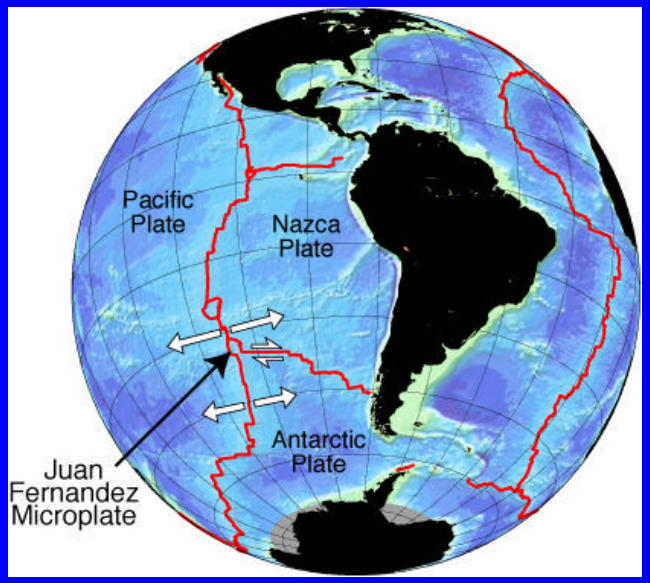
2004 Jason II and DSL-120 science programs

Pockalny/Larson
8 Jan – 9 Feb

Rob Pockalny Presenter

Deep Endeavors - Pockalny, Larson & Natland

TN165 R/V Thomas G. Thompson
Easter Island to Easter Island
(2004/01/09 - 2004/02/16)



Goals

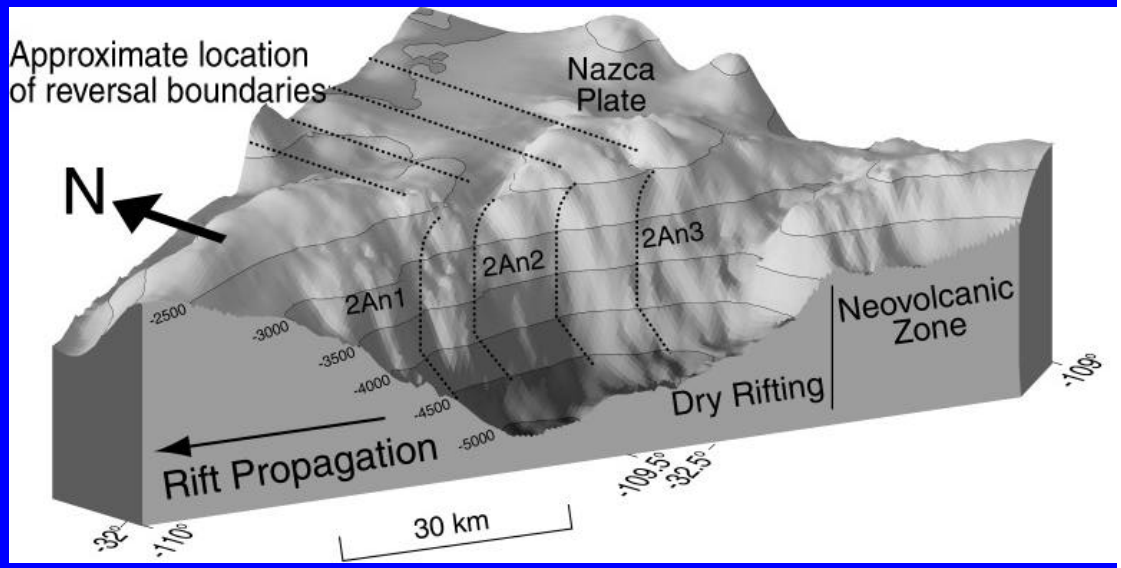
Test models of crustal accretion
=> back-rotation of upper crust

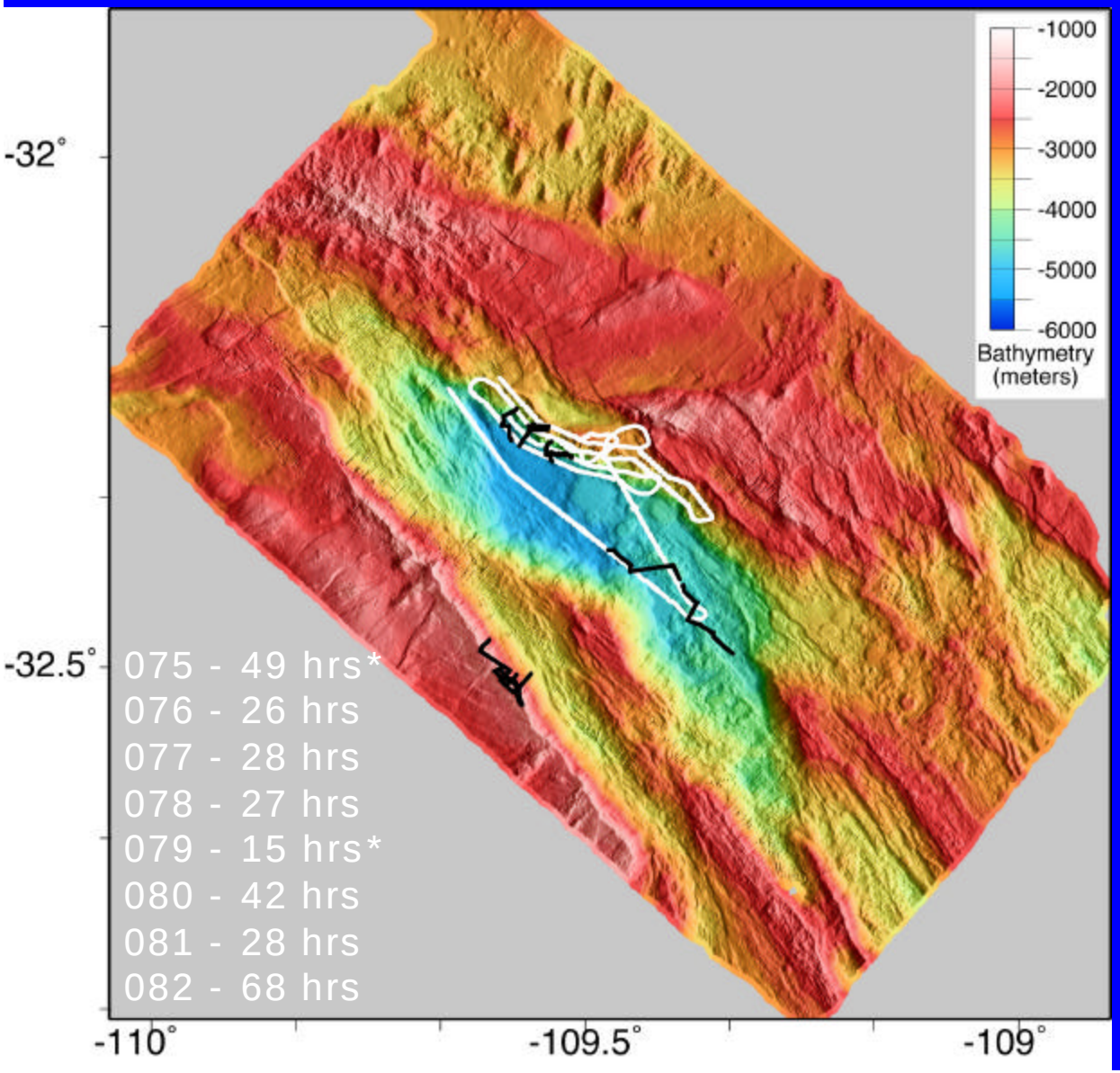
Observations

- structural attitude of units
- inclined magnetic polarity boundaries
- lithologic sequence

