

DESSC Meeting

December 2007

Jason Science User Reports

Emily Klein
Scott White
Dan Fornari

Mar 24 – April 27, 2007



Medusa 2007 Cruise AT 15-17, April 2007

1. Geology of Overlapping Spreading Centers on EPR

DSL120A-051&052

J2-265...-267

PI's -- E. Klein, M. Perfit, K. Von Damm & S. White

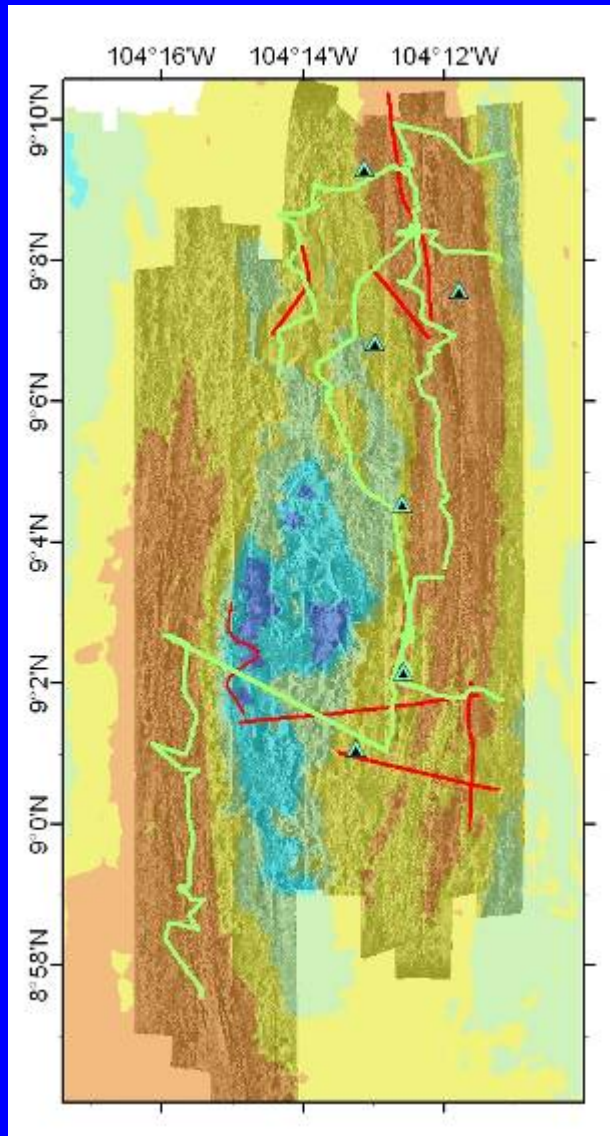
2. Last Year's Eruption of EPR at 9 50'N

J2-268

120A-050

PI's -- D. Fornari (J2) & S. White (120A)

9N OSC mapping ~ AT15-17



120A sidescan mosaic

(6 days, 235 km² side-scan,
SM2000 acquired on all lines,
fluxgate magnetometer on fin)

Green = J2 track

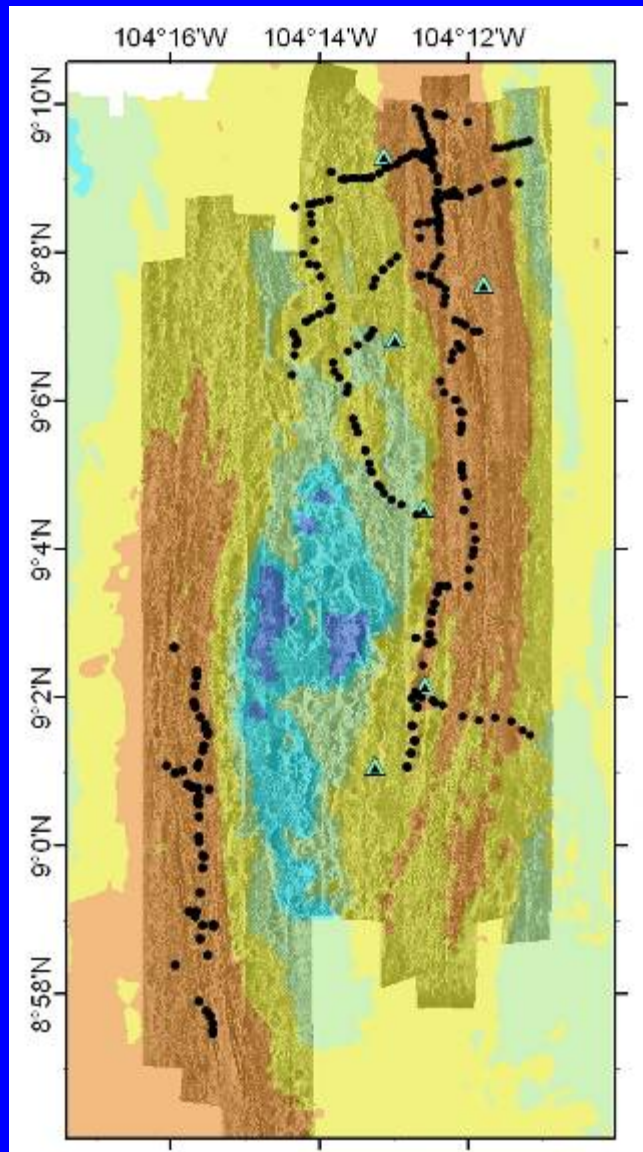
(16 days, 4 lowerings)

Red = TowCam track

(7 runs, useful pairing w. *J2*)

