Seafloor Sampling from US Academic Research Fleet

UNOLS Marine Rock and Sediment Sampling (MARSSAM) Facility supports NSF PI's across the fleet

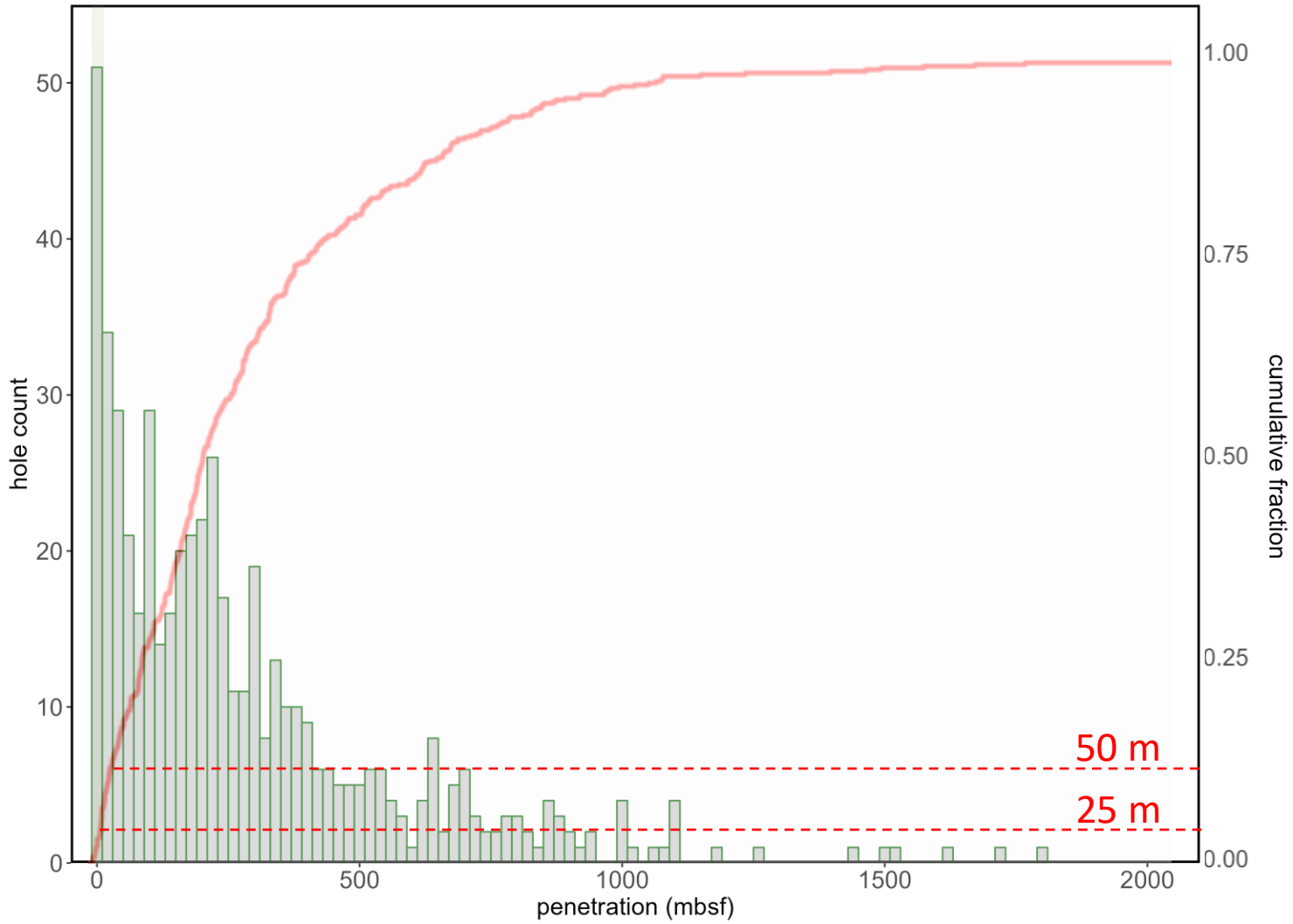
Many options for recovering sediment-water interface, seafloor rock exposures, and cores <10 m length, essentially one option for recovering cores >10 m and <30 m, no options for recovering cores >30 m

AGOR-23 Class (e.g. R/V Revelle)

R/V Sikuliaq

Ocean Class (e.g. R/V Ride)

What does that mean for Riserless Drilling objectives?