Strategy

1) regional survey
   - base map
   - ID magnetics
2) deep-tow (DSL120)
   - locate outcrops
   - ID polarity boundaries
3) near-bottom (JASON 2)
   - ground-truthing
   - sampling



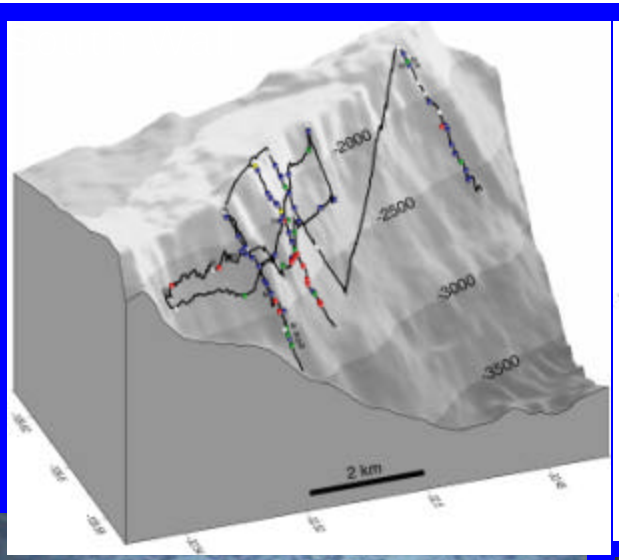


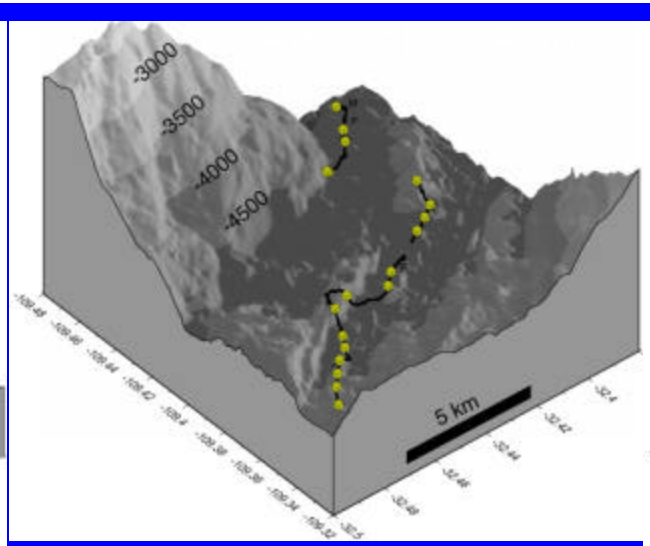
DSL120 (6 days)

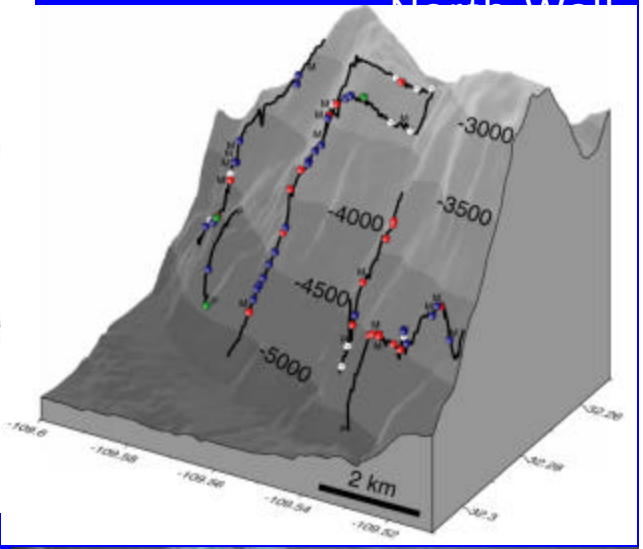
- 3 deployments
- 98 hrs survey time
- 150 m, ~1-2 kts
- SM2000
- MAPRs★
- 3 Component Maggie

JASON 2 (16 days)

- 8 deployments
- 283 hrs bottom time
- 192 rock samples
- 5 push cores
- 2 elevator lowerings *
- 3 Component Maggie


-2000
-2500
-3000
-3500
2 km


-3000
-3500
-4000
-4500
5 km


-3000
-3500
-4000
-4500
-5000
2 km

Problems

- Bow thrusters overheating on R/V Thompson at speeds < 1 kt
  - working out the “kinks” with the new DP system, or
  - underpowered for this type of work/weather conditions

Suggestions

- Real-time mosaicking for DSL120 very good
- JASON spare parts
- First-time users get some experience
- Improved navigation flags (confidence limits?)
- Laser spacers
- Improved lighting/strobes for high-def camera

Acknowledgments

- Capt. Phil Smith and the crew of the Thomas G. Thompson
- Will Sellers & the non-Patriot-fans of the Deep Submergence Group
  Pete C, Phil F, Tom C, Dara S, Chris T, Steve G, Bob W, Cynthia S, Akel S, & Roger D.
- Lew Abrams, Lelsie Sonder, Chris Popham, Zach Stehley, Emily Constantine, Clay Houston, Chris Wood, Nick Deardorff
- This research is sponsored by the National Science Foundation
  OCE-0137386 to U. of Rhode Island and OCE-0137173 to U. of Miami

