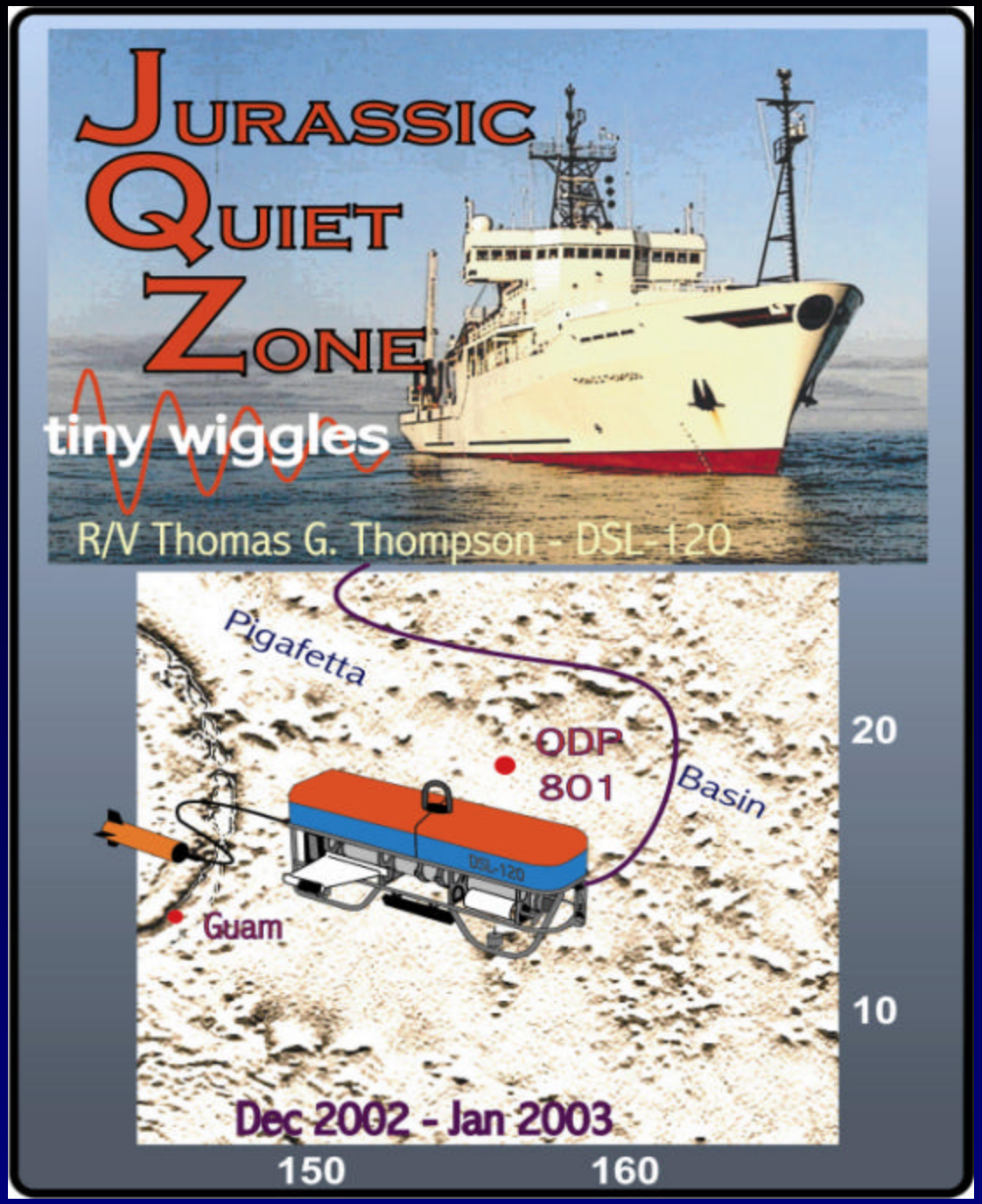

TN152

Deeptow Magnetic Survey of the Jurassic Quiet Zone

NSF OCE-0099327

Co-PIs

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WHOI

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Texas A&M

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KORDI

Exp. Leader

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HMRG

Jurassic Quiet Zone Project Science Objectives

Overall Objectives

- Extend marine timescale to oldest possible crust
- Determine character of JQZ: is it a period of constant polarity or is it a period of rapid reversals?

