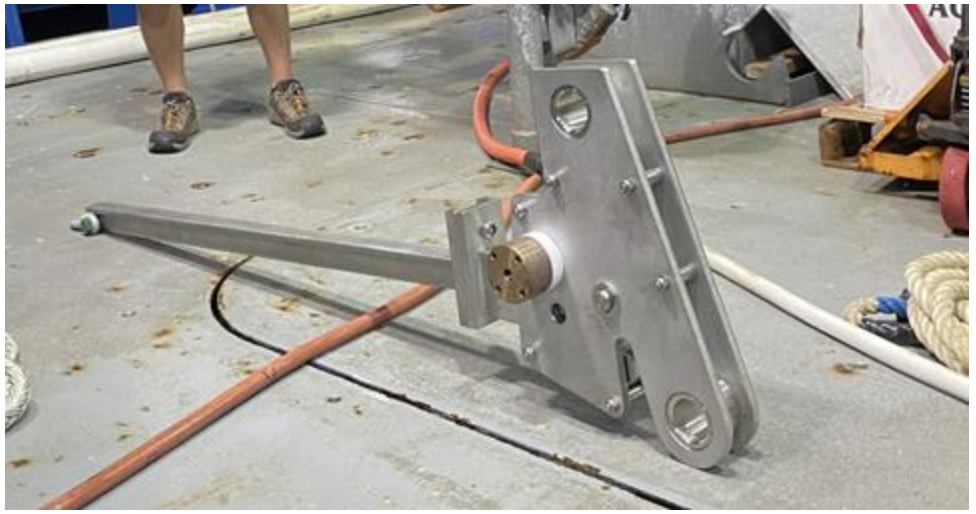




Potential prevention method

- OSU Hydrostatic safety for surface ~30m that fits into our arm
- OSIL safety mechanism, for surface but can change pressure (shallow operation only)





Potential prevention methods

- Long core system

- Used Benthos acoustic release w/ strongback
  - This is currently broken and massive compared to what we need
  - No ranging mechanism, using pinger
  - Needs altimeter

Potential prevention methods

- USGS shear-pin-based safety
  - Does anyone have info on this?

- We have accurate dredge shear pins

Potential prevention methods

- Bottom contact switch

- Releases the safety mechanism and arms the JPC

Theoretical prevention methods

- Acoustic
  - Option 1: acoustic release
  - Option 2: acoustic safety
- Bottom contact switch on trigger core nose
  - Wired directly to mechanical safety
- Hydrostatic with shear pin
- Messenger safety

- What wacky ideas do you have? Ways to mechanically trigger things at bottom of ocean?

Discussion about coring