Martinez
6 Apr – 9 May

Fernando Martinez Presenter

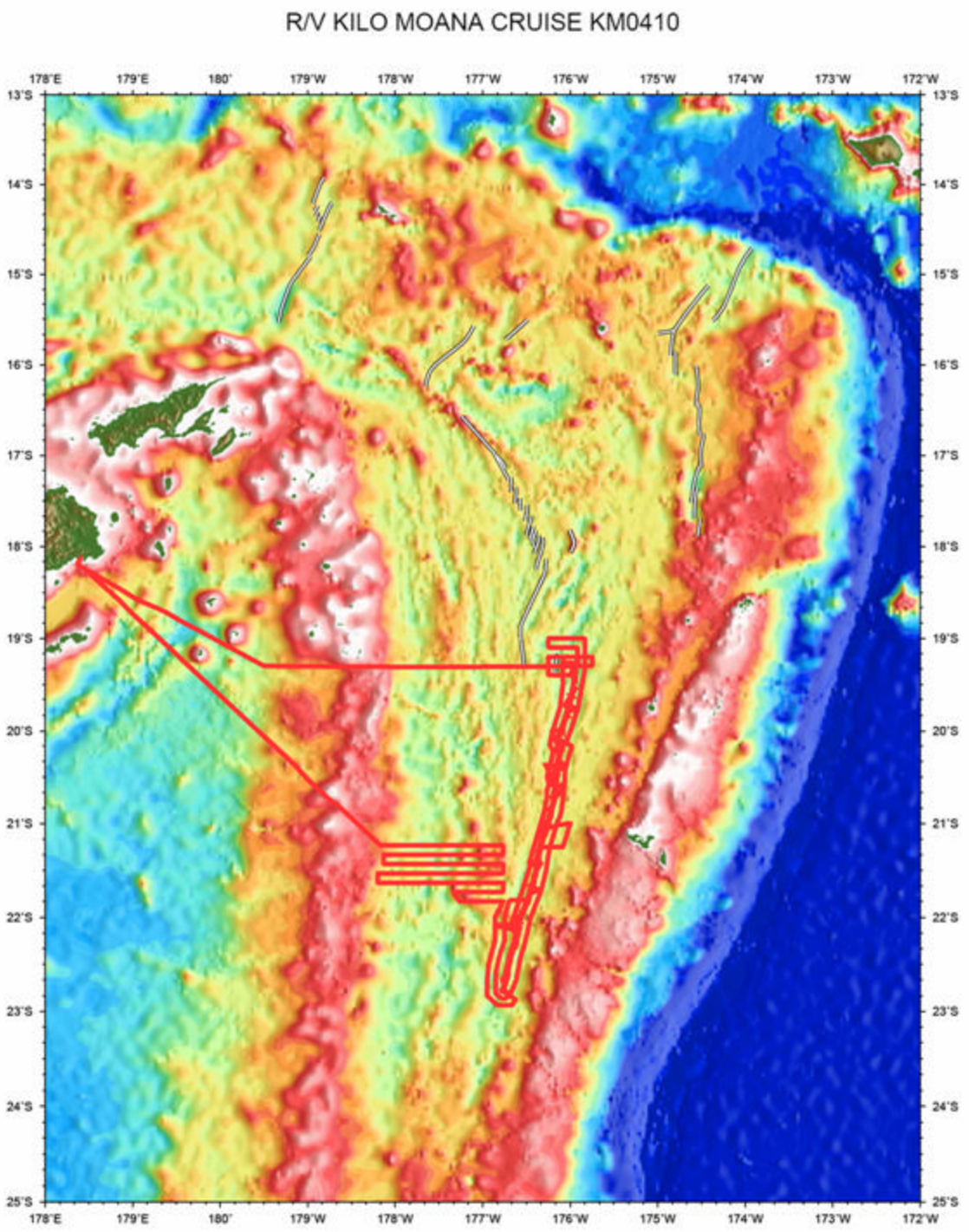
R/V Kilo Moana CRUISE KM0410
07 APRIL to 10 MAY, 2004
Suva, Fiji to Suva, Fiji

PI's Fernando Martinez
Brian Taylor
Joseph A. Resing
Edward T. Baker

Project title: Collaborative Research: Investigating the Interrelationships between Crustal Structure, Volcanism, and Hydrothermal Activity Along the Back-Arc Eastern Lau Spreading Center (ELSC)

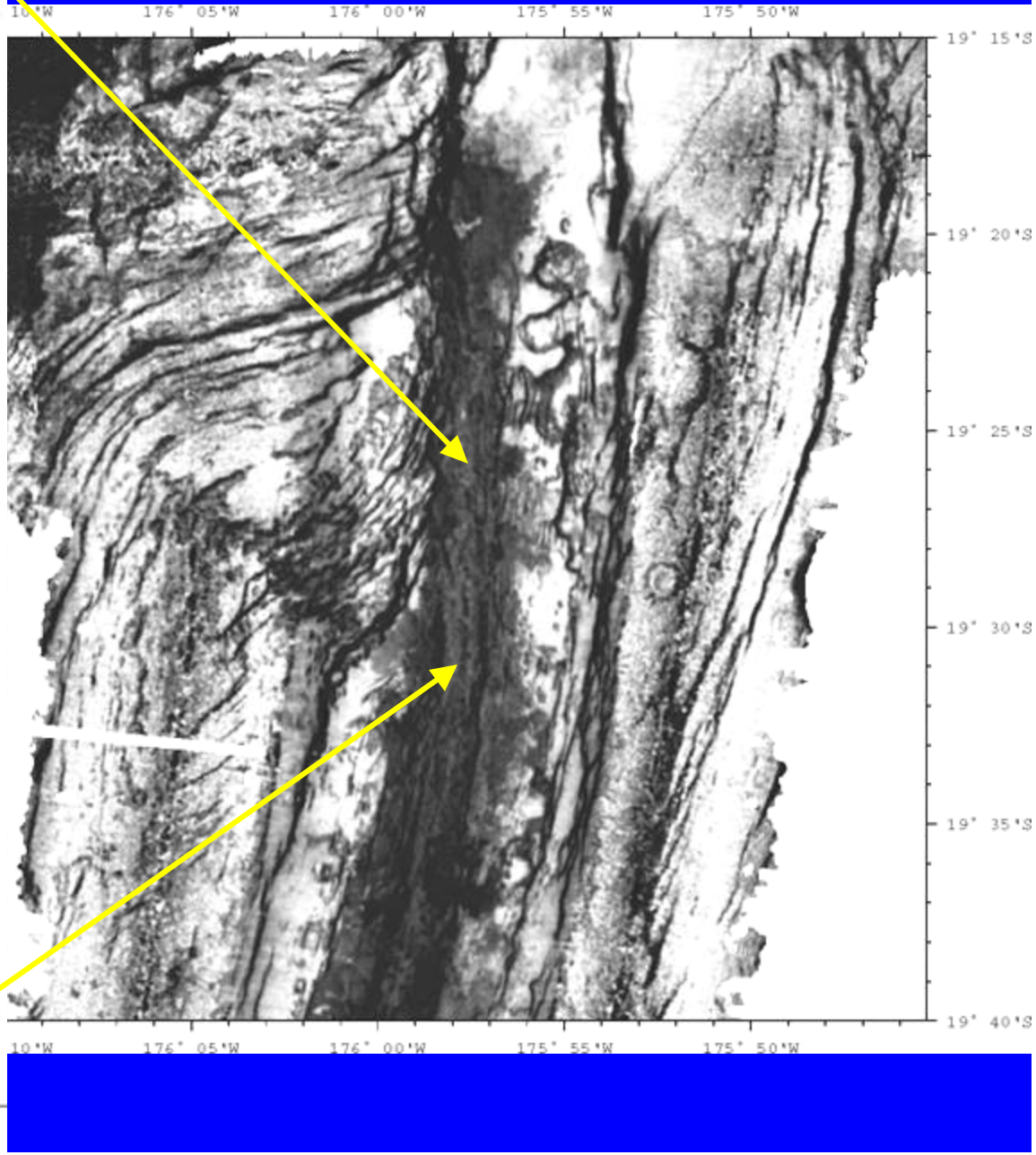
Objectives: As the first cruise of the RIDGE 2000 Integrated Studies Site in the Lau Basin, our goals were to:

- Obtain a nested-resolution mapping of the entire ELSC to examine the tectonic structure and volcanism along axis.
- Carry out a continuous survey of hydrothermal activity along the entire ridge.
- These data are to be used to identify sites for more focused surveys by subsequent cruises and eventually determine the focus area for this ISS