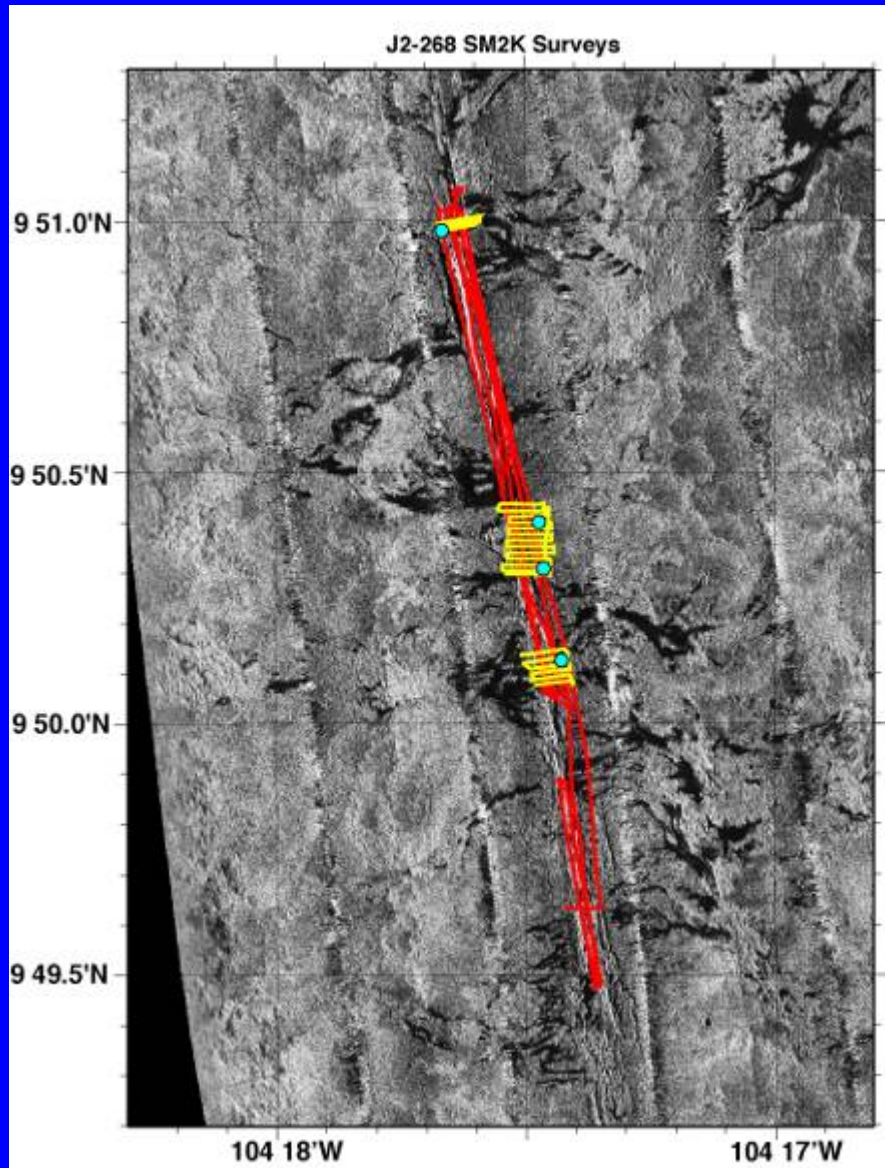
Blue Triangle = xponder

9N OSC mapping ~ AT15-17



- 213 video hours
 - 30,000+ Vvan records logged
 - Improved event logger
- 282 rock samples
 - 67+ “evolved” samples
 - Fe-basalt to Dacite
 - MgO 0.6-8.7 wt %
- 1 new hydrothermal vent discovered

EPR-ISS Benchmark Survey ~ AT15-17 ~ Jason2 Dive 268



Ridge2000

EPR ISS

SM2000 surveys

Red = AST surveys

Yellow = Benchmark surveys

Blue dots = Benchmarks

- 4 permanent benchmarks installed
- OBS rescue (2 of 3)
- tiltmeter rescue

S. A. Soule & D. Fornari

WHOI

Chuck Fisher

June 4 – July 6, 2007

Jason II on the NOAA Ship Ron Brown

June 4 to July 6

“Investigations of chemosynthetic communities on the lower continental slope of the Gulf of Mexico”

A project funded jointly by the Mineral Management Service and the NOAA Ocean Exploration Program

PIs:

James Brooks and Bernie Bernard: TDI Brooks Int.

Robert Carney and Harry Roberts: LSU

Erik Cordes and Peter Girguis: Harvard

Charles Fisher: PSU

Ian MacDonald: TAMU

Samantha Joye: UGA

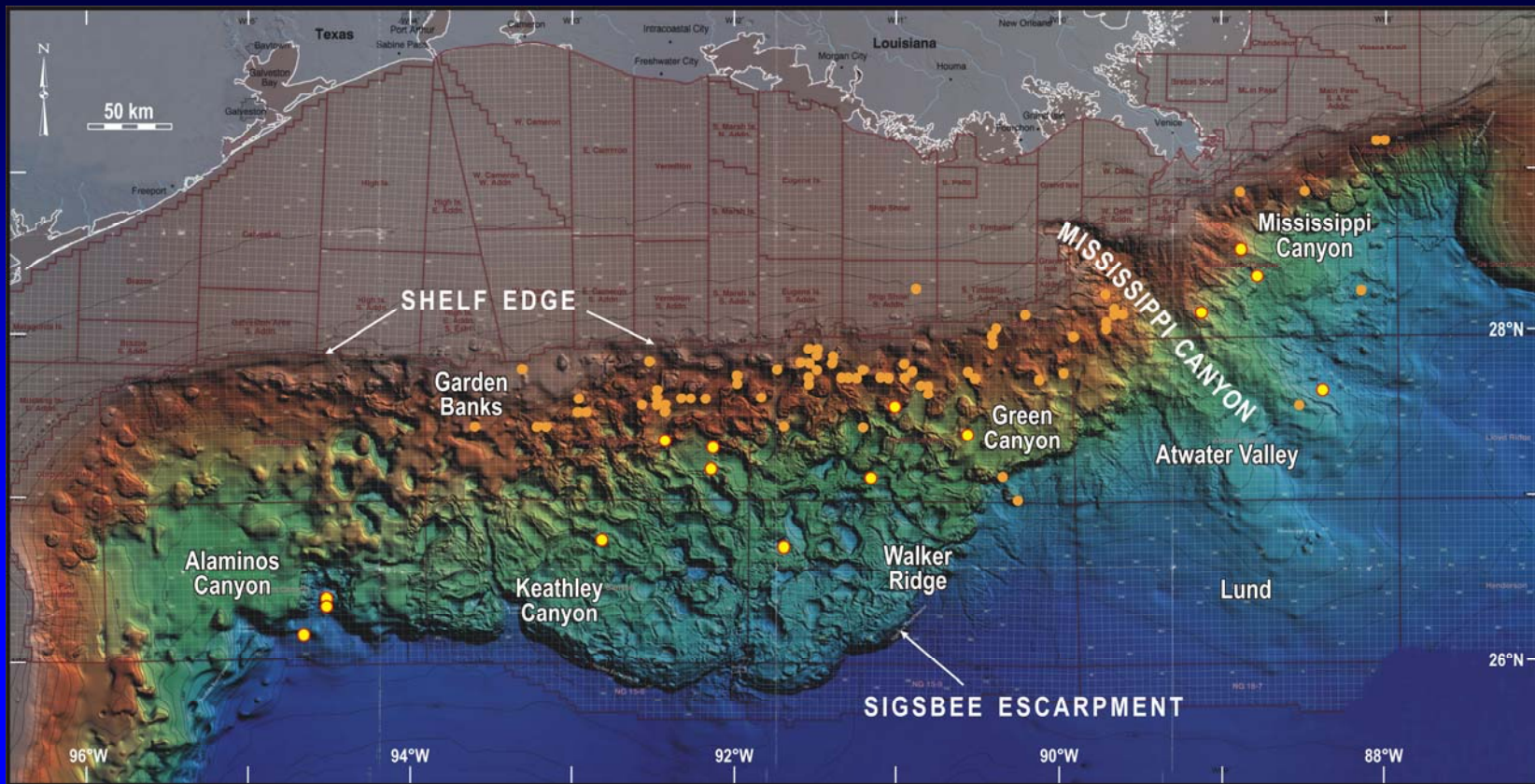
**International collaborators: Stephane Hourdez, France;
Monika Bright, Austria; Nicole Dublier, Germany**

