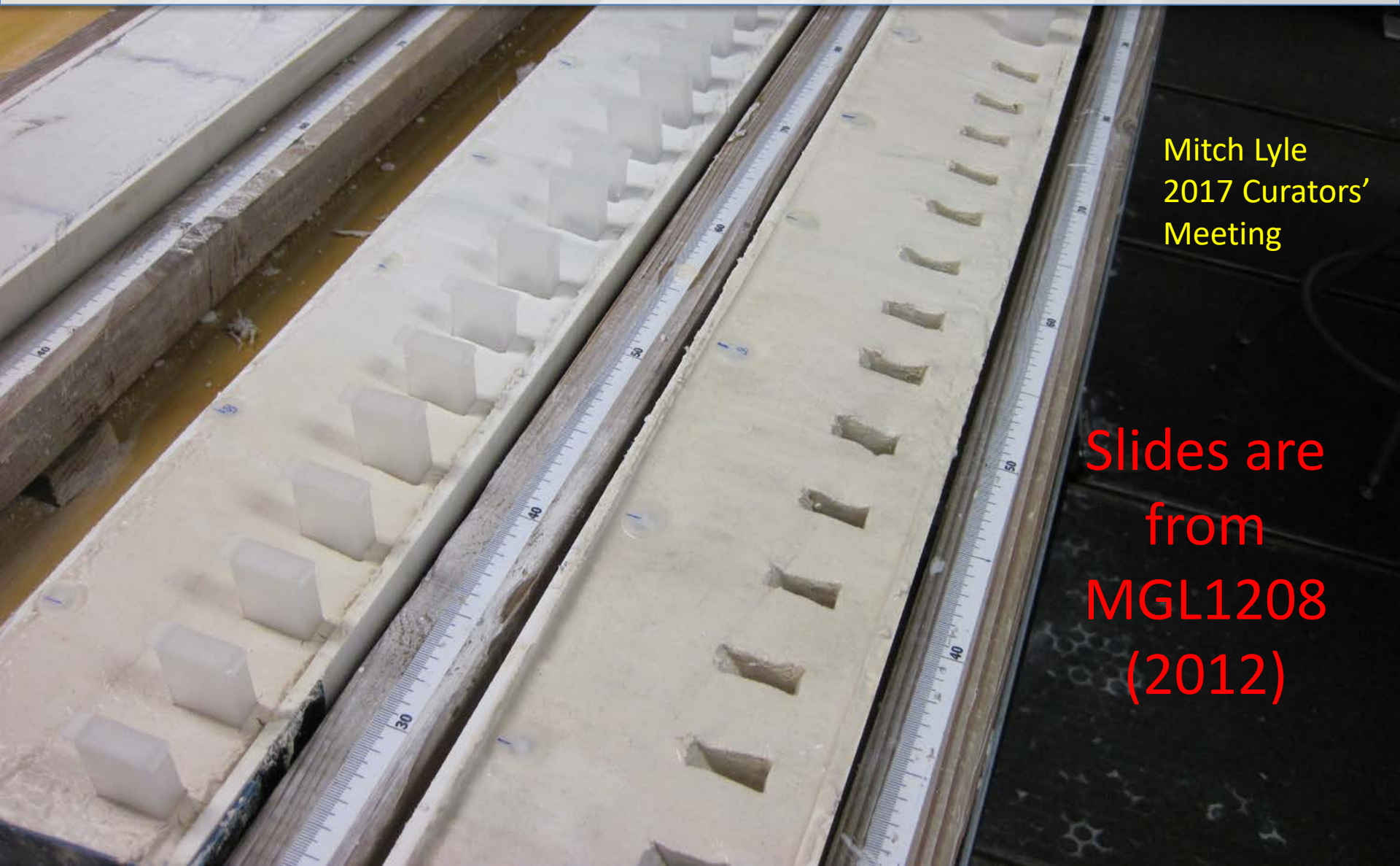
Seagoing Curation: Optimizing Research



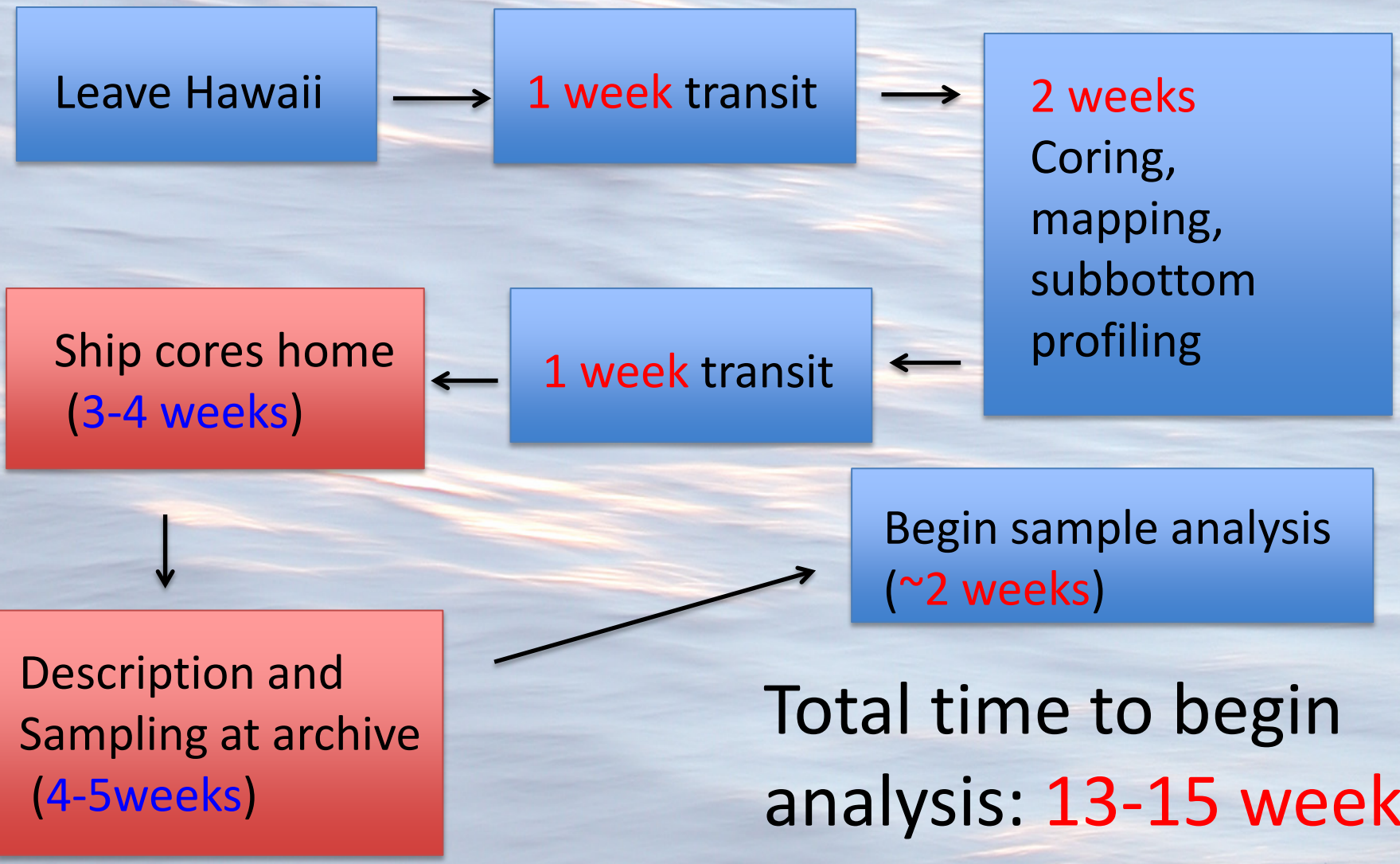
Mitch Lyle
2017 Curators' Meeting

Slides are from MGL1208 (2012)

Points

- Curation at sea optimizes research time and distribution of samples
- It works best when coordinated with multisensor track measurements