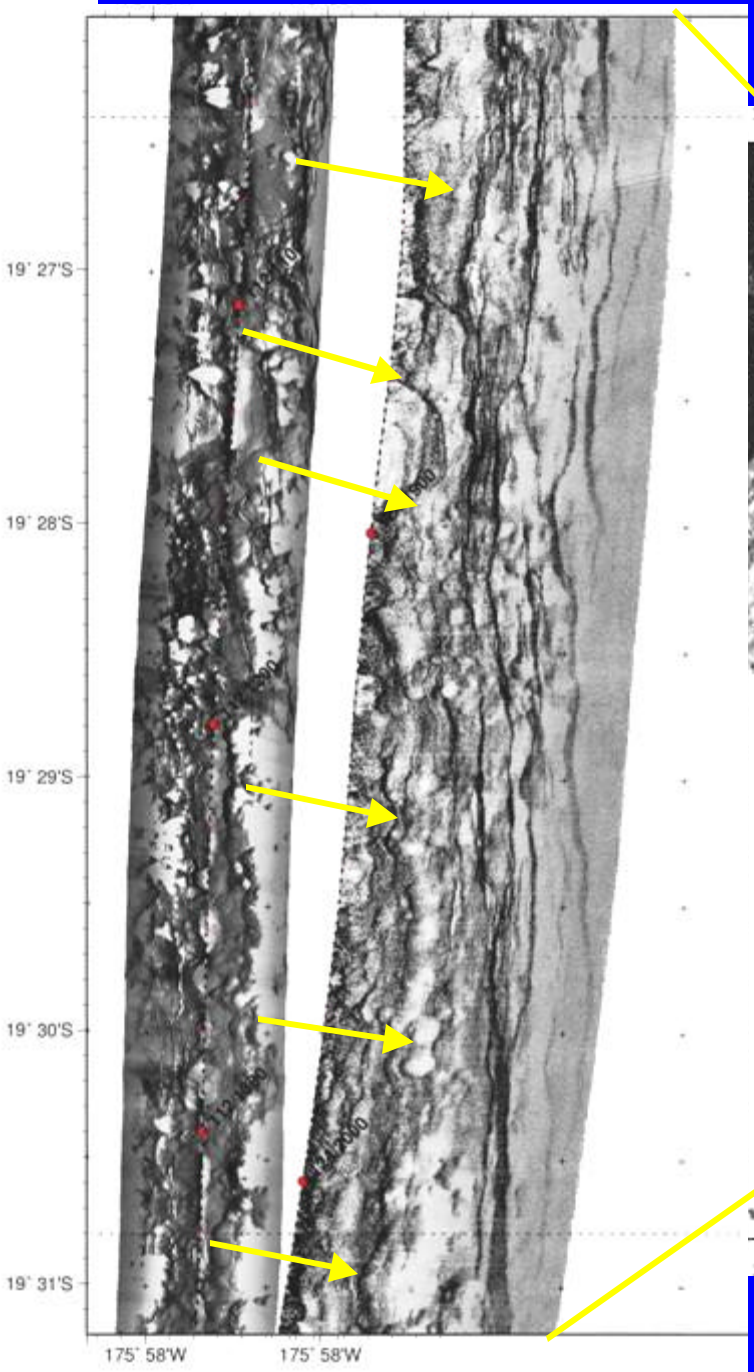


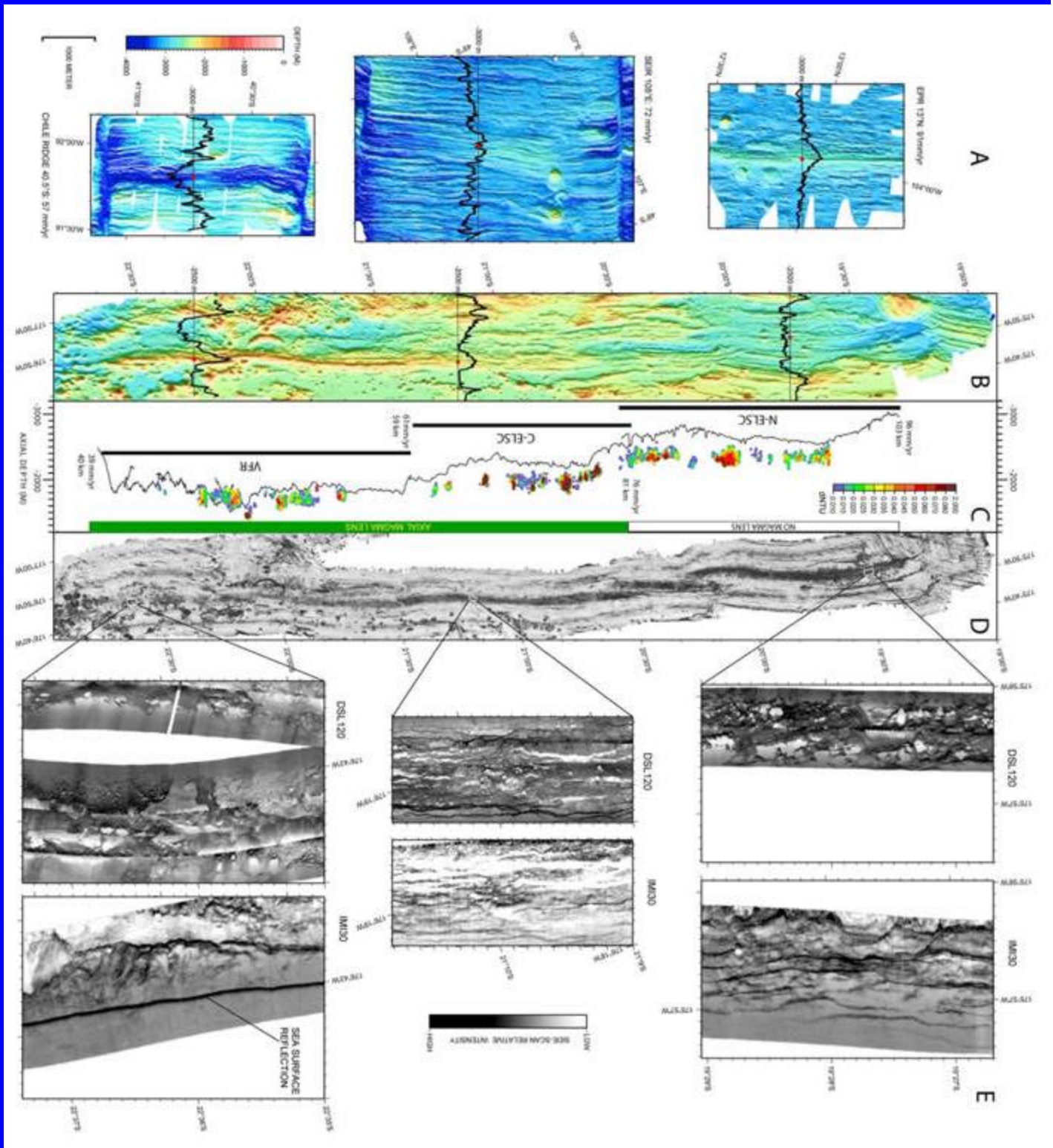
NESTED SIDESCAN SONAR SURVEYS

SIMRAD EM120 SIDESCAN



DSL120A IMI 30 (PORT SIDE)