Specific goals

- Tying in drillhole data from ODP Hole 801C
- Confirming seafloor magnetic stripes exist in JQZ
- Defining intensity envelope
- Constraining early history of pacific plate spreading

Jurassic Quiet Zone Project
Cruise Statistics

DSL-120A sidescan, including 3-component magnetometer and towing KORDI absolute field magnetometer system

- 5 Lowerings ~27 days bottom time surveying
- 1553 km along track near-bottom magnetic data
- 1863 sq km sidescan data
- 930 sq km phase bathymetry
- 323 Gbytes raw sonar data

Jurassic Quiet Zone Project
Cruise Assessment - DSL120

DSL-120A sidescan and maggie sensors worked well. Ballasting and trim seemed a hit-or-miss

Phase bathymetry was still an issue requiring customized processing.

Navigation sensors (doppler, LBL, acoustic range) all worked but there needs to be better integration of nav data. Doppler was not used/integrated into nav processing either in real-time or after the fact.

Had a problem with a “cocked” sheave on NSF winch.

Jurassic Quiet Zone Project
Cruise Assessment- Ship

Ship worked well … even under IMS regulations

Could not survey with ships sea surface magnetometer faster than 6 kts. Got permission for 8 kts but still too slow for transit speed of 10-12 kts.

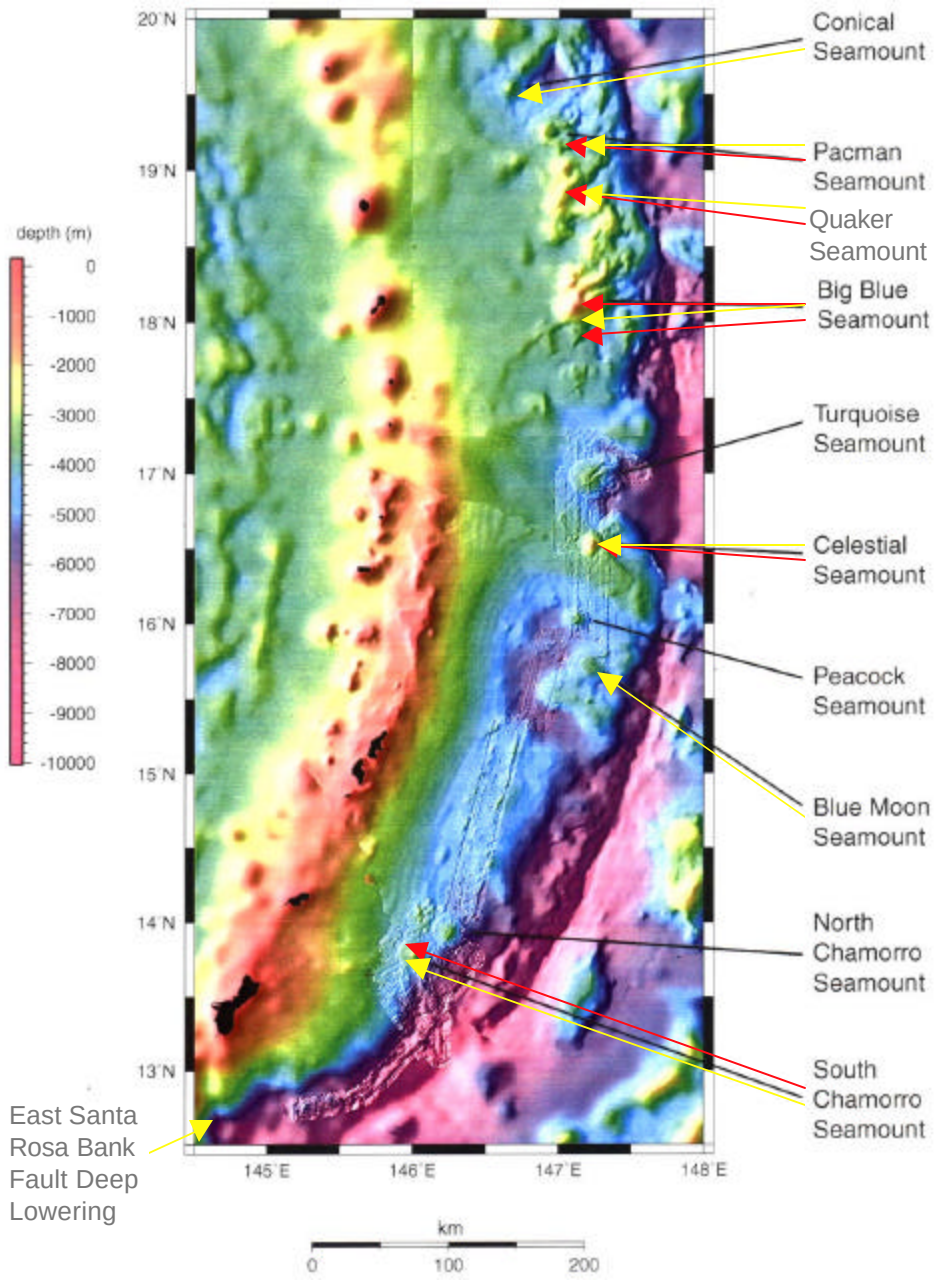
Sub-bottom 3.5 khz profiler worked well but no digital output in a usable form was available.