- Sea-going curation needs to be coordinated between curator and science party, identifying people responsible for description and sampling
- It is a great research activity for undergraduate and graduate students at sea

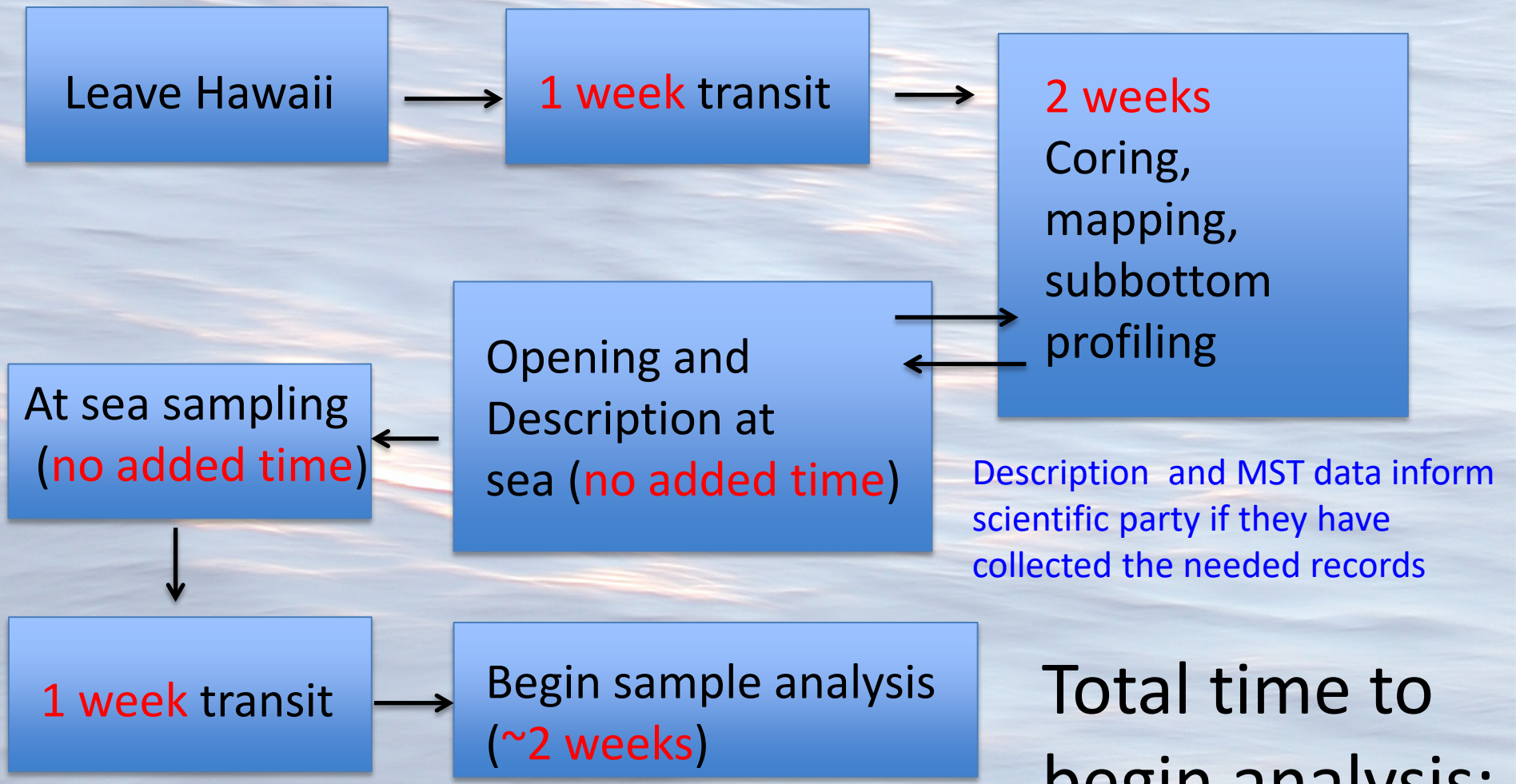
Timeline without curation at sea: 30 day cruise Hawaii to Hawaii