39 mm/yr
INCREASING SPREADING RATE
96 mm/yr
A
B
C
D
E
C-ELSC
N-ELSC
VFR
DSL120
IMI30
SEA SURFACE REFLECTION

Chave

24 Jun – 6 Jul

No slides submitted

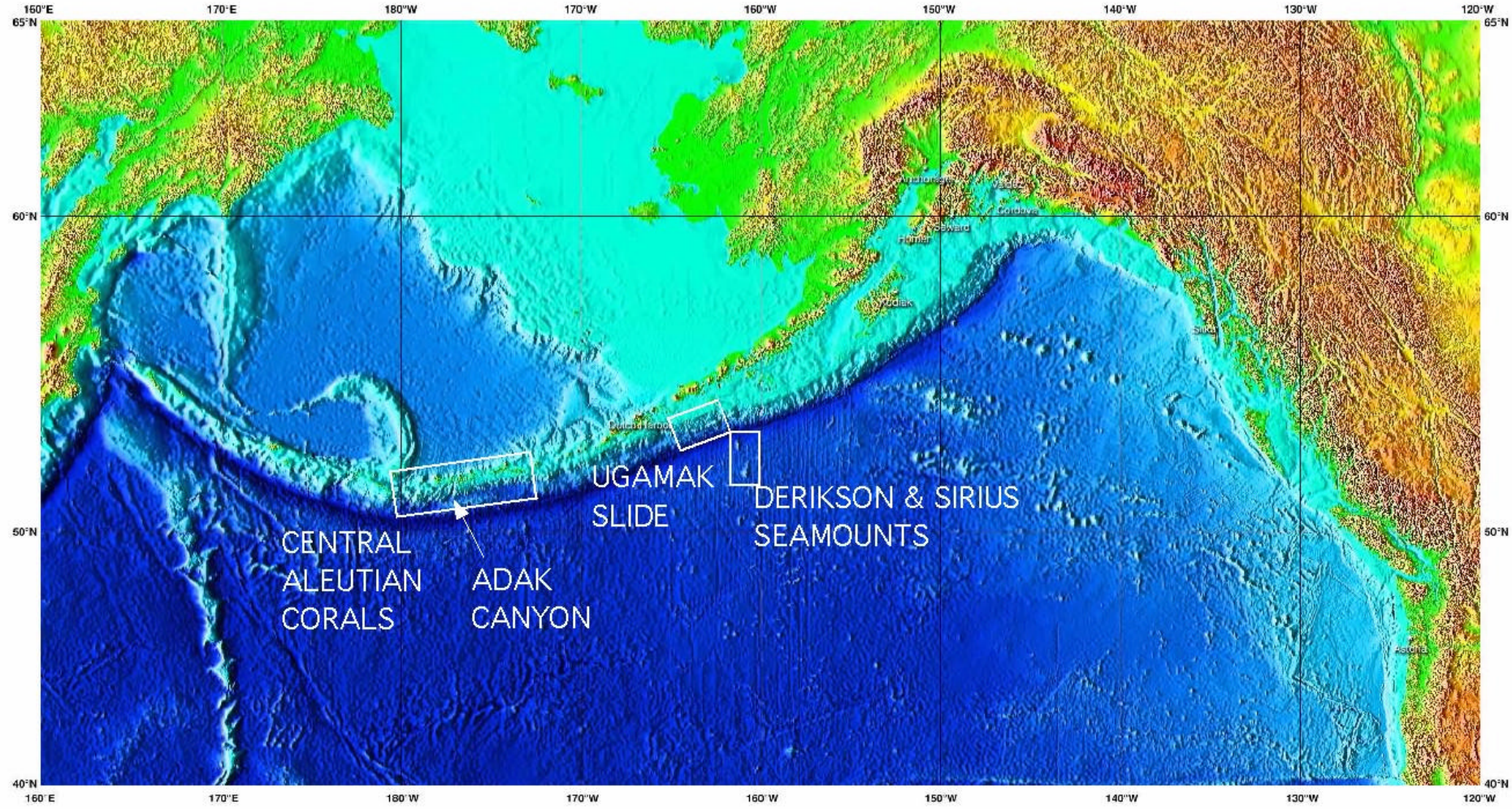
Reynolds
10 Jul – 16 Aug

Jennifer Reynolds Presenter

Aleutians Initiative 2004: ROV *JASON II*

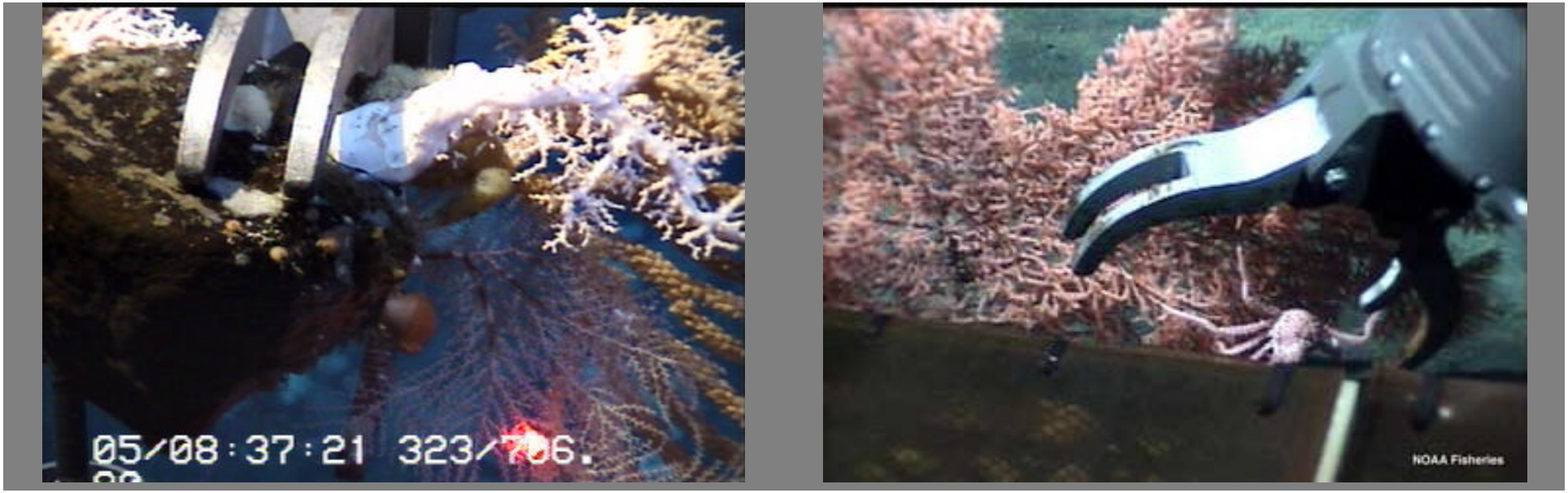
West Coast & Polar Regions Undersea Research Center