The NOAA Ship Ronald H. Brown

- Spacious and stable
 - (274', ~4,000 ft² of lab space)
 - Scientific party of 32 (includes Jason Group)
- Fully capable for Jason II ops (sister ship to Atlantis)



The overall goal of this cruise was to ground truth our techniques to discover new sites with significant chemosynthetic or coral communities, characterize the new sites and communities, and continue process oriented studies designed to understand the forces that lead to the establishment of cold seep communities and differences among them.



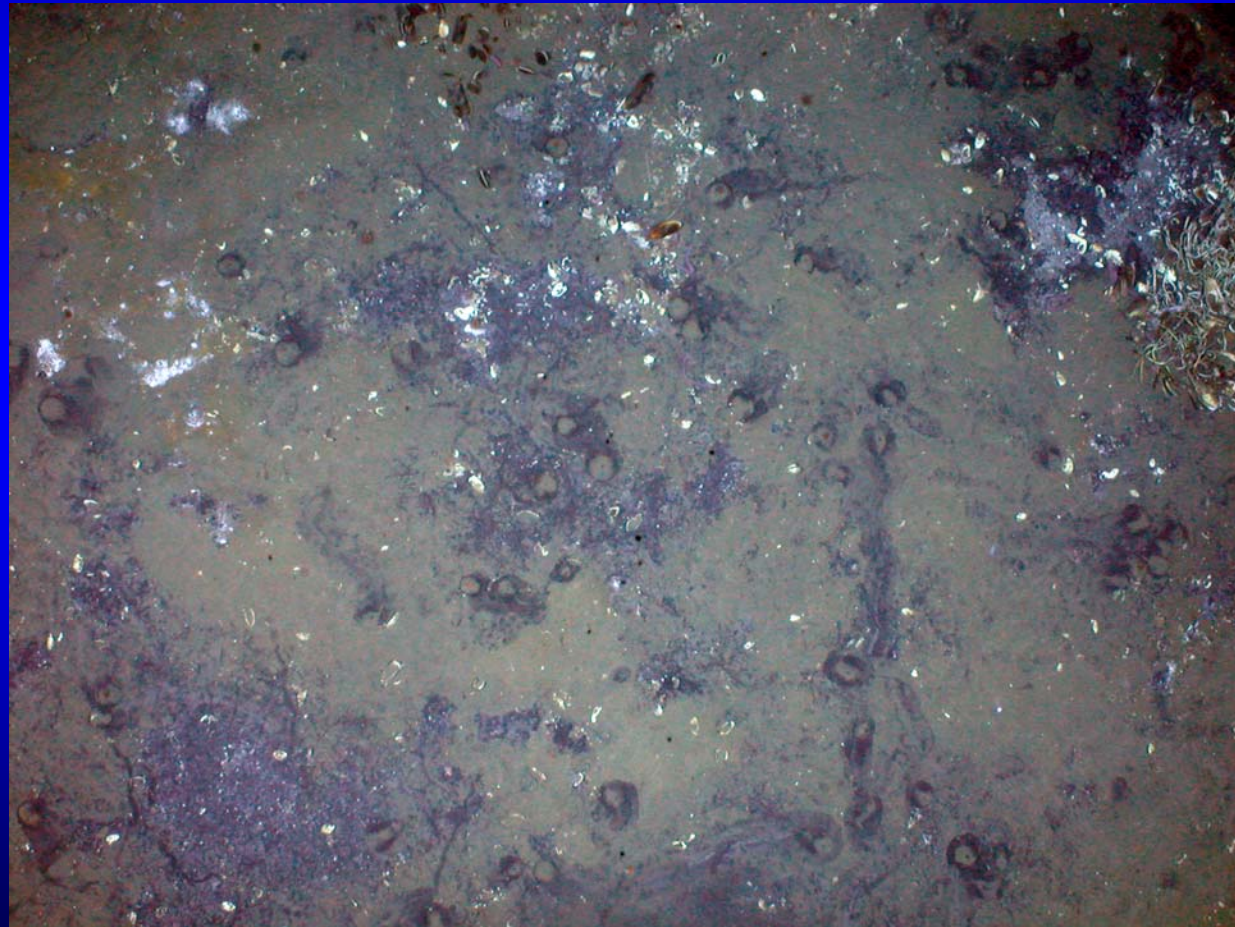
All sites with chemosynthetic macrofauna communities in the N. Gulf of Mexico confirmed by ROV or manned submersible. 15 Sites circled in red were visited by Alvin or Jason II in 2006 or 2007. Five new sites were discovered using JII in 2007

June 2007 Cruise highlights

- Fast processing, turnaround and use of SM 2000 data collected at sea.
- Very efficient exploration of new sites, visiting up to 10 geophysical targets spread over several km during single lowerings (and discovery of macrofaunal communities during every lowering to a new site)
- Discovery of Active mud volcano and Asphalt seep
- Re-imaging of tubeworms banded for growth studies using Alvin in 1992.
 - Using MacDonald cool pix camera picked up and aimed by manipulator when needed ****Very nice option****

June 2007 Cruise highlights

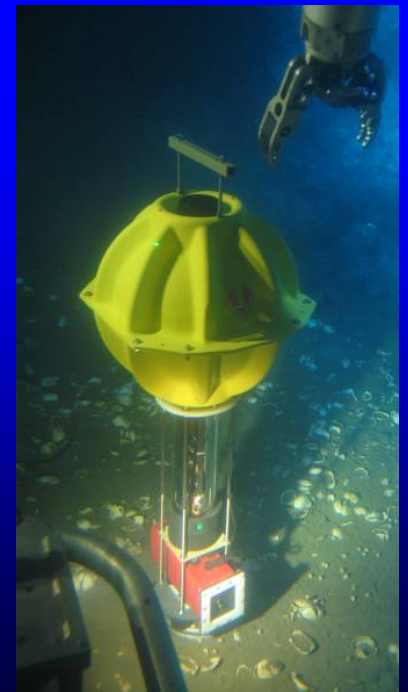
- Discovery and characterization of new type of oil seep community: heart urchins



June 2007 Cruise highlights

Excellent navigation, efficient push coring, efficient and high quality spatially explicit down-looking image collection, 1st use of Girguis in-situ Mass Spec., deployment and recovery of rotary camera systems, high quality quantitative faunal collections (including intact aggregations of stained tubeworms), extensive efficient use of elevators.