Total time to begin analysis: 13-15 weeks

includes MST, needs participation by science party

Timeline with curation at sea: 30 day cruise Hawaii to Hawaii



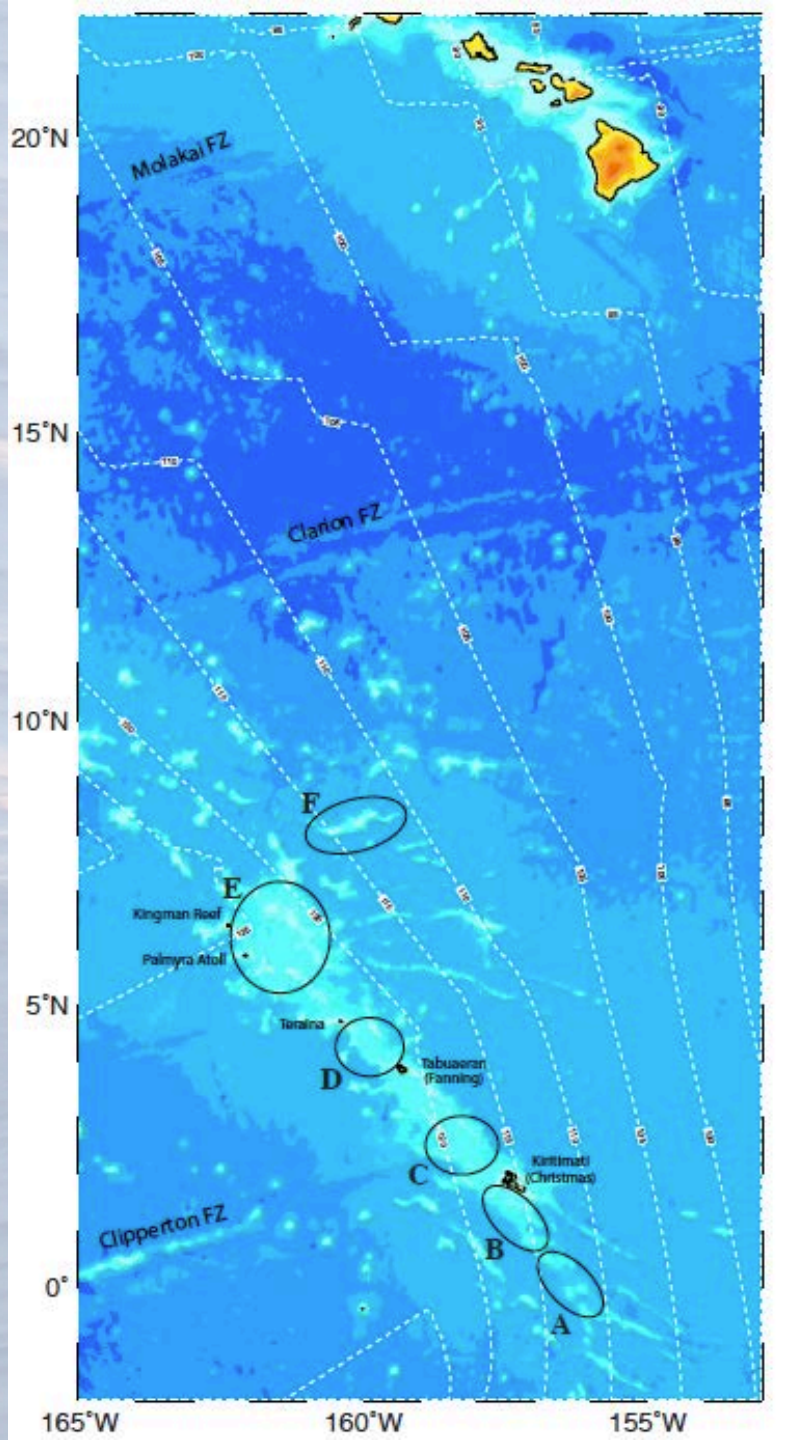
Total time to begin analysis: ~6 weeks

Costs/Benefits of at sea curation

- MST van needs prep, shipping; curation supplies need to be shipped (cost to coring group)
- Better informed research at sea, better sample collection
- Projects get samples faster before research inertia sets in
- Description leader needed to maintain quality description
- Important research activity for students, but must fill added berths
- Ability for at-sea research work—some work on samples can be done at sea

Important Step 1: coordination with curator and coring group

- Identify the number and types of cores to be taken, likely number of samples to be taken
- Provide for MST use, shipment
- Provide for core opening, extrusion equipment
- Provide for D-tubes, samplers, curation supplies to be shipped