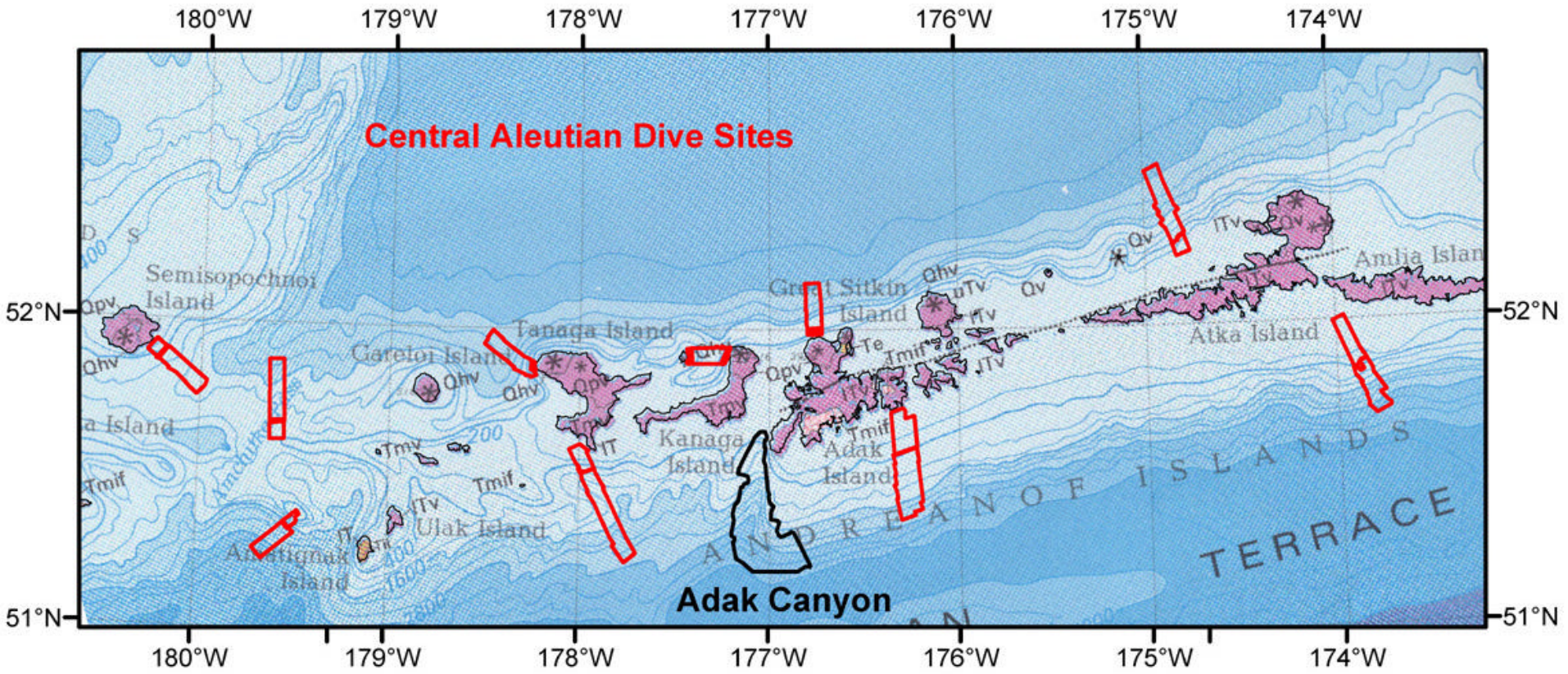
(NOAA/NURP)



Aleutians Initiative 2004 (Leg 2)
ROV *JASON II*

- **Stone, Heifetz, Woodby, Reynolds, Greene** (NMFS, Alaska Dept of Fish & Game, University of Alaska Fairbanks, Moss Landing Marine Laboratory) - *Distribution of deep-sea corals and associated communities in the Aleutian Islands*
- **Yogodzinski, (Keleman), Scholl, (Singer)** (University of South Carolina, WHOI, Moss Landing Marine Laboratory, University of Wisconsin) - *Primitive plutonism in an island arc: A study of deep submarine canyons in the Western Aleutians*


05/08:37:21 323/706.
NOAA Fisheries


Central Aleutian Dive Sites
Adak Canyon
180°W
179°W
178°W
177°W
176°W
175°W
174°W
52°N
51°N
Semisopochnoi Island
Tanaga Island
Kanaga Island
Adak Island
Atka Island
Amlia Island
Ulak Island
ANDREANOF ISLANDS
TERRACE

Aleutian Leg 2 - Jason II Dive Statistics

	Stone coral habitat	Yogodzinski Adak Canyon	TOTAL
Days =	10.75 days	3 days	13.75 days
Dives =	10 dives	3 dives	13 dives

Avg hrs in water =	18.71
Avg hrs on bottom =	13.96
Avg km on bottom =	7.06
Avg speed (kts) =	0.26

Bio samples =	467	260 corals 42 sponges 165 misc inverts
Rock samples =	119	82 Stone 37 Yogodzinski

Rathburn
10 Jul – 16 Aug

Elena Perez Presenter

Unimak Expedition:
Mapping, Sampling, and Exploration of the Seafloor Offshore Unimak Island, Alaska

(5 projects)
July 10-24, 2004

R/V Roger Revelle/ JASON II and TOW CAM

Positives: JASON II is powerful, versatile and reliable

Negatives: 1)The JASON II camera & video system provides only low-resolution images. The still camera (higher resolution) did not work , and had limited capability. The low resolution images cannot be used for publication. This long-standing problem of low priority for high resolution images must be solved. We need high resolution, digital video and still cameras that can zoom and tilt to produce useable images.

2) ROV on-deck turn-around time of 8 hours (for a series of short dives) was not made known ahead of time. Advertised turn-around of a few hours presumes a series of long dives for pilot rest.

Origin and Evolution of Western Gulf of Alaska Seamounts

PI: Randy Keller; Co-PIs: Robert Duncan and Martin Fisk

(Oregon State University)

1) Created first multibeam map of a seamount (Derickson Seamount)in the area of a former ridge-ridge triple junction in the Great Magnetic Bight

2) Seamount and surrounding seafloor are being faulted by the bending of the Pacific Plate entering the trench

3) Geochemistry results have implications for understanding mass fluxes at subduction zones and

Survey of Alaska Seamount Corals

PI: Amy Baco-Taylor (WHOI)

1) First time corals have been observed & sampled in situ at these depths

2) 43 coral specimens were collected in water depths from 4800m to 2766m ; most were octocorals and new to science

3) Several coral taxa extend the known depth and geographic ranges

Biological Response to Catastrophic Disturbance on the Aleutian Margin, Gulf of Alaska

PI: Tony Rathburn; Co-PIs Lisa Levin, Joris Gieskes, Jon Martin

(Indiana State Univ.; SIO; Univ. of Florida)

1) Discovered new methane seep and possible new deep-sea seep community associations
2) Created the first detailed multibeam map of the the area
3) Discovered new deep-sea coral habitats
4) First to characterize the relationships between seafloor geology, geochemistry and the mosaic of biological communities in the region.