The Jason Group was awesome and the cruise virtually 100% successful!



One limitation:

- The safe air weight payload (for launch and recovery) has recently been re-evaluated and current air weight limitations can limit multifunctional payloads.
 - Including (but not limited to) biological collections into temperature insulated containers because of the weight of water.
 - Current limitations virtually prohibit the use of the 5-chamber suction sampler with most other equipment because of its air weight.
- Repeat users should expect diminished payload capacity compared to pre-2007 cruises.
 - We avoided most negative impacts of this by using elevators, however the air weight of the suction sampler precluded it's routine use as planned.

Anthony E. Rathburn

July 22-29, 2007

**Monterey Bay Cruise AT 15-20
July 22-29, 2007**

**Anthony E. Rathburn, Chief Scientist
Joan M. Bernhard, Co-PI; Jonathan B. Martin, Co-PI**

**Collaborative research: Interdisciplinary approach to understand
stable isotopic disequilibrium in benthic foraminifera**

**Objective: Use JASON II to collect samples
from methane seep habitats and nearby
environments to determine the relationships
between the biology, ecology and isotopic
characteristics of benthic foraminifera and
ambient geochemistry.**

**Goal: To determine why the carbon isotopic
values of calcareous foraminifera are out of
equilibrium with ambient pore water.**



Cruise Highlights

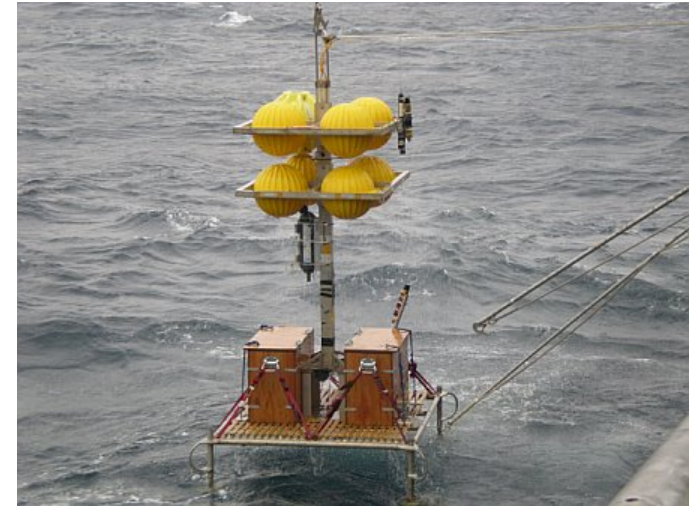
❖ Collected numerous (n~ 100) seafloor core samples using elevator deployments / recoveries (about 1000m water depth)

❖ The first cruise to leave Jason II deployed for the entire science portion of a cruise (4 days)

❖ Took professional HD and 3-D video of operations

❖ Successfully re-engineered and manipulated injector cores to conduct *in situ* incubations on the seafloor

❖ Initial results of portions of the research will be presented in a poster (13:40 on Thursday; B43E-1651)



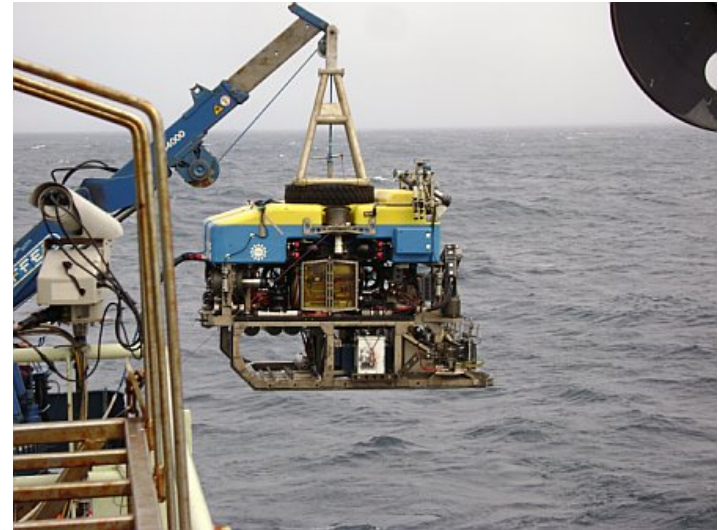
Assessments

Ship Operations, JASON II operations, logistics, and technical assistance were all excellent and contributed to the success of the cruise.



Concerns

- **The 8-12 hour turnaround time for Jason II is a major concern for deep-water operations and for multiple deployments on a short cruise.**