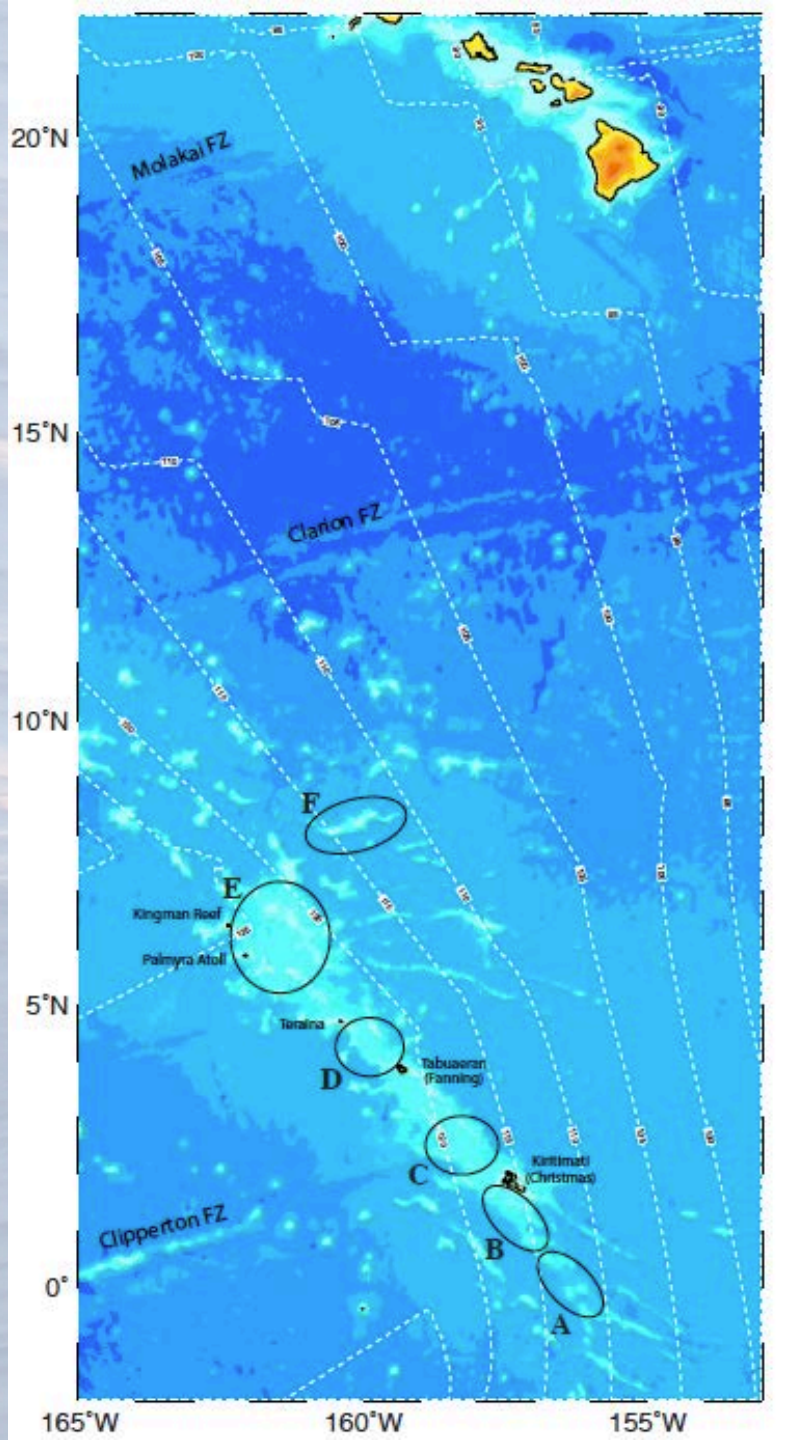


Example cruise: MGL1208 Line Islands Ridge, 2012

Co-chief scientists:Jean Lynch-Stieglitz and Pratigya Polissar

Latitudinal coring transect in the central equatorial Pacific

Cruise funded as an EAGER survey project—limited funding for post-cruise research



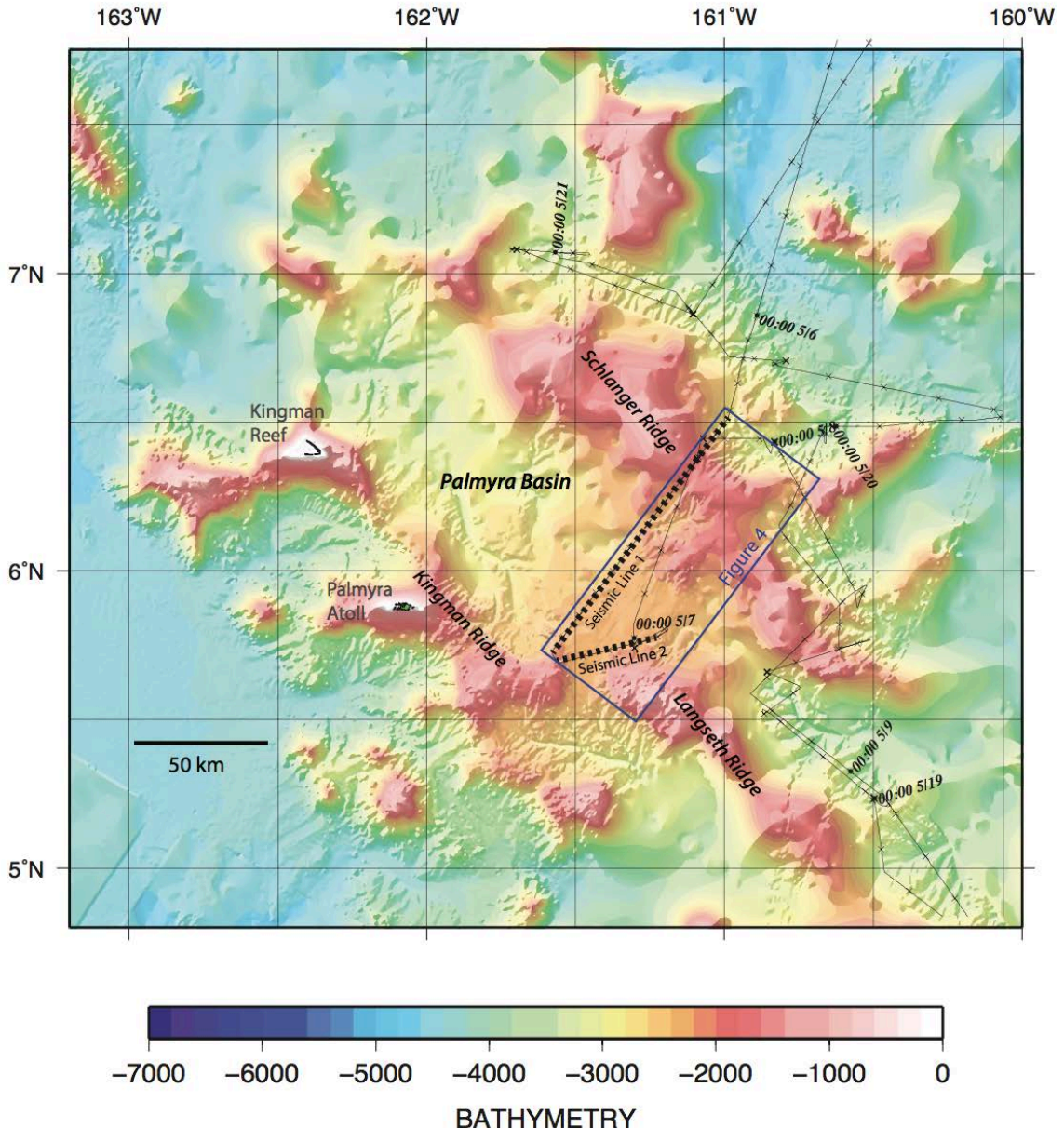
MGL1208
Line Islands Ridge

Objectives: obtain a set of cores crossing the ITCZ to study change in production, ENSO, dust transport on glacial-interglacial time scales

Coring plan:
PC's, BB gravity cores, multicores

Ridge was last cored in the early 80's, prior to GPS, common multibeam

Problem: Steep topography, slumping



Poorly surveyed region with only satellite topography available.