Data courtesy of L. Childress (IODP)

Represent number of non-mudline (i.e. more than 1 core) holes drilled by International Ocean Discovery Program from JOIDES Resolution

If we assume hole length is reflective of scientific objective, <5% of objectives can be met with current NSF-supported infrastructure/facilities/vessels

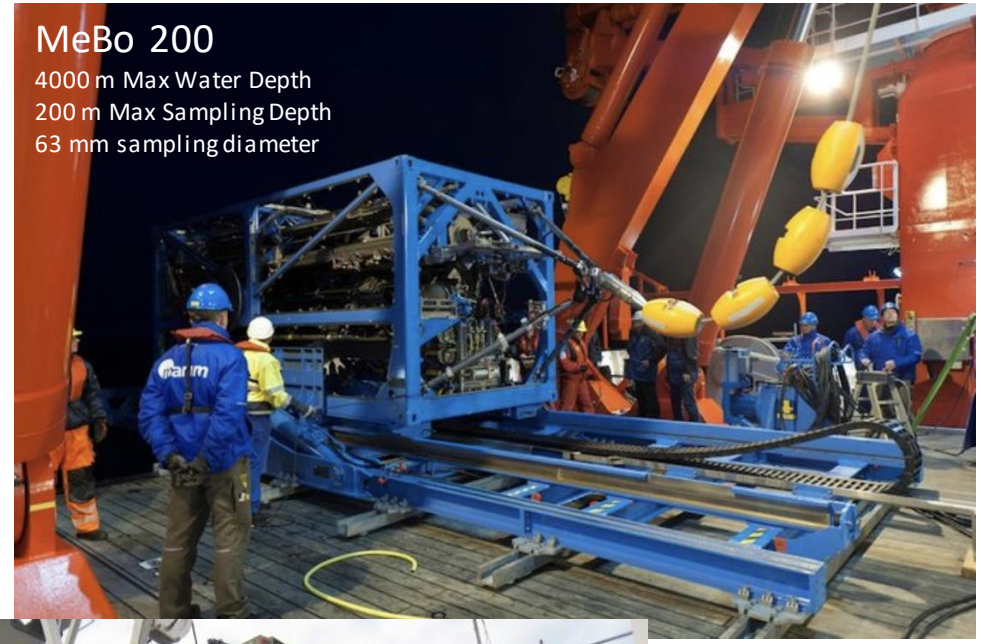
Restoration of 50+ m jumbo piston core capabilities gets closer to 10% but requires a ship capable of handling it.

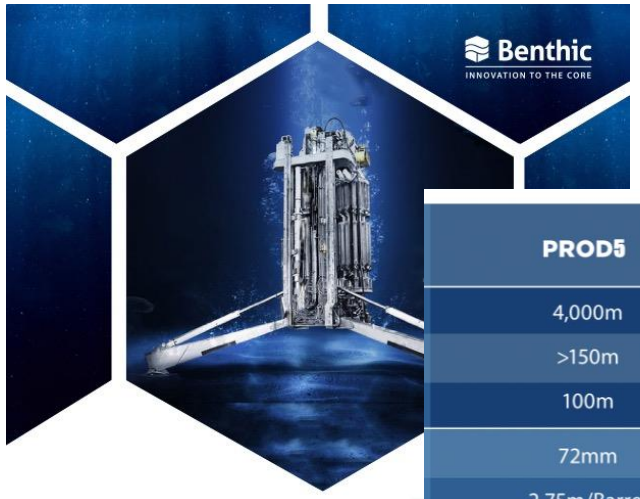
How can we sustain US research leadership in the near term?

Promising option is purchase or contract for use of a seafloor lander-based coring/drilling system (or systems)

Can be adapted to many different platforms, *including icebreakers*

Need deck space for support containers and heavy overboarding (details dependent on system)

