

Sediment Sampling via Coring and Drilling. Evolving and Reinventing.

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Outline

- 1) We face a problem with the IODP drilling gap – demand increase on other approaches
- 2) We've faced disruptions before... how did we adapt/reinvent?
- 3) Piston Coring – diverse approaches/limitations – Modify Ships
- 4) Long Piston Coring – Ships needed.
- 5) Technologies on the horizon – Vision needed – cost effective, aligned to science.
- 6) Will science dictate facilities, or will facilities limit science? Action needed



Déjà vu all over again – Ups & Downs of Ocean Drilling

MOHOLE – 1958- (1961) – 1966-ish. **GLOMAR CUSS-1**. Success! Then chaos and discord! **LOCO PROJECT** unfunded and cancelled. Birth of **JOIDES**.

DSDP - Deep Sea Drilling Project. **GLOMAR CHALLENGER** – Phase 1 - 1968 to 1974. **REINVENT** Phase 2 (IPOD) 1975-1983.

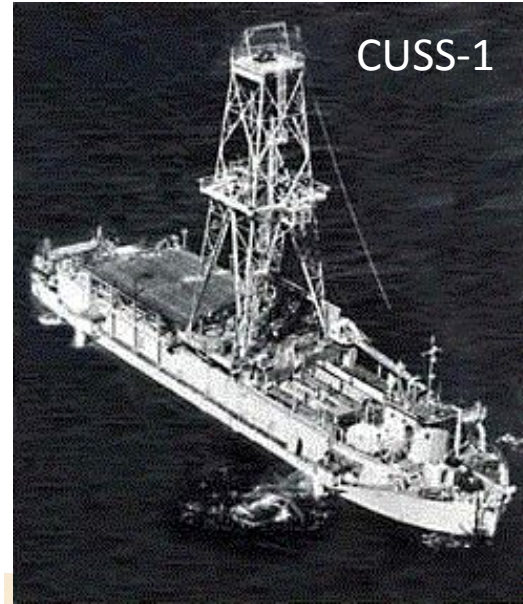
What next? Two options

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ODP Ocean Drilling Program **JOIDES RESOLUTION** PHASE 1 - 1985-96, Report - "Our Dynamic Earth" 1996 PHASE 2 – 1996-2004

IODP Integrated Ocean Drilling Program **JR, CHIKYU, MSP** 2003-2013 (Earth, Oceans, Life).

IODP International Ocean Discovery Program 2013-202? Separate but cooperating international programs