Only 3 or 4 previous cores from LIR shallower than 3500 m

Lyle et al,
2016; Marine geology

Problem: Steep topography, slumping

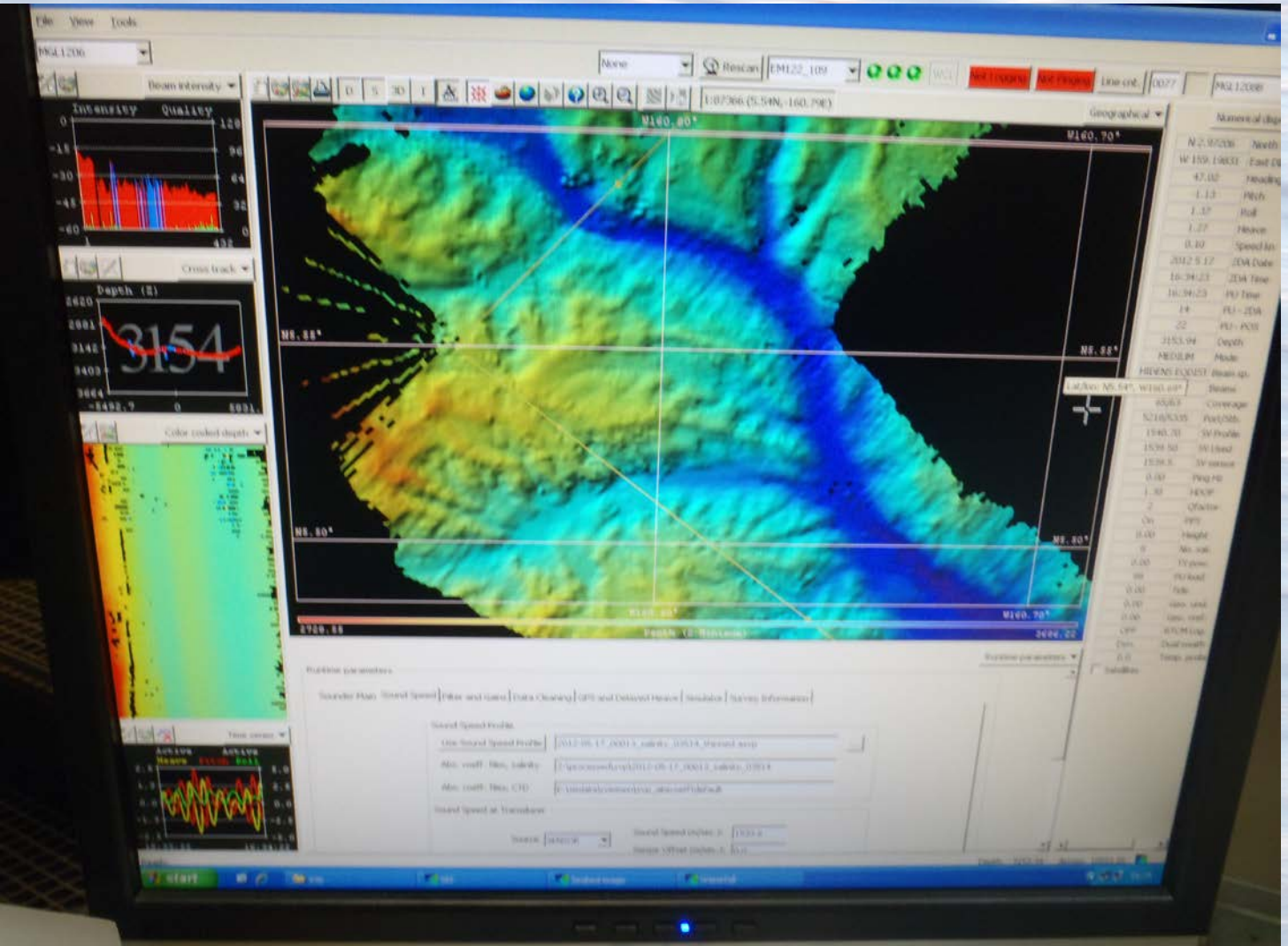
red dot is a dredge, surveyed by Thomas Washington in early 1980's