Dating the Ugamak Slide

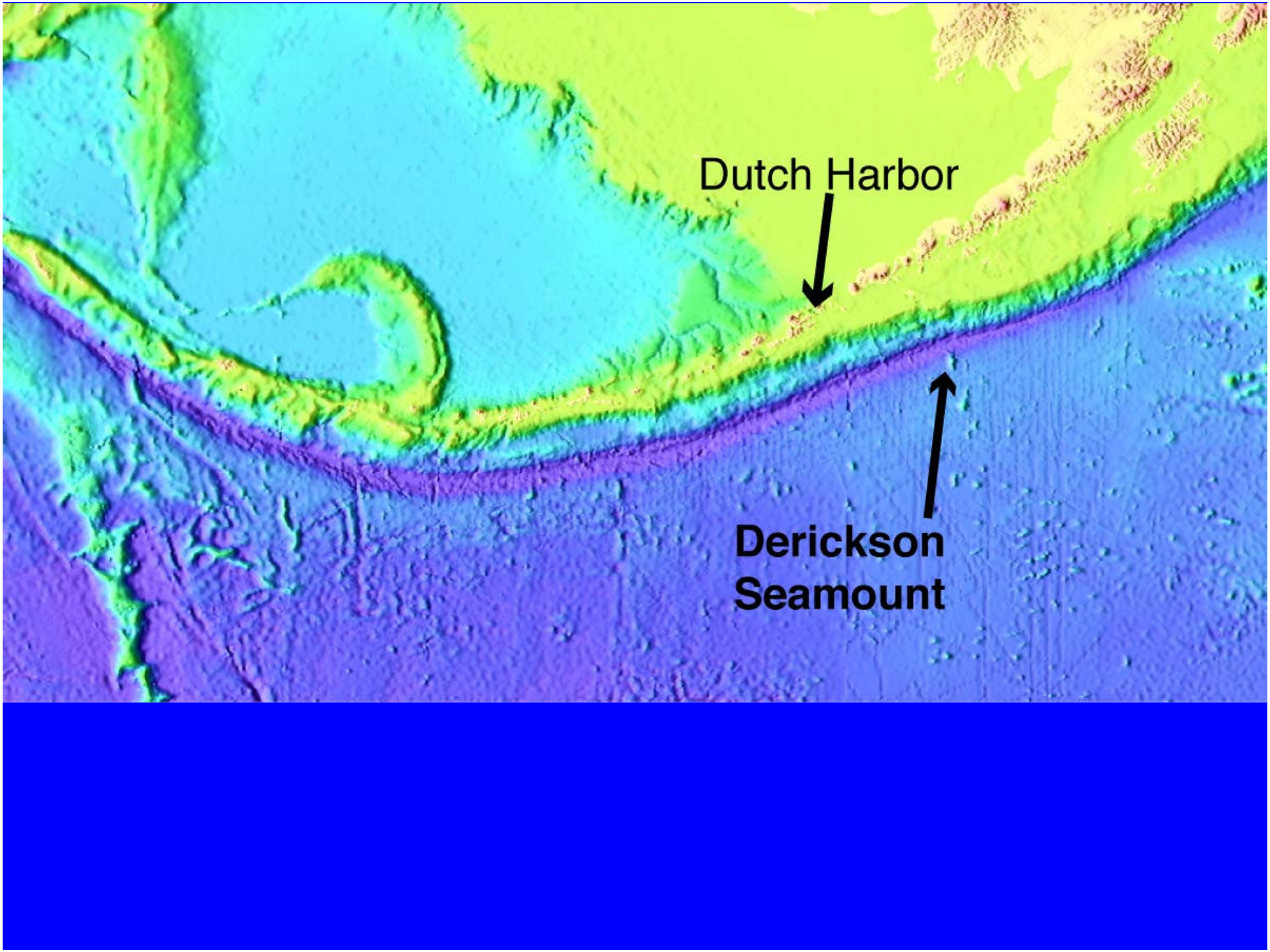
PI: Gerard Fryer (Univ. Hawaii)

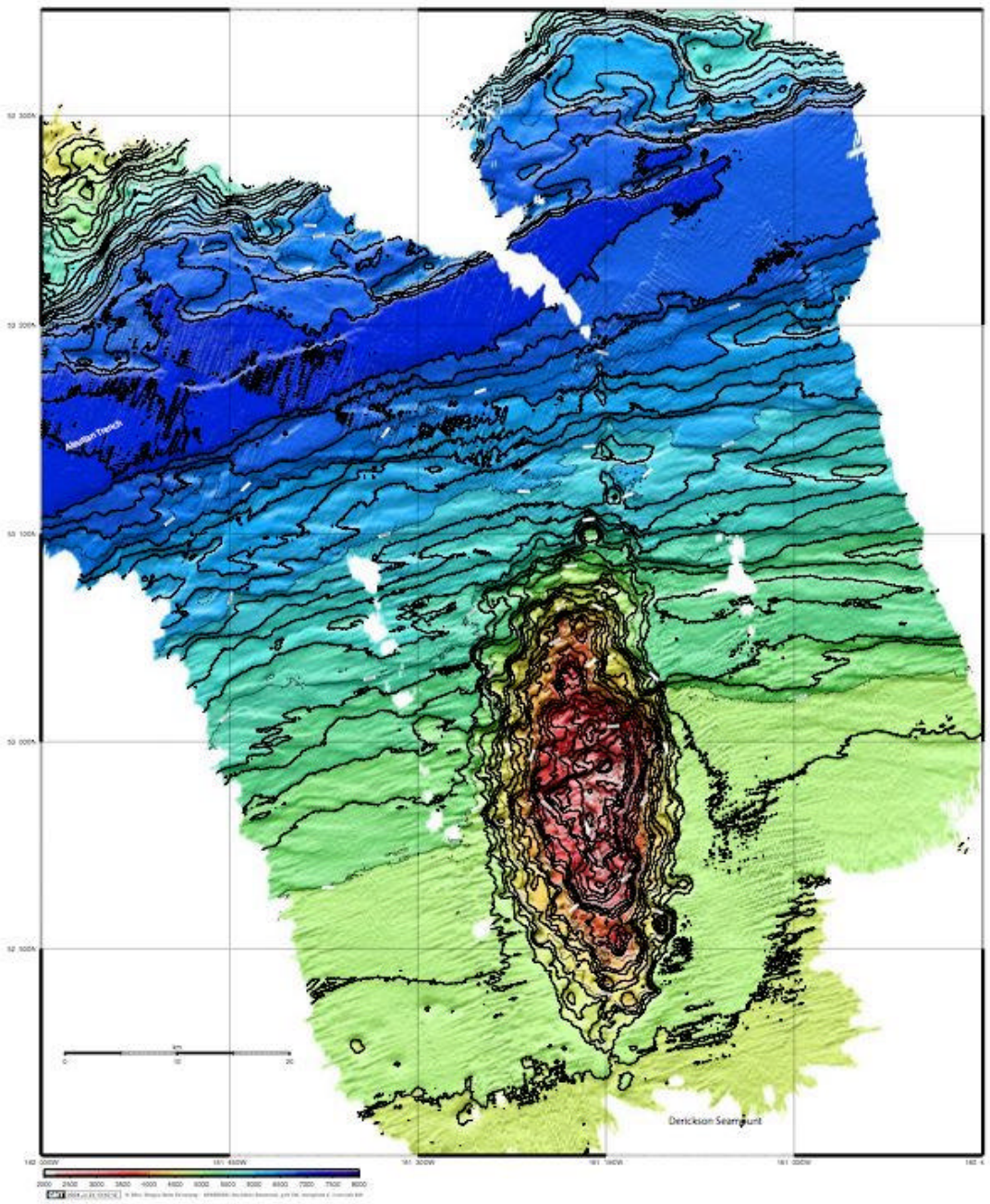
1) Mapped Ugamak Slide area to ascertain the origin of the 1946 tsumani presumed to have resulted from a seafloor slide
2) Results provide exciting new information and significant constraints on the characteristics of the 1946 tsunami

Keller
10 Jul – 16 Aug - ??

Randy Keller Presenter

(I’m not really sure which cruise he was on, but looking at the map, I would guess the Rathburn cruise)


Dutch Harbor
Derickson
Seamount


Aleutian Trench
Derickson Seamount

Reeves-Sohn
25 Oct – 10 Nov

Debbie Kelley Presenter

Seismicity and Fluid Flow of the TAG Hydrothermal Mound - Leg 4

R/V Knorr 180-1, 10/25-11/9/04

Jason2

PIs: Reves-Sohn and Humphris

(SOC participants: Green and Copley)

Accomplishments

- Temperature probe recovery (19 of 21 deployed)
- Tide gauge recovery
- High-temperature fluid samples
- Shrimp and crab samples
- SM2000 microbathymetry survey
- Water column hydro plume survey
- Chimney geological samples
- Push core samples
- Instrument testing (plume detection laser and sonar)
- Valley footwall visual survey and gabbro sampling

Comments

- Excellent cruise, exceeded objectives. Kudos to NDSF.
- Thrusters on Medea would have roughly doubled our working efficiency on-station.
- Upgrading resolution of video cameras (to digital still resolution) would also improve our ability to work on-station and post-process imagery.