Problems with Hydrosweep bathymetry meant we got very poor quality essentially unusable data. Too deep for EM300

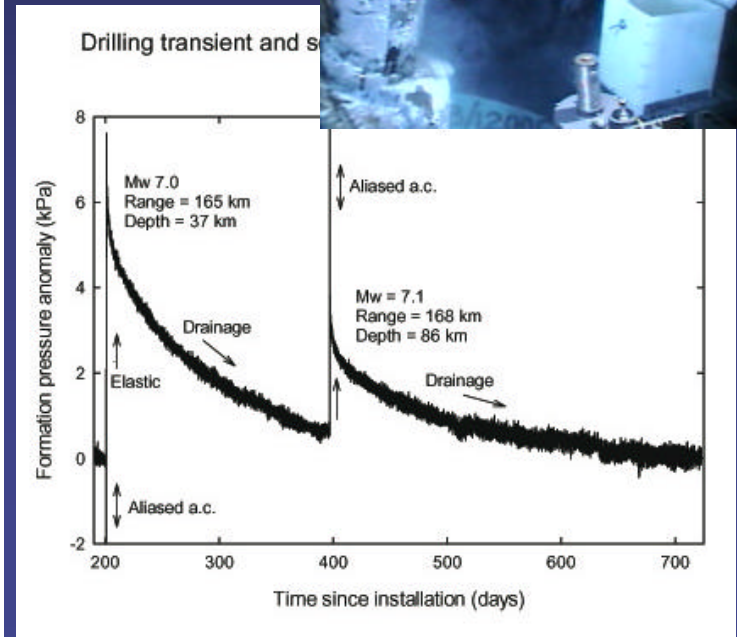
Fryer

17 March - 4 May Fryer/Wheat (J2/DSL120)

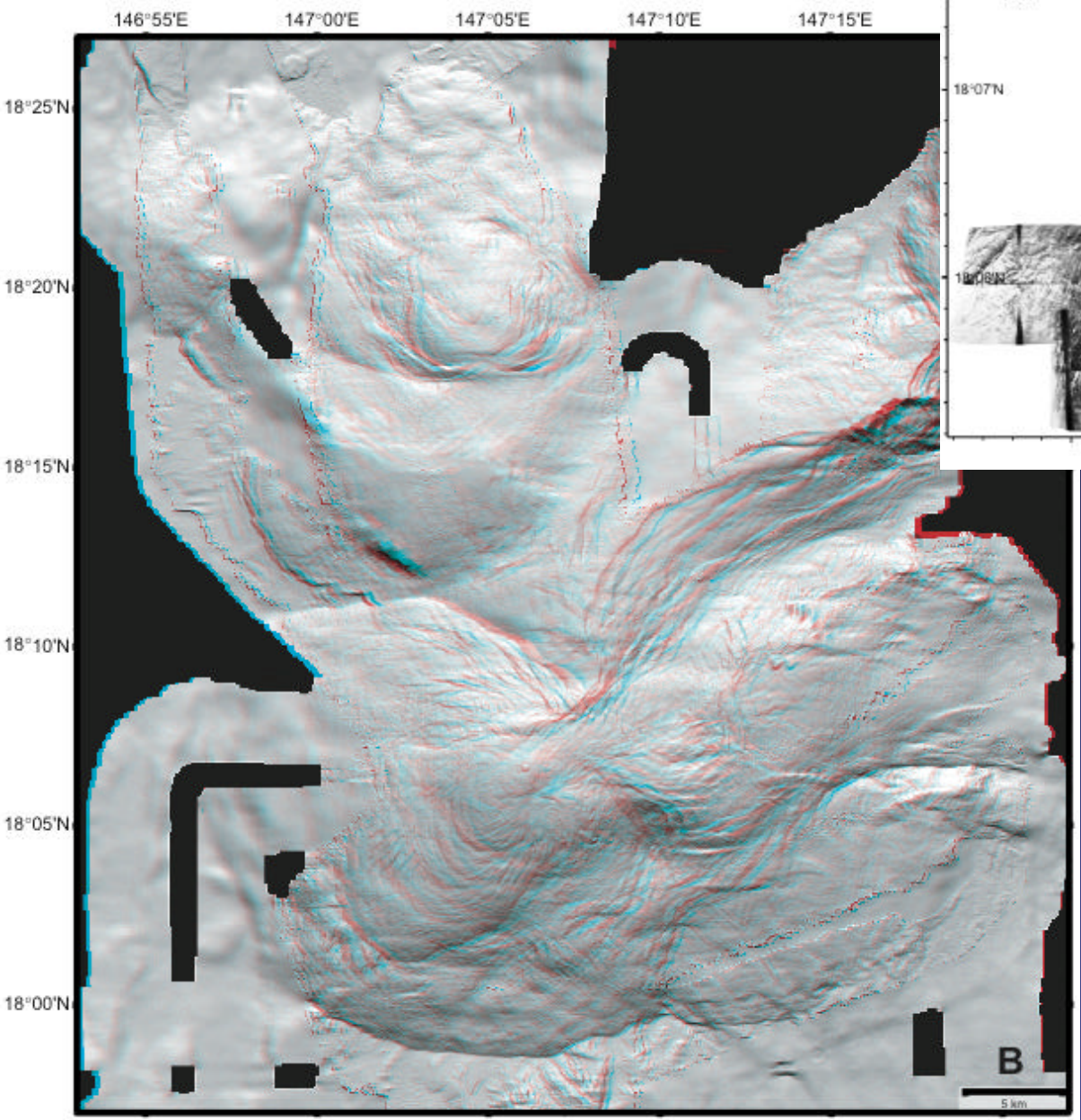
Main objective was the study of Forearc Serpentinite Mud Volcanoes