Note difference in swathmap

Source: GeoMapApp GMRT

Problem: Steep topography, slumping

Large channels, slumping off slopes



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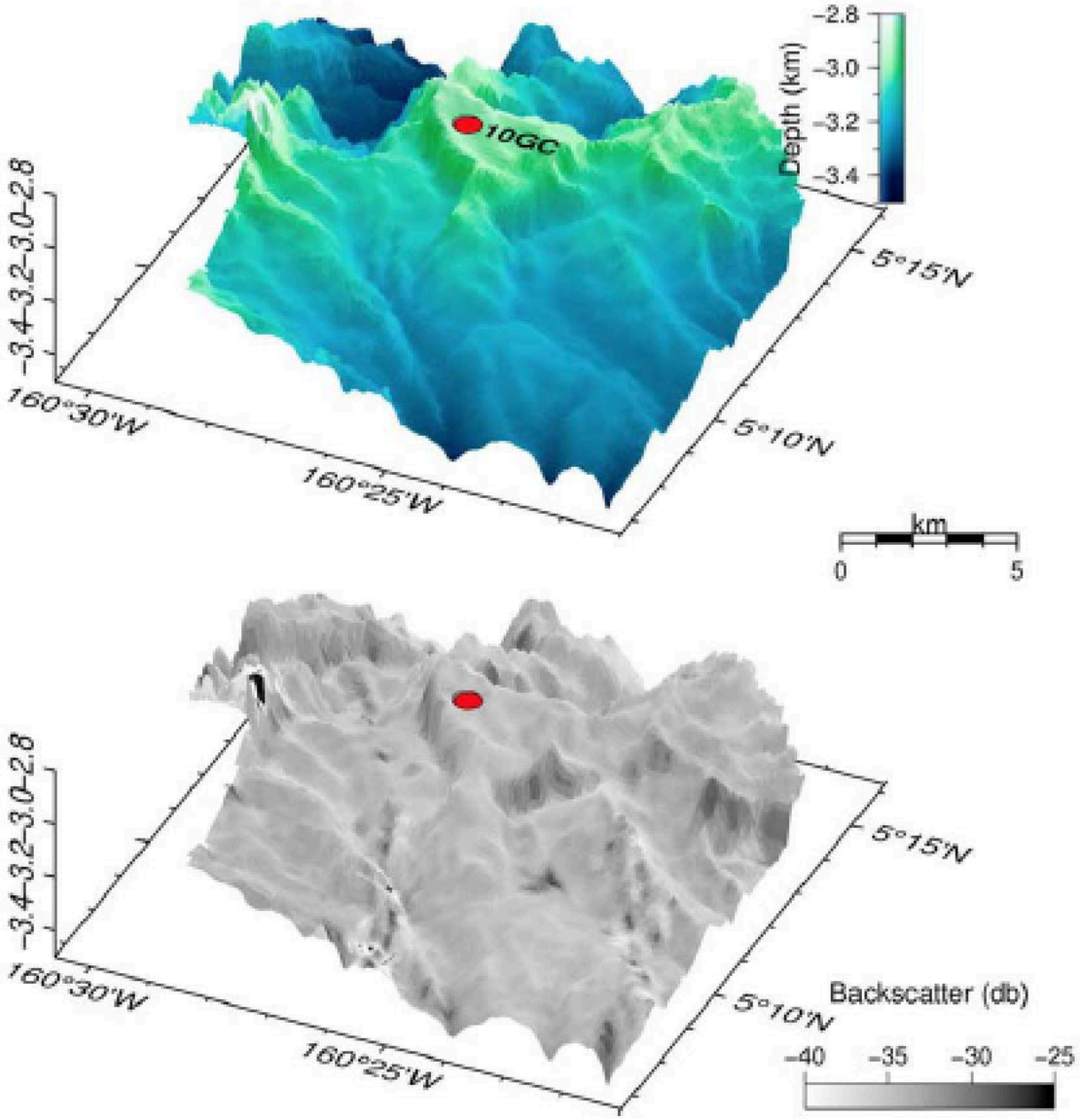


Highly eroded topography along LIR

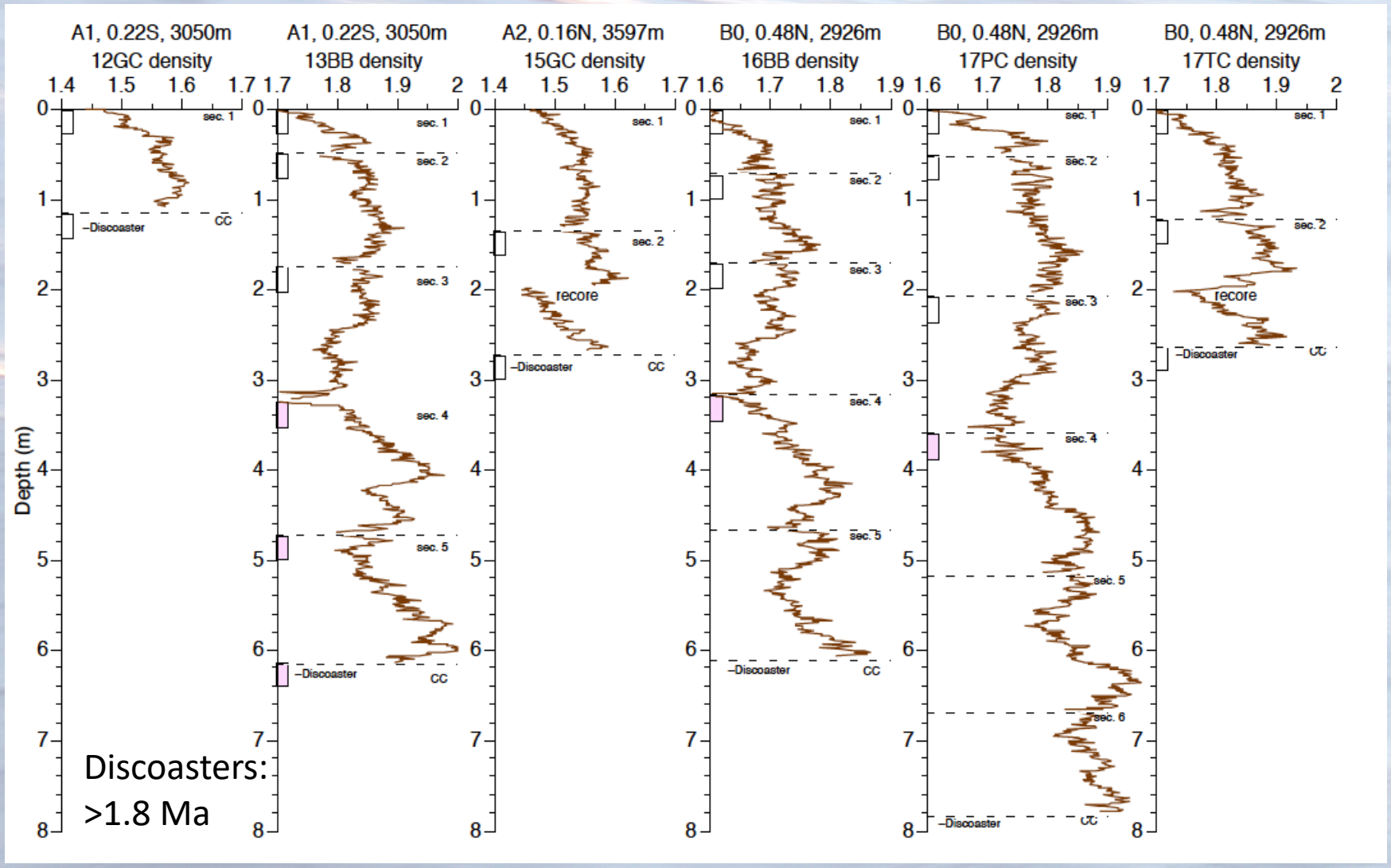
Needed GPS, multibeam, and chirp to locate core sites.

Were the cores adequate for latitudinal transect?