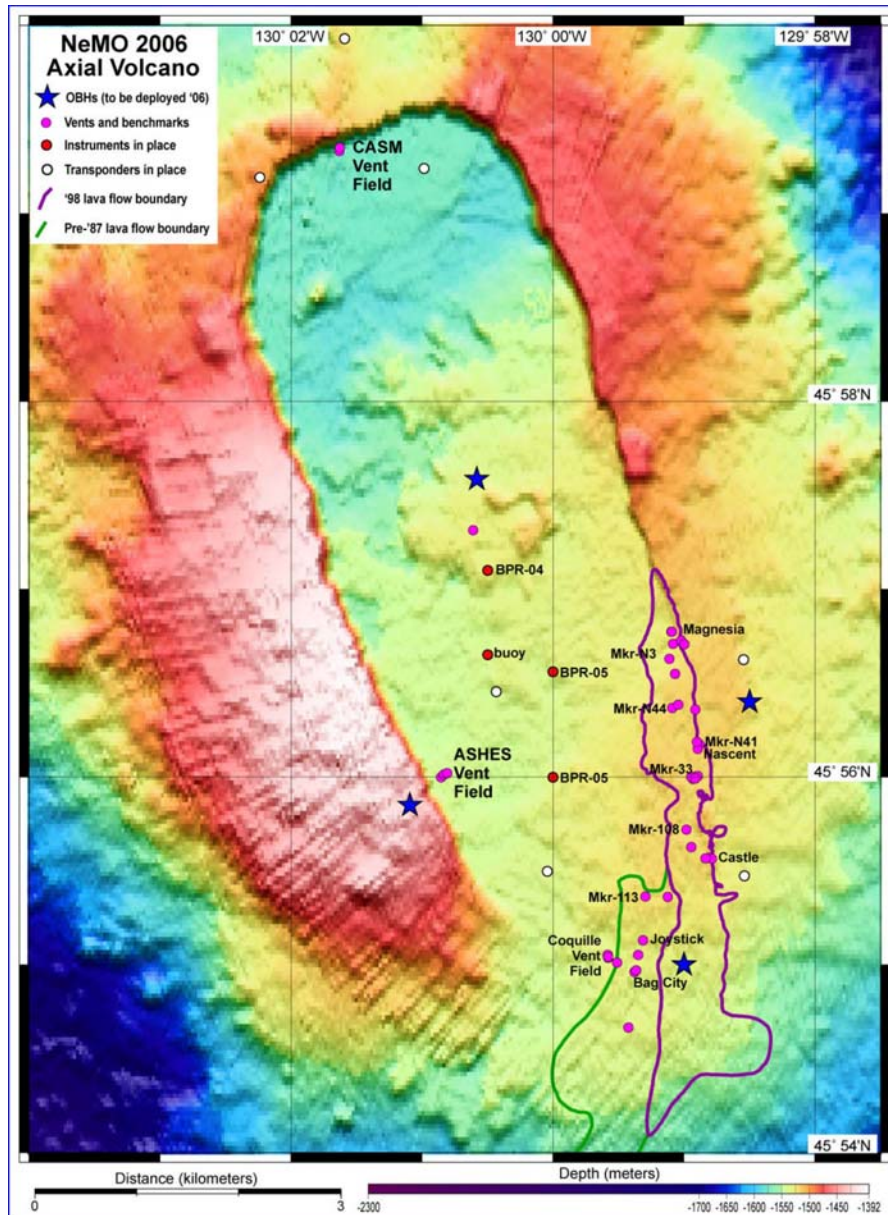


- **Although our operations using the elevator at 1000m went very well, the 8-12 hr turn around time for Jason II ops gave us no time to sample a second site, so that option in our sampling was not available.**
- **At sites of several thousand meters, researchers are not typically able to use an elevator, necessitating multiple deployments of Jason II. Adding 8-12 hrs to a proposal for each planned ROV deployment is very costly in terms of underutilized ship time. Another solution would be most welcome.**