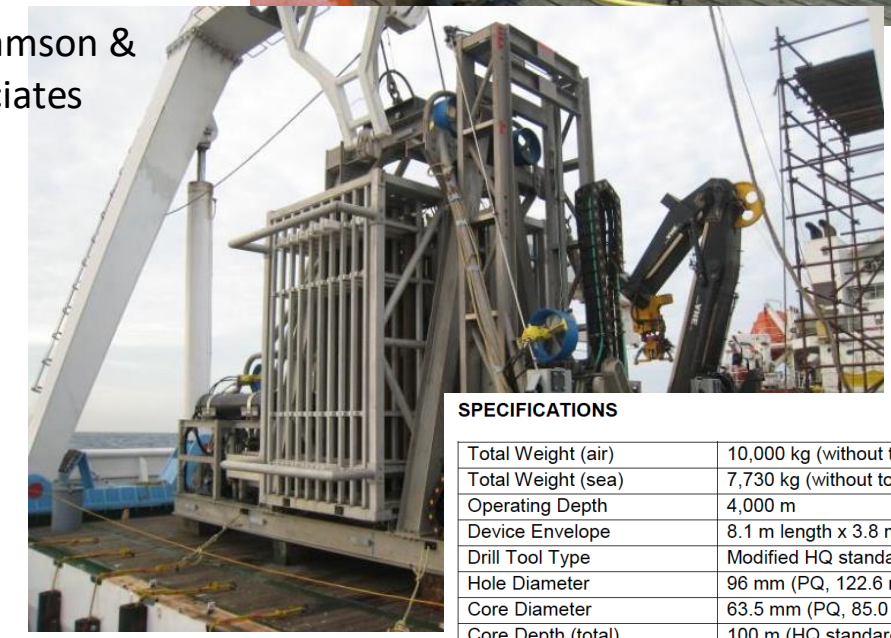




PROD
PORTABLE REMOTELY OPERATED DRILL
OIL & GAS | OFFSHORE RENEWABLES

PROD5		
4,000m	Max Water Depth	General
>150m	Max Sampling Depth	
100m	Max Casing Depth	
72mm	Sampling Diameter	Hard Rock Sampling
2.75m/Barrel	Core Length	
130hp	Rotary Coring Power	
75mm	Sampling Diameter	Soft Sediment Sampling
2.75m/Barrel	Core Length	
>12t	Max Push Thrust	

Williamson & Associates
ACS



SPECIFICATIONS

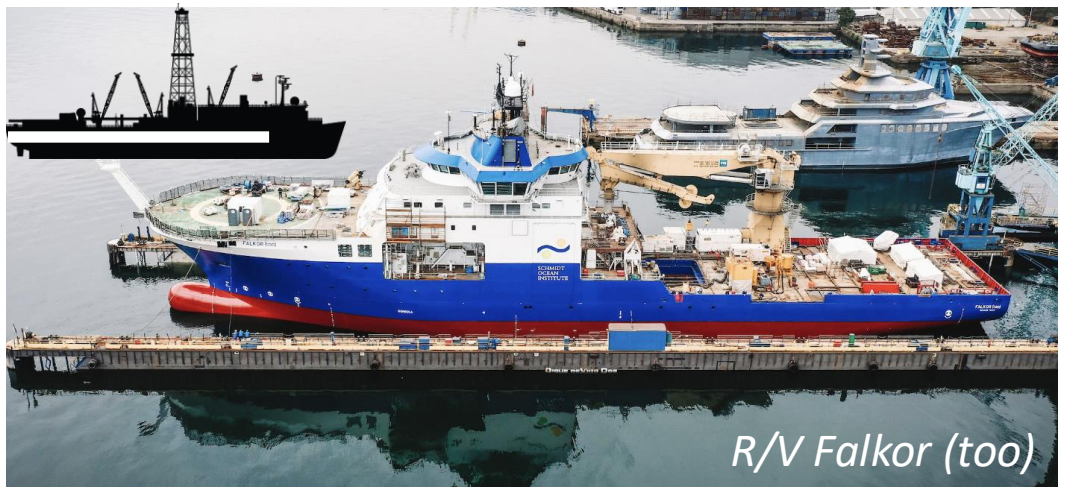
Total Weight (air)	10,000 kg (without tools and core samples)
Total Weight (sea)	7,730 kg (without tools and core samples)
Operating Depth	4,000 m
Device Envelope	8.1 m length x 3.8 m width x 5.8 m height
Drill Tool Type	Modified HQ standard (up to PQ standard)
Hole Diameter	96 mm (PQ, 122.6 mm)
Core Diameter	63.5 mm (PQ, 85.0 mm)
Core Depth (total)	100 m (HQ standard, expandable to 150 m)

How do we get there? Develop an Operational Model

1. Establish scientific mission requirement

2. Identify plan for infrastructure: *Develop NSF Facility, long-term industry lease, occasion-basis contracts?*

3. Establish access to capable vessel (or, better, vessels): *new or adapted ARF asset, Antarctic Research Vessel, non-profit partnership platform (e.g. SIO R/V Falkor (too)), industry contract/lease, some combination?*