Tivey

14 Nov – 17 Dec

Dan Fornari Presenter

KN180-2 Operations Summary

Title: Magnetic and Structural Studies of a Lower Crustal Exposure of Ocean Lithosphere: Kane Megamullion, Mid-Atlantic Ridge 23°30'N.

Co P.Is Maurice Tivey, Brian Tucholke and Henry Dick

8 Jason Dives (#110-117 includes one 1 test dive) at 4 sites - Total time ~10 days

8 ABE dives (#142-149)

28 dredges

SeaBeam and sea surface magnetics

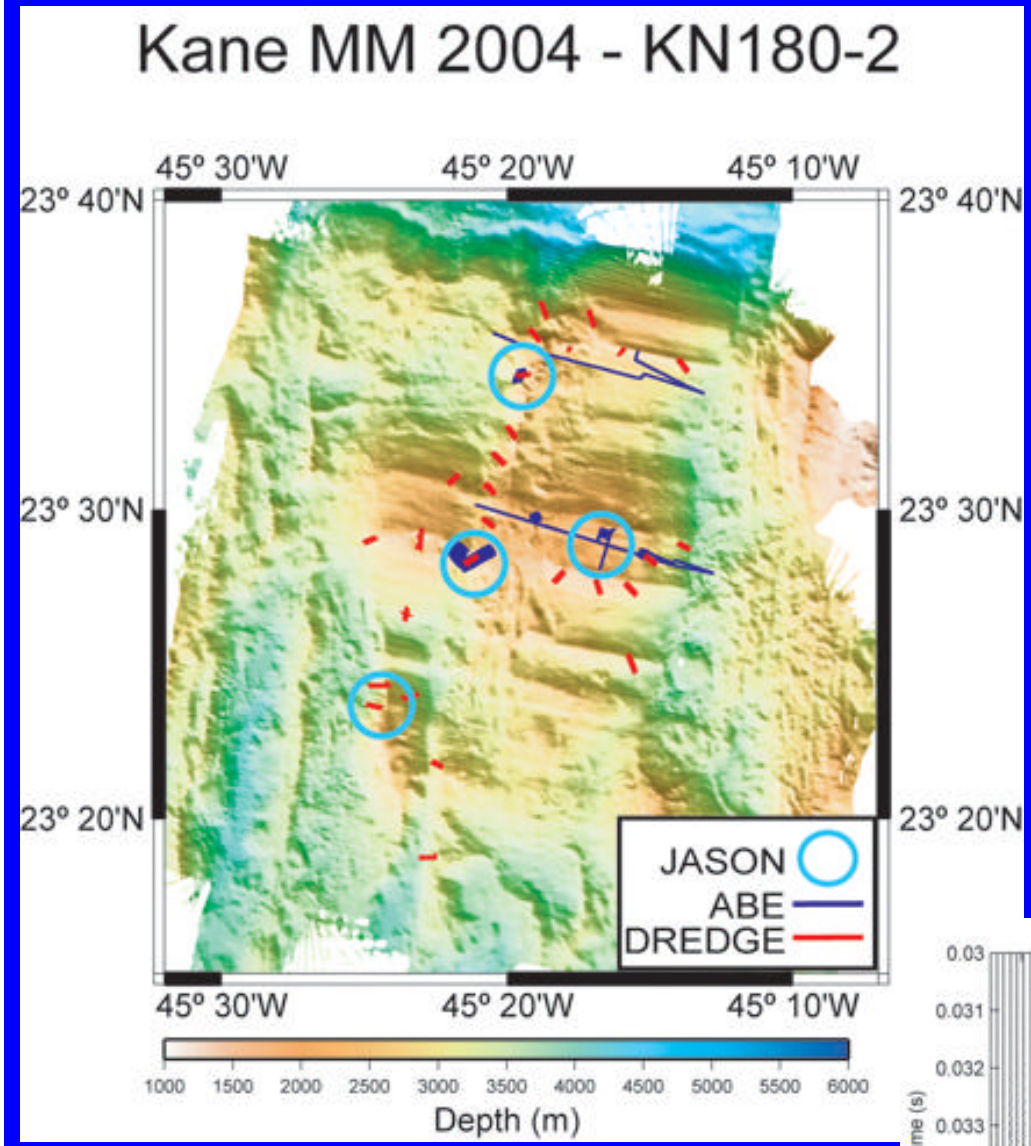
The objective of the cruise is to investigate three basic questions about the structure and evolution of slow-spreading ocean crust, and at the same time to obtain site-survey data for a proposed ODP program.

The project focuses on the Kane megamullion (core-complex), which is interpreted to be the exhumed footwall of a long-lived (~1.2 m.y.) normal "detachment" fault near Kane F.Z. on 2.7 million year-old crust of the Mid-Atlantic Ridge. This exhumation exposes an upper-mantle section of lithosphere and a deep-crustal section that is readily accessible to survey, sampling, and eventual drilling.

The Kane megamullion area also shows well defined magnetic lineations of chron 2A without any major disruptions, thus implying the presence of coherent source rocks.

The three primary scientific questions we hope to address with this program are:

- How are magnetization and the polarity-reversal history of Earth's magnetic field recorded at mid-crustal and deeper levels?
- What conditions of magmatism at the rift axis attend formation of megamullions, and what are the resulting composition and intrusive relations at mid-crustal and deeper levels?
- What are the nature of strain accommodation and evolution of strain localization in the shear zone of a major normal fault in ocean crust?



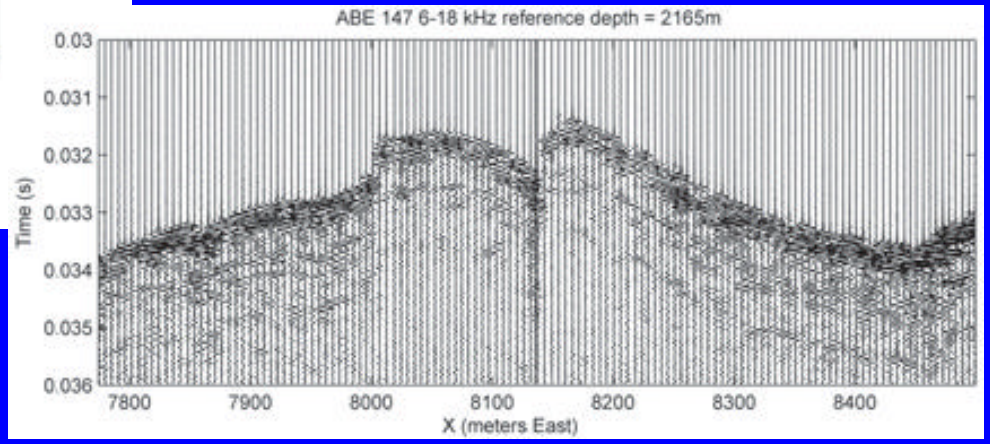
Tivey, Tucholke, Dick

Knorr 180-2 Cruise

Jason2, ABE & Dredge

Locations (left)

ABE CHIRP subbottom profile (below)



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