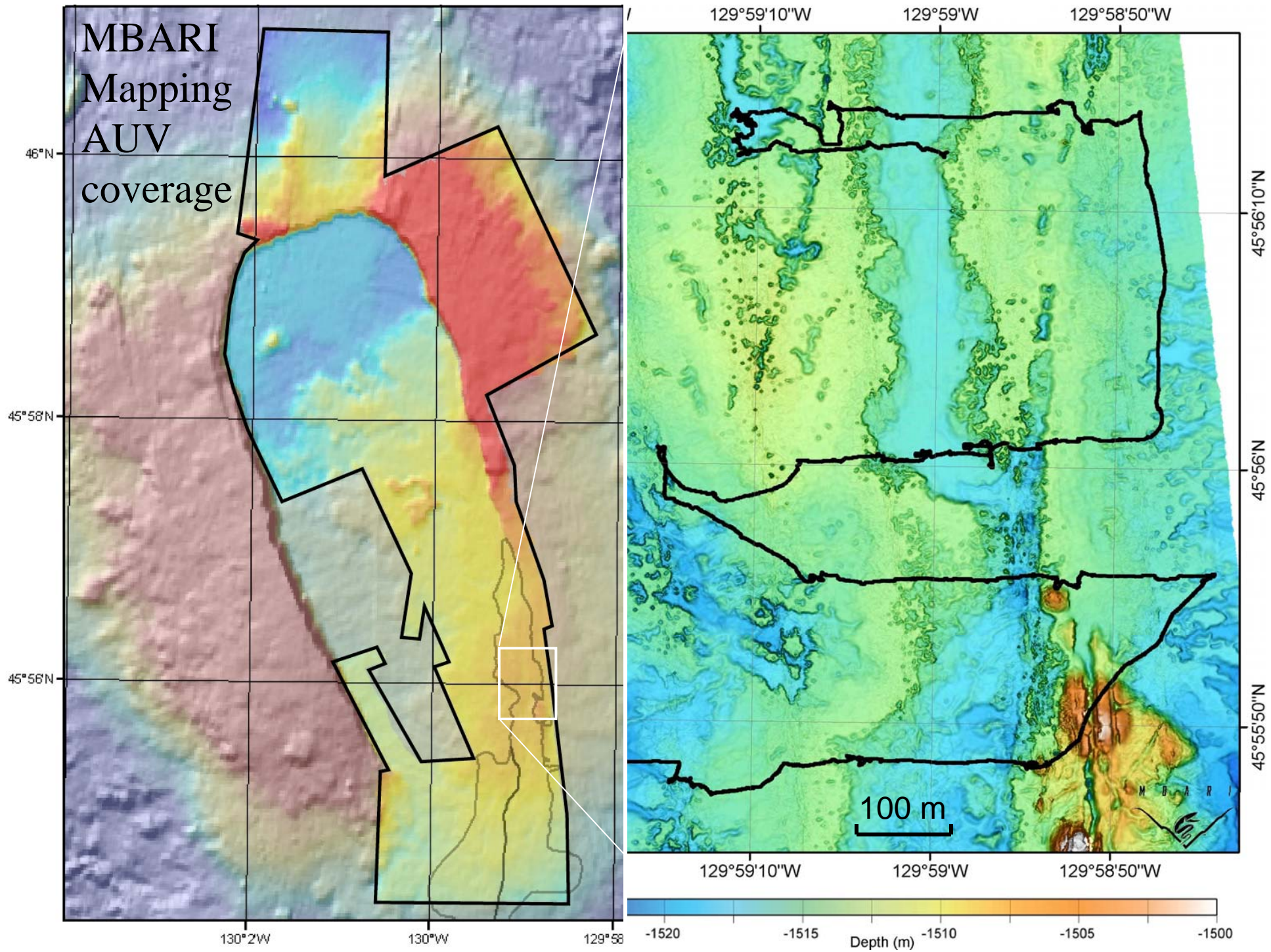
Bill Chadwick

August 3-20, 2007

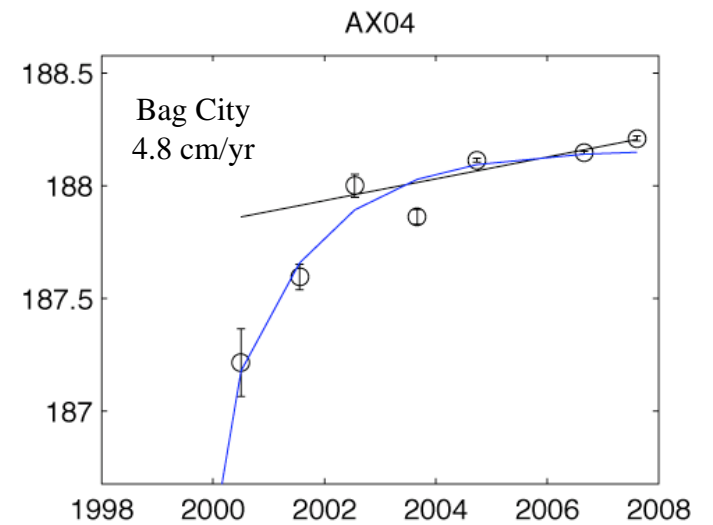
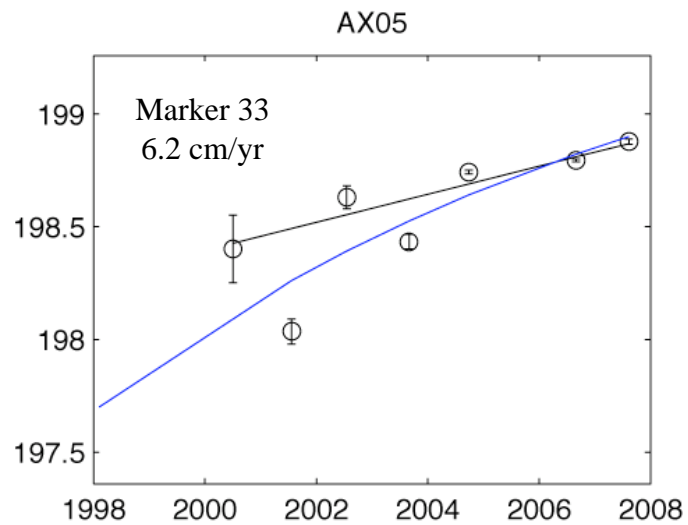
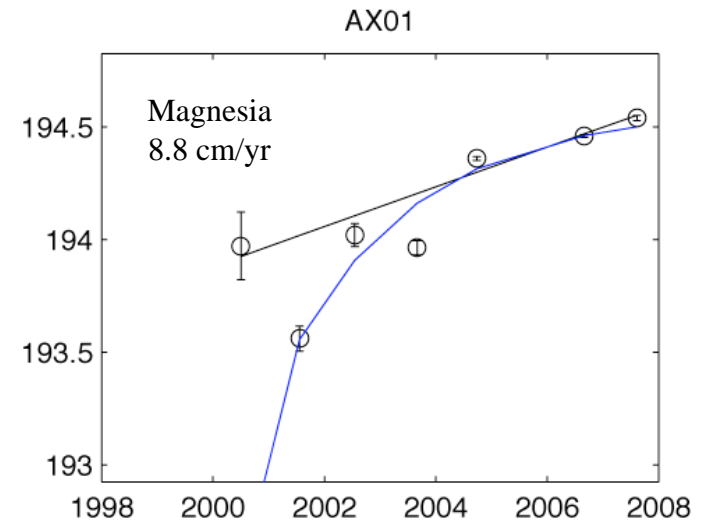
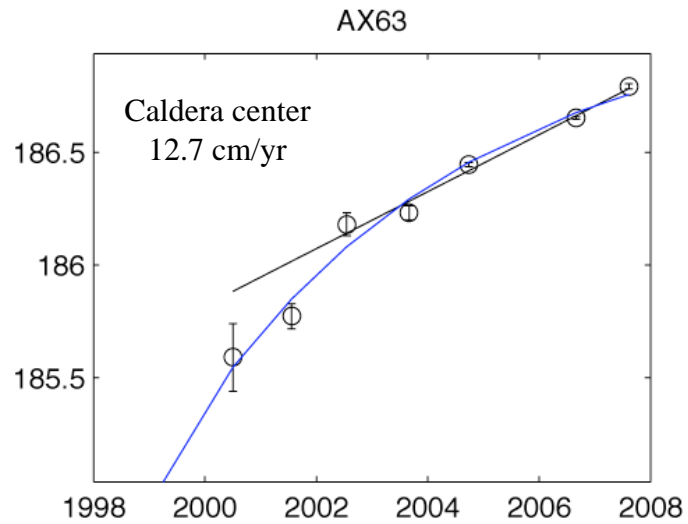
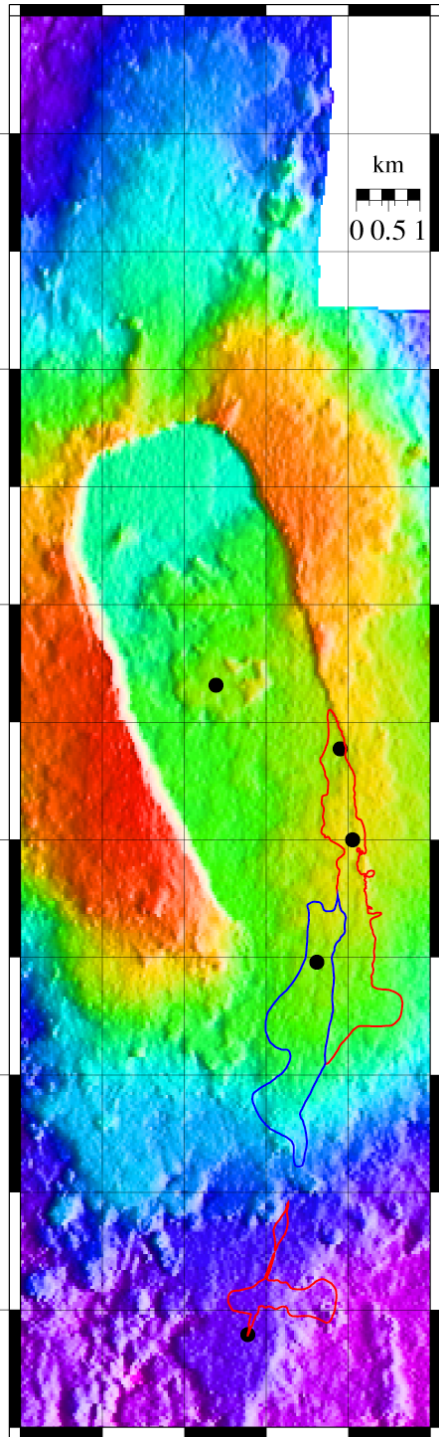
NeMO 2007 (Atlantis/Jason/MBARI AUV)