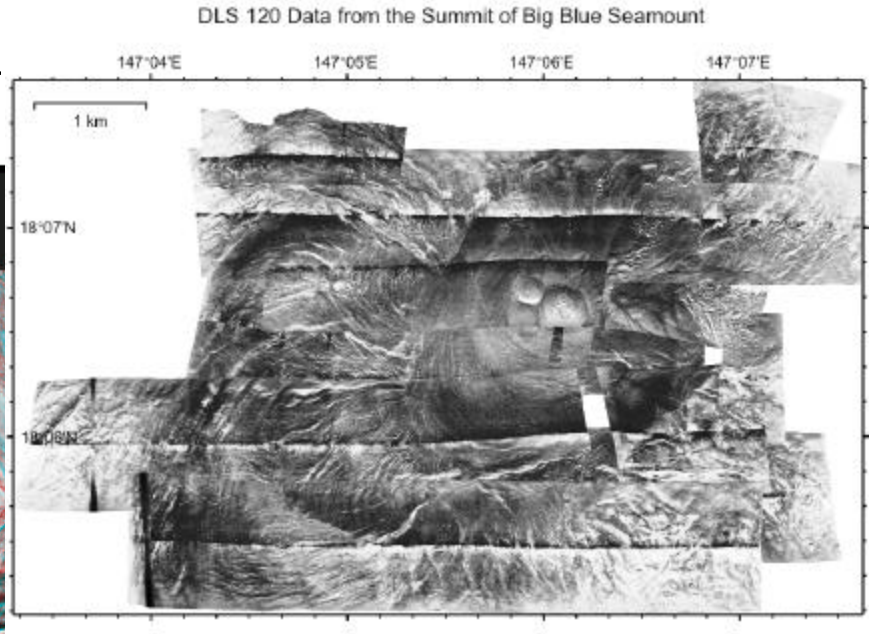


- DSL-120 surveys: 5 summits & 1 flank
- J2 lowerings 11 total: on 8 Smts., the first 6500 lowering with Jason2, one on a backarc basin hydrothermal site
- Recovered borehole instrumentation at ODP Site 1200