R/V Falkor (too)

4. How will we facilitate enduring access to recovered material? *new or expanded existing core repository, modular labs vs. repository analytical infrastructure, etc.?*

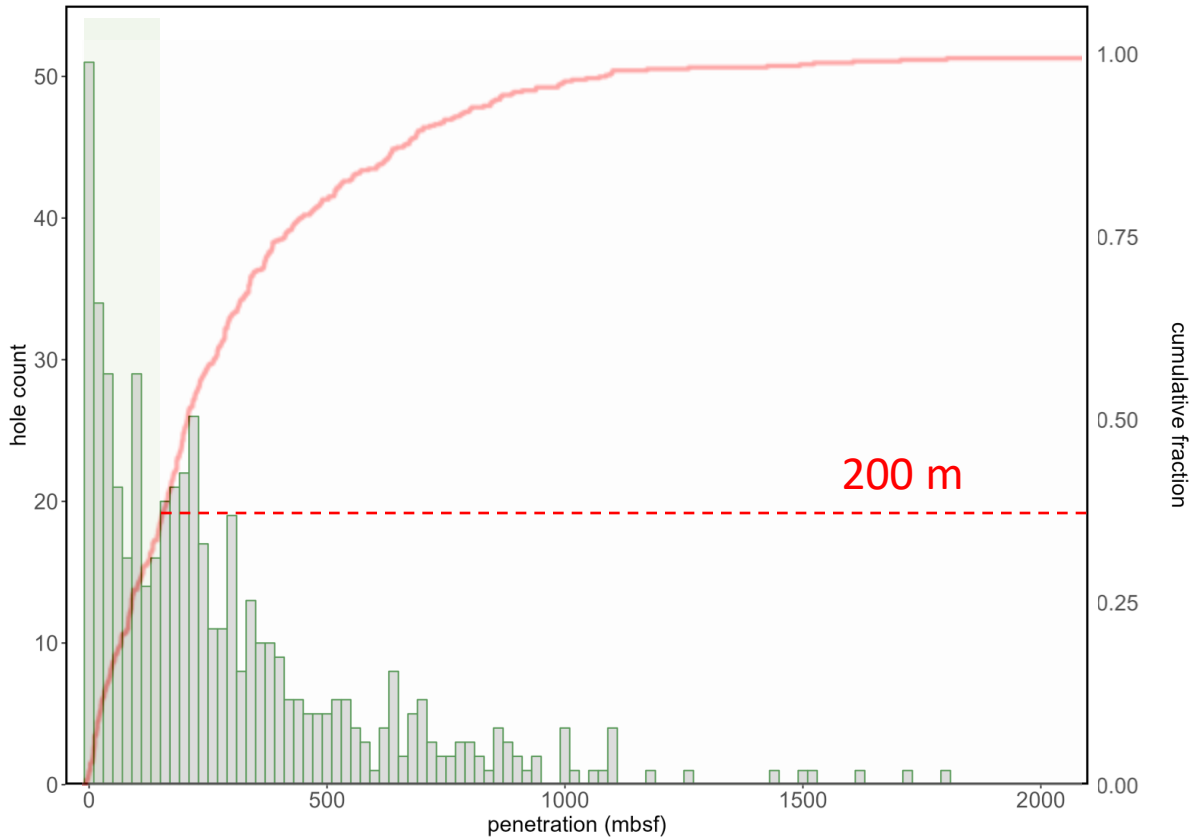
	Full Industry Contract/Lease Option	**Full NSF/Non-profit partnership Option**
Advantages	immediate functionality, low maintenance	lower cost per operation, reinvestment in US research community, more science supported
Disadvantages	Sustained high cost per operation, fewer science ops supported per year	significant initial start-up cost associated with facility development and tech training

A message of hope…

There are achievable and innovative options to access the <200 m subseafloor during the hiatus in US-led Riserless Drilling

Possible to meet ~40% of IODP objectives for ~10% the current sustained operational cost, while opening important research opportunities (e.g. high latitude and shallow-water environments)

Lander drilling will not replace the critical capabilities of a riserless drilling platform like JOIDES Resolution, but is likely to be an important **part of the solution**, perhaps in addition to partnerships with (IODP3/ECORD) to sustain access for deeper drilling objectives as the US community reimagines its future



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