After Survey, get cores

MST data acquisition

MST records tied with shipboard stratigraphy



Opening cores—messy and loud

Description: Comparing sediments to physical properties

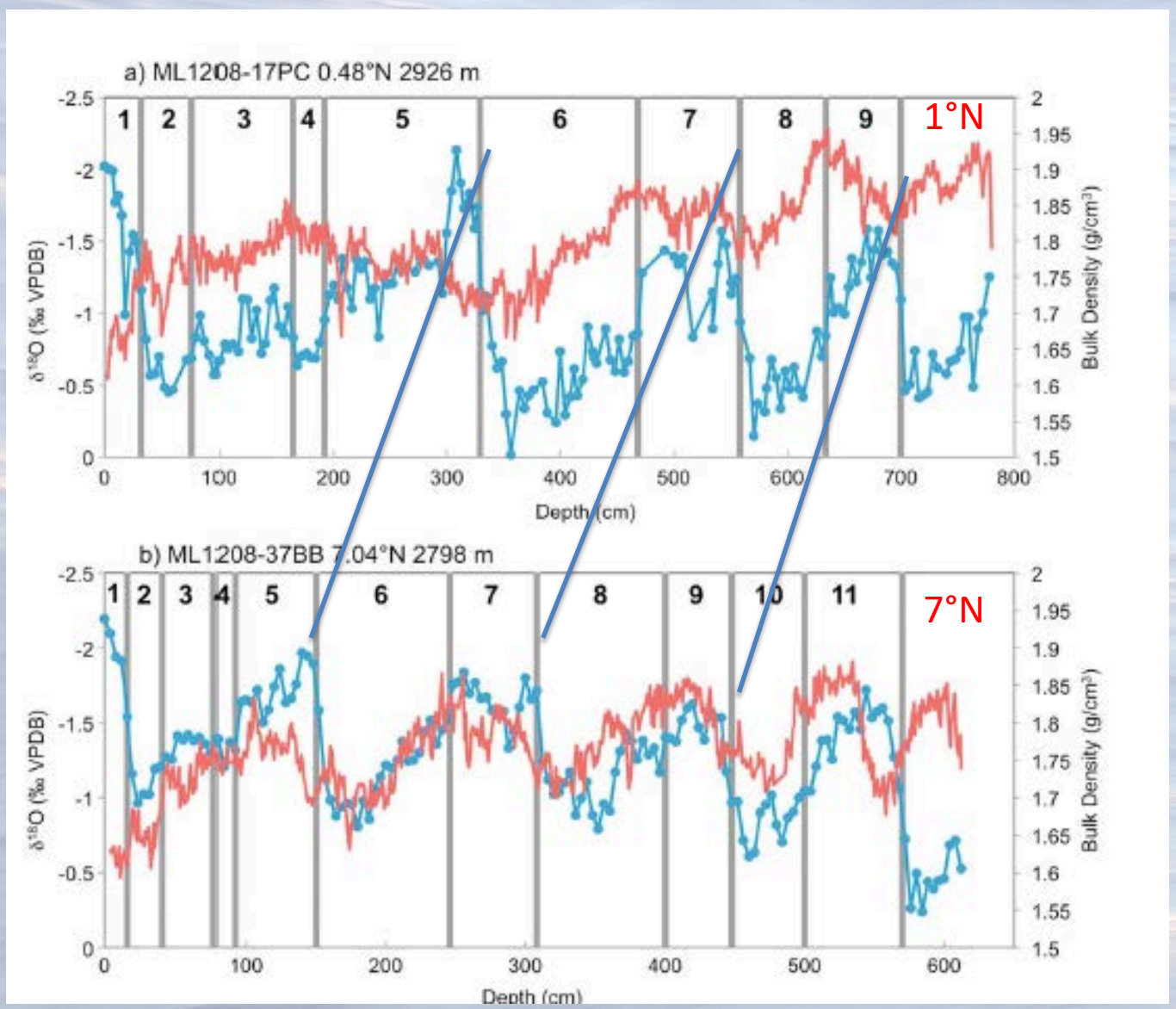
Occasionally finding slumps

Using biostratigraphy to confirm correlations

Core sampling

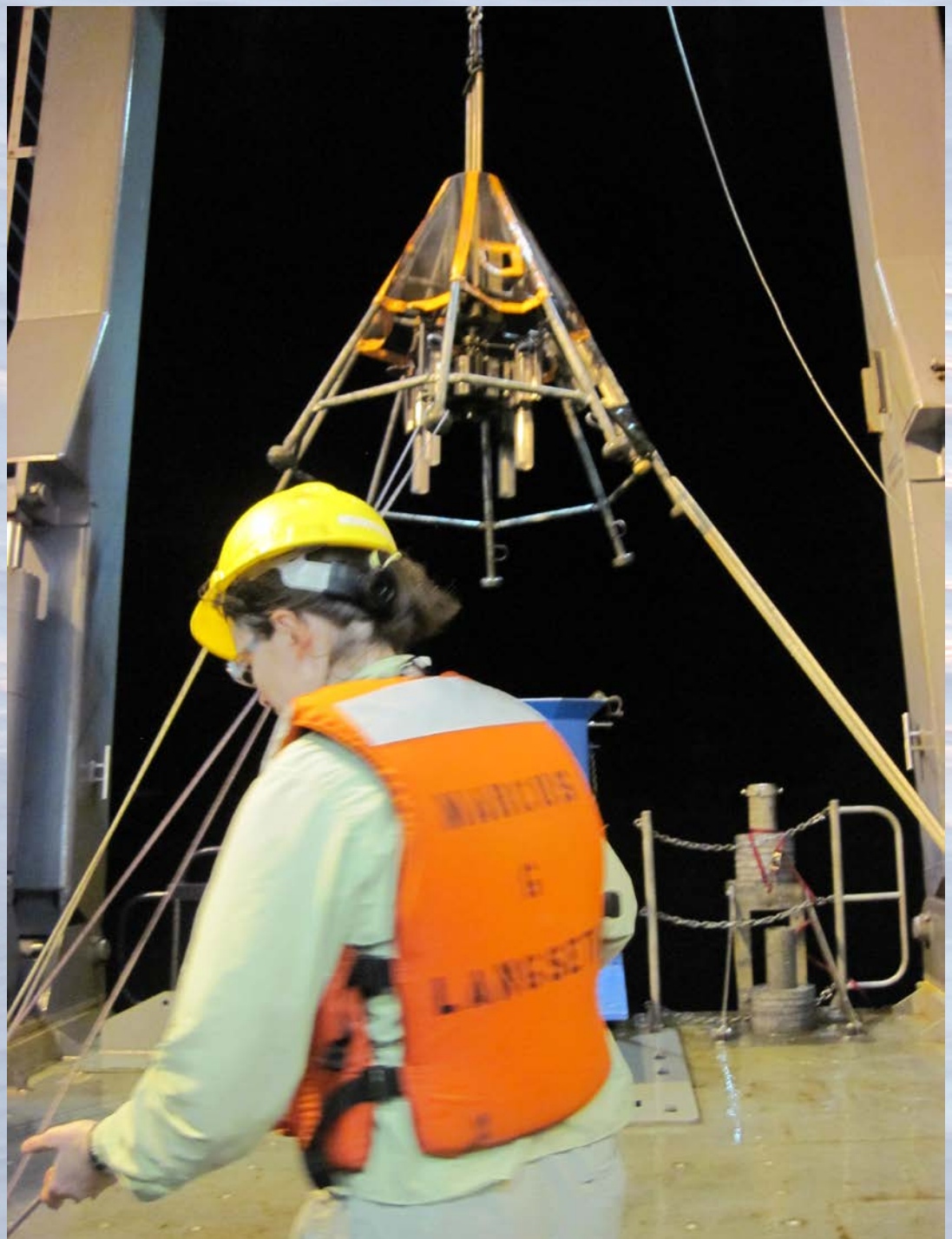
Sampling at sea allowed distribution of samples among researchers from the 6 participating institutions immediately