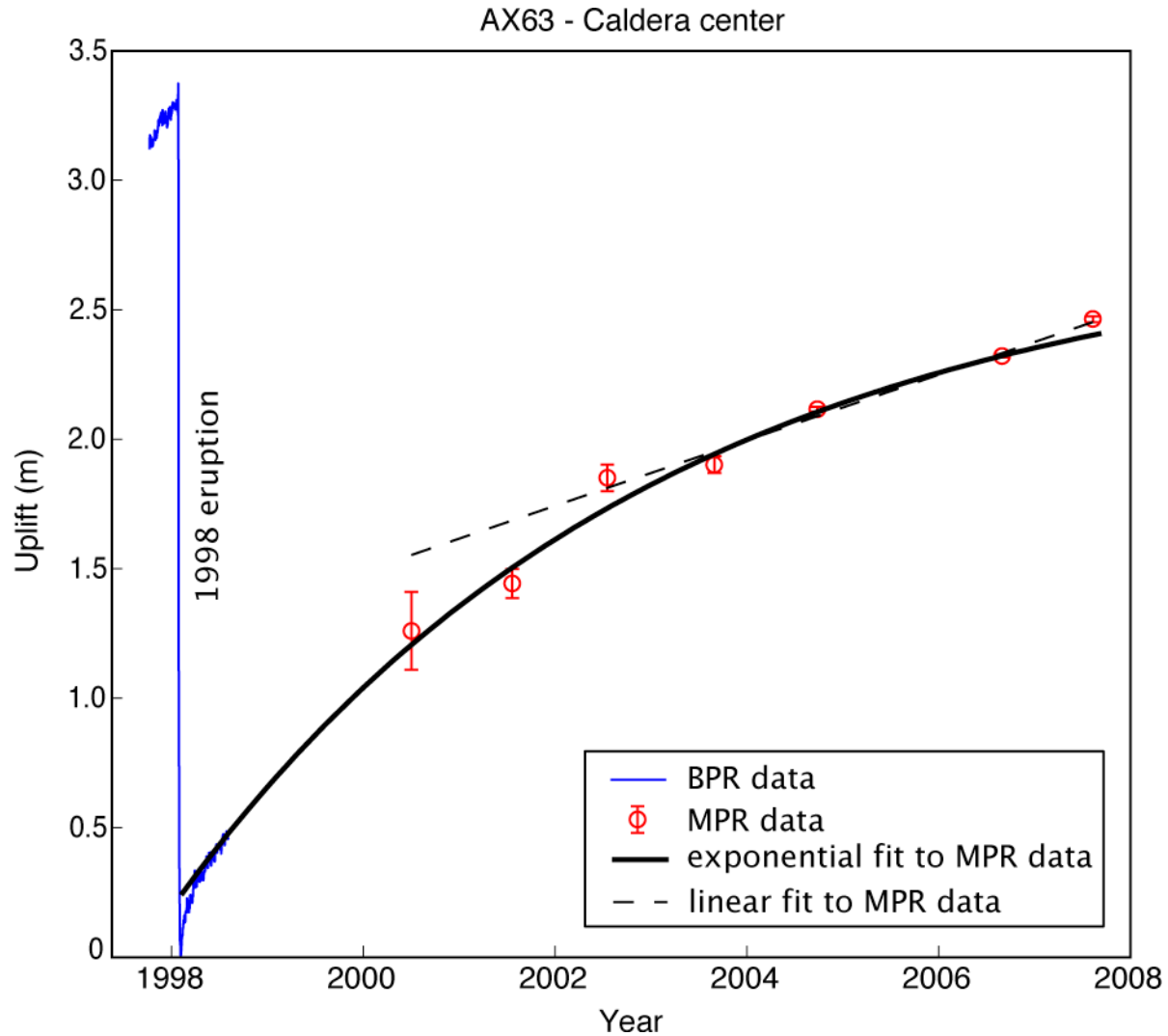
- ROV: Endeavour (2), Axial (6), Cobb (2)
- AUV: 2 dives @ Axial
- Fluid & bio sampling, Pressure measurements, BPR & OBH moorings, RAS, MTRs & HOBOS, CTDs, geologic surveys
- HDTV on Jason
- Cobb: 2 new vent sites



Inflation



Next eruption in 5-6 years?