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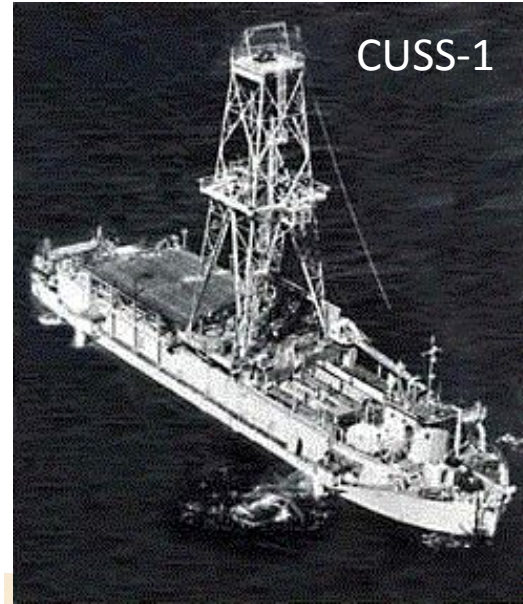
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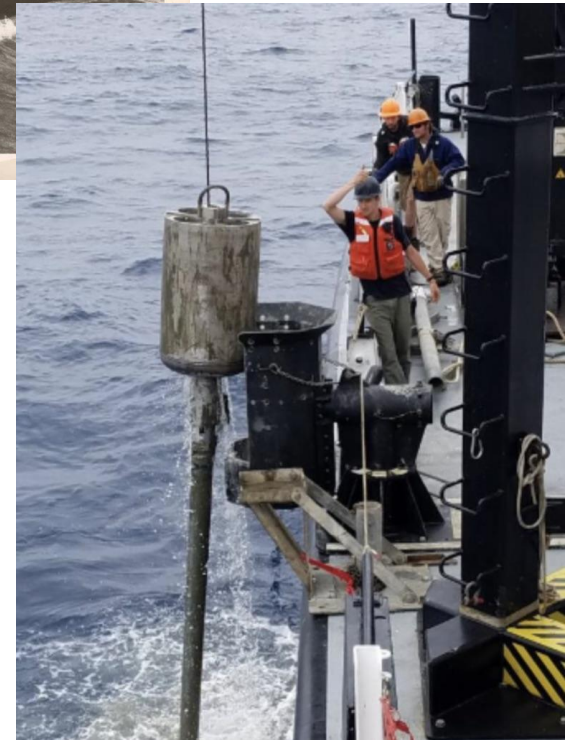
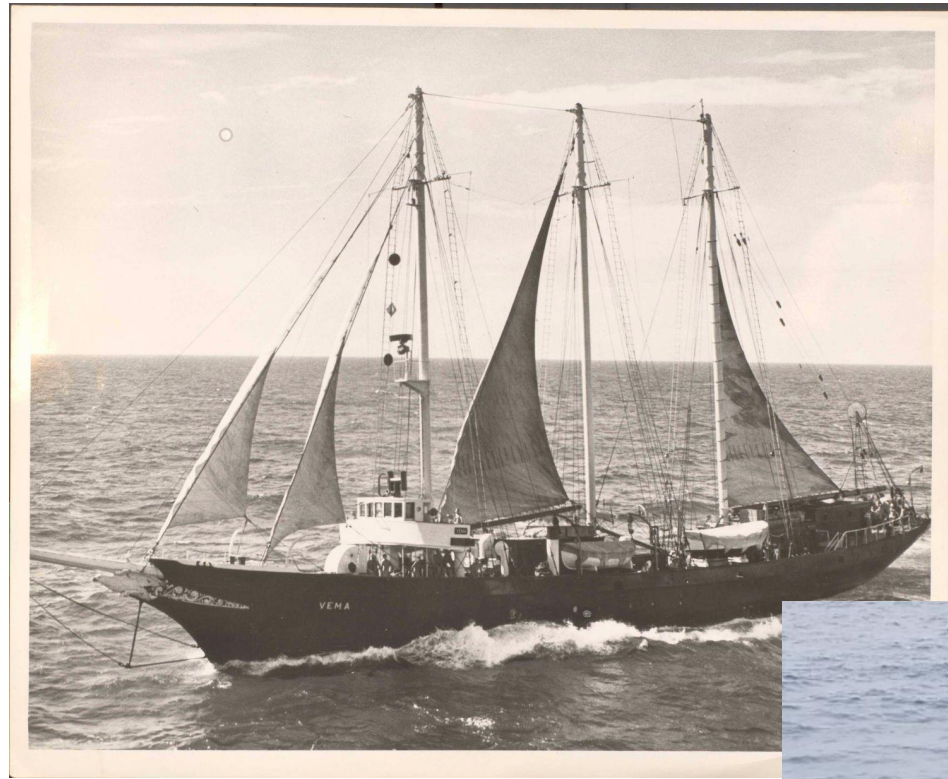
What Next?

Piston Coring – Early heyday, collapse, rebirth in a bar in Panama

1940's-1970's – each institution alone – Lamont dominated – Small Diameter Light Weight. No liners.

Given ODP Hydraulic Piston Core, non-drill piston coring fell aside in the 1970's-1980's

If you can't go long, go wide! 1) Charlie Hollister at WHOI made GPC in the 1970s, but it was lost. 2) (May 4th 1991) The Panama Agreement (Pisias, Mayer, Mix, Malfait, Heinrichs). OSU then made larger diameter, heavier gear, innovated design, created NORCOR. HEAVY PULLOUTS - >30,000 LB. We broke stuff (thankfully not people). Please NSF can we have bigger wire? Not then. Now?



ODP-to-IODP transition was far from certain. We explored cheaper options with Lander Drilling.

PROD 1 - Invented at Univ. Sydney and developed in the 1990's by Benthic Geotech Australia.

1999. NSF Proposal - Mix / Goldfinger / Torres / Johnson to test Lander Drilling on a US Academic Research Vessel.

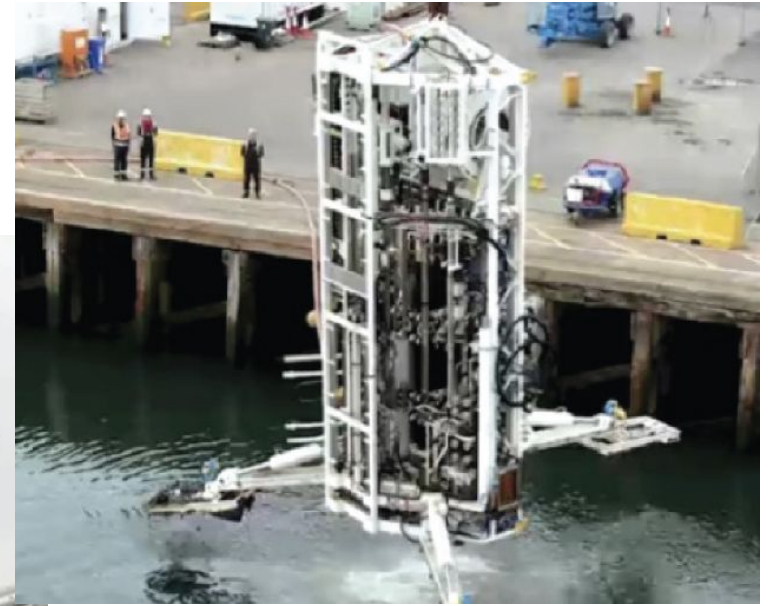


PROD-1 Deployed on R/V Thompson March 2000



It worked, but wasn't ready for use.
NSF funded IODP, couldn't afford both.
German partners developed MeBo.

Landers are now maturing in industry – many options



Giant (Long) Coring

Building on GPC (Hollister 1970s), France developed the Calypso (60m) Core in the 1990's, which created the IMAGES program – unique to 120m vessel Marion Dufresne.

WHOI (thanks to Broda, Curry, Keigwin, et al.) started development in 2003 and the 50m “Long Core” went operational on R/V Knorr in 2008 (innovation in weight handling).

R/V Knorr retired in 2014 and so did the Long Core. No US Ship can currently deploy the Long Core. Fixing this will be a discussion later in the meeting.



We need larger ships for sea floor sampling

Schmidt Ocean Institute -
FALKOR(Too) is a re-purposed
Offshore Support Vessel



So where are we now? Discussion Starters.

One size does not fit all needs, but too small fits no needs.

“Right-Sizing” the fleet “wrong-sized” MGG sampling programs. That causes a problem now.

Jumbo Piston Cores (e.g., MARSSAM) fit on US Vessels, limited by winch and wire. Can we upgrade existing vessels? A-Frames? Wires? Portable Winches? This seems doable.

Long Core cannot be deployed today. Can we modify existing global vessels to use Long Core? Can we charter (or purchase/refit) offshore support vessels? Near-term replacement of some vessels? Longer-term building of new global vessels? Antarctic Research Vessel?

Lander Drilling is possible but challenges US Ship capabilities. Might work on Falkor(too) or chartered offshore support vessels (e.g., IODP Expedition 389 use of PROD-5)?

Pathway to reinventing shipboard Ocean Drilling? Part-time operations before rebuilding?

Given realistic financial constraints, how should we prioritize?