MST data acquisition vs lab studies



red: bulk density
blue: ruber O-isotopes

Lynch-Stieglitz et al., 2015, Paleoceanography



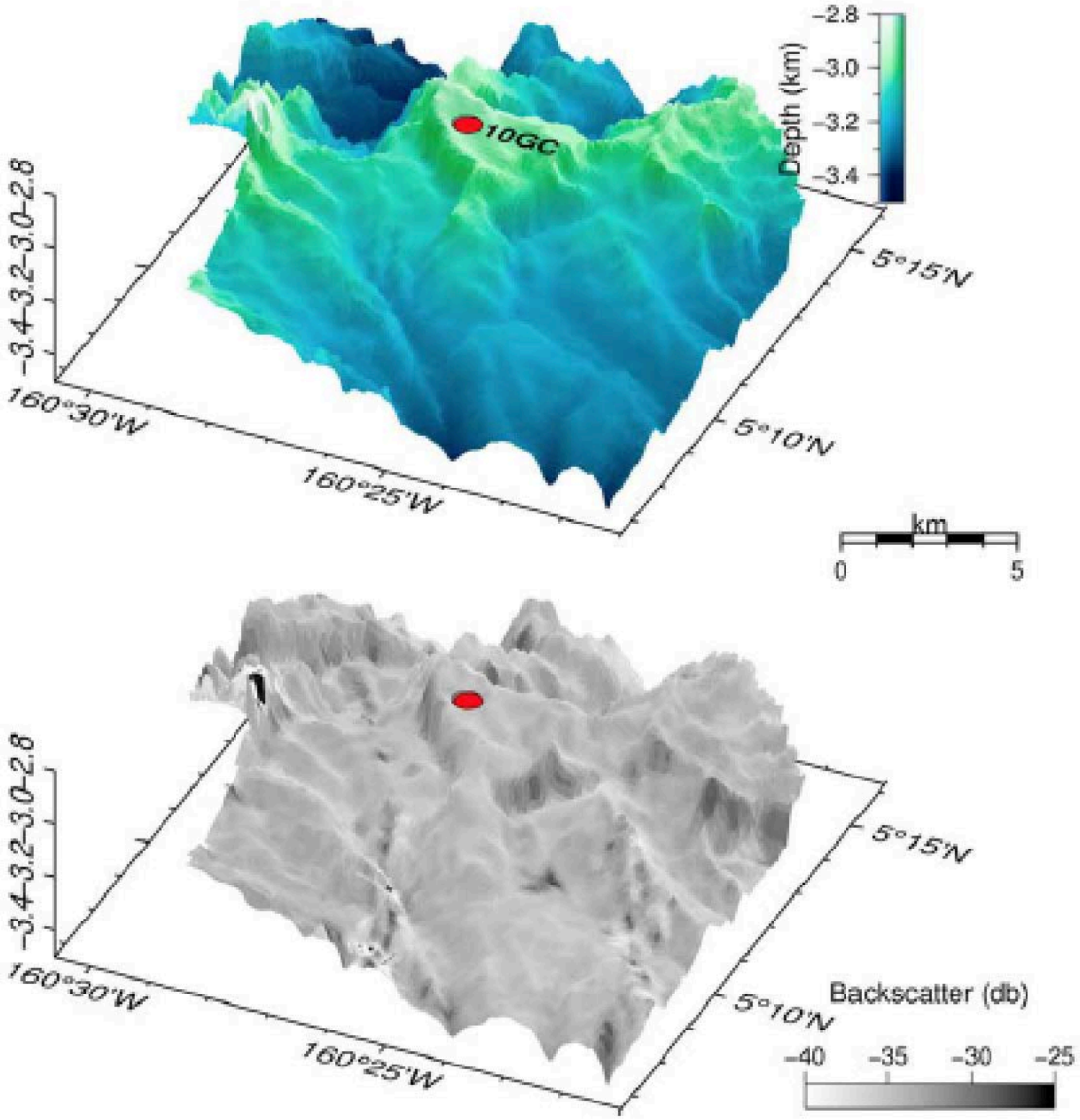
Multicoring: often slabbed at sea

Multicore—shipboard extrusion/sampling

Conclusions

- Curation at sea optimizes research time and distribution of samples
- Provides important feedbacks to fieldwork
- Provides an efficient transition between fieldwork and sample analysis
- Provides good training for students, and makes use of their time at sea

Problem: Steep topography, slumping



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