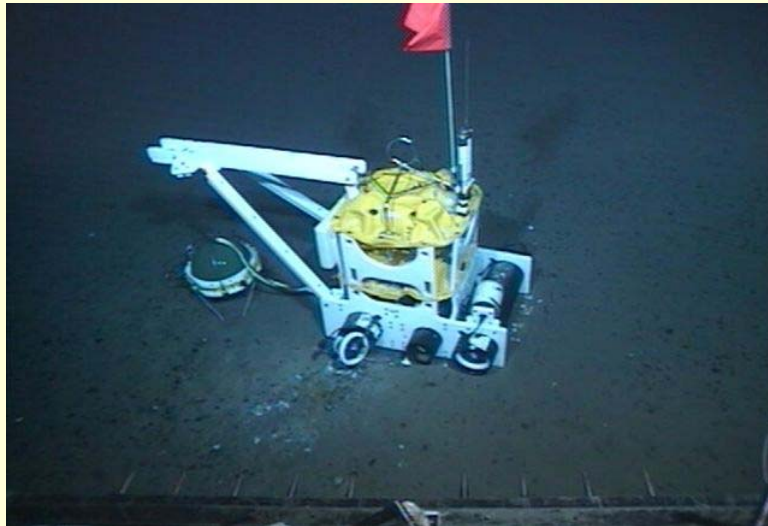


Funded by NSF to continue measurements in 2009 & 2011

Beecher Wooding
John Collins

Oct 31 – Nov 10, 2007

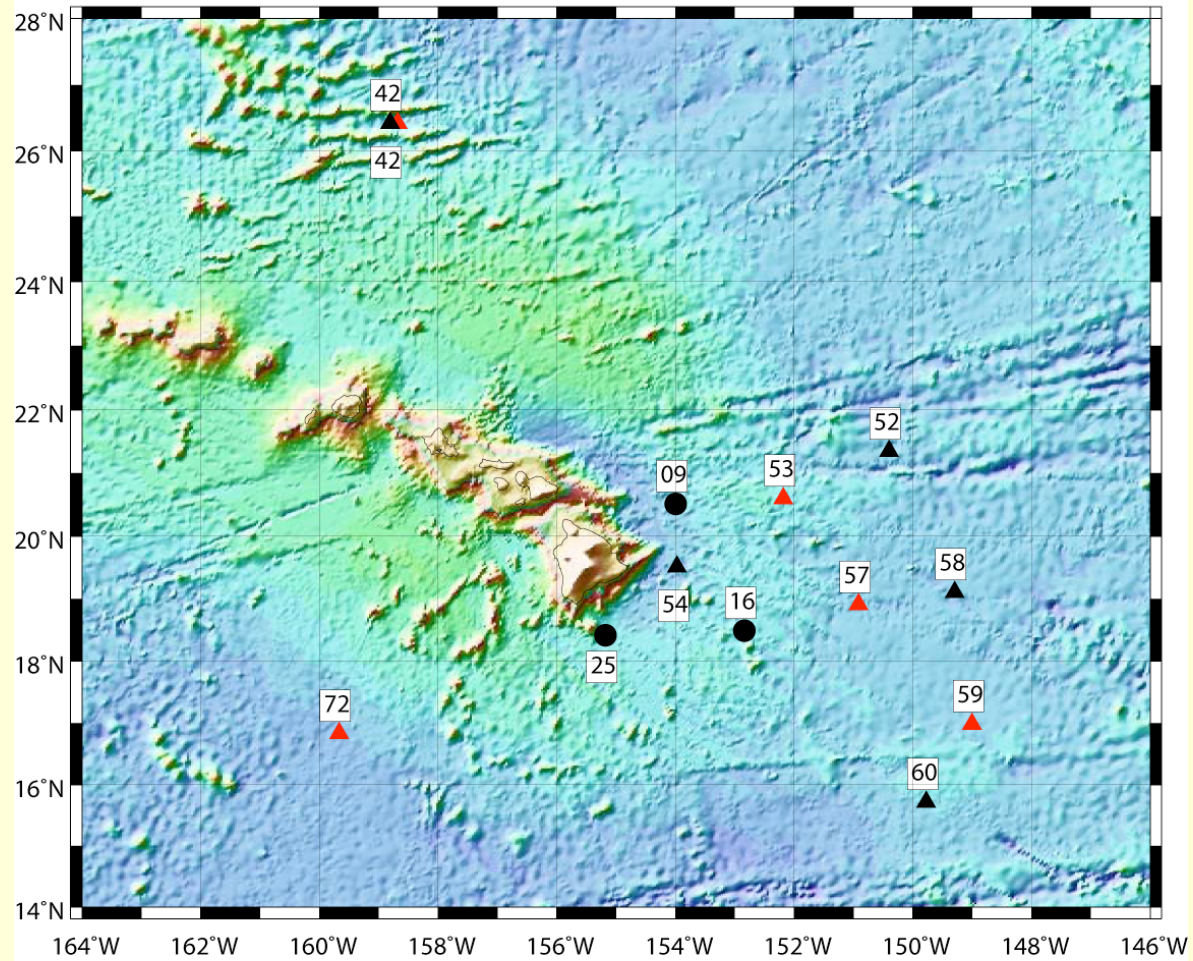
OBSIP OBS Rescue Cruise
R/V Kilo Moana, Oct 31 - Nov 10, 2007
Chief Scientist: Beecher Wooding (WHOI)



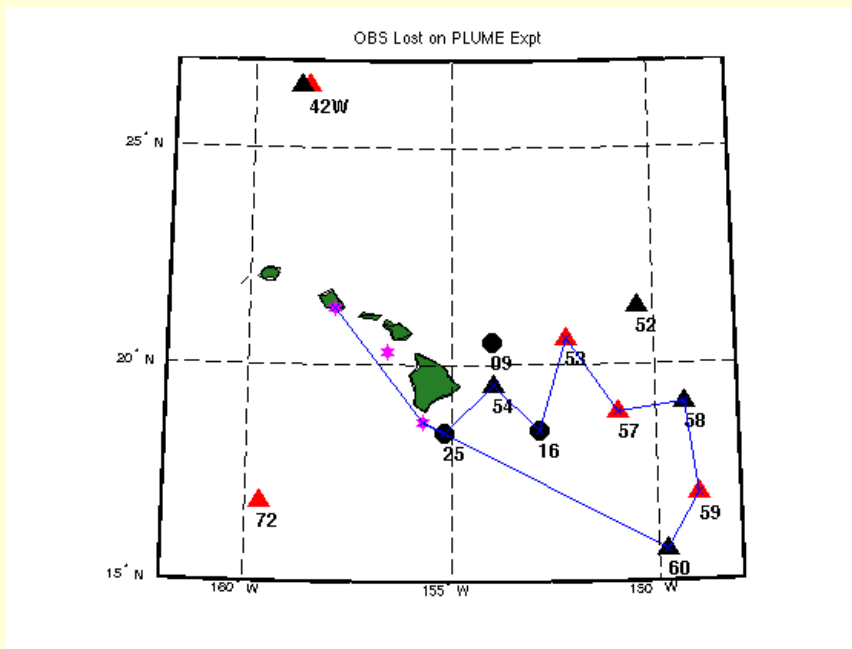
OBSIP Rescue Cruise

- 13 OBS total lost on PLUME 1 (3) and PLUME 2 (10).
- Cruise goal was to learn why OBS were not recovered by normal acoustic means
- Do OBS (WHOI and SIO) have fundamental design flaw?
- Glass Ball implosion responsible for non-recovery at 5 of 8 sites visited
- One OBS had pre-released (when?)
- Two OBS likely stuck in soft mud, despite ~65 lbs of positive buoyancy

OBS Lost on PLUME



Map shows locations of OBS lost on legs 1 and 2 of the PLUME experiment. Black disks and black triangles represent SIO OBS lost on PLUME1 (3 total) and Plume2 (5 total), respectively. Red triangles represent WHOI OBS lost on Plume 2 (5 total).



Cruise track followed by KM. Eight OBS Sites were visited during cruise. OBS were found at 7 sites; an anchor only was found at Site 25.

- Site 60: SIO OBS with imploded glass balls ----- Recovery Attempted, Failed
- Site 59: Intact WHOI OBS (stuck in mud?) ----- Recovered
- Site 58: SIO OBS with imploded glass balls ----- Recovered
- Site 57: Intact WHOI OBS (stuck in mud?) ----- Recovered
- Site 53: WHOI OBS with imploded glass balls ----- Partial Recovery
- Site 16: SIO OBS with imploded glass balls ----- Sensor Ball Recovered
- Site 54: SIO OBS with imploded glass balls ----- Sensor Ball Recovered
- Site 25: SIO OBS anchor only

OBSIP Rescue Cruise

- Overall my assessment of DSL's performance is off the scale.
- DSL's ability to navigate the ship during the vehicle descent was fantastic. The instruments were commonly sighted as soon as the bottom was. In cases where searches were required, the ship tracks they steered maximized aerial coverage and minimized time.
- We had hoped to visit perhaps 6 instrument sites, and were able to actually visit 8. The increase was due almost entirely to DSL's ability to quickly locate the lost instruments.
- Have forwarded to DSL suggestions for modest, purpose-built hardware that would improve capability of JASON to salvage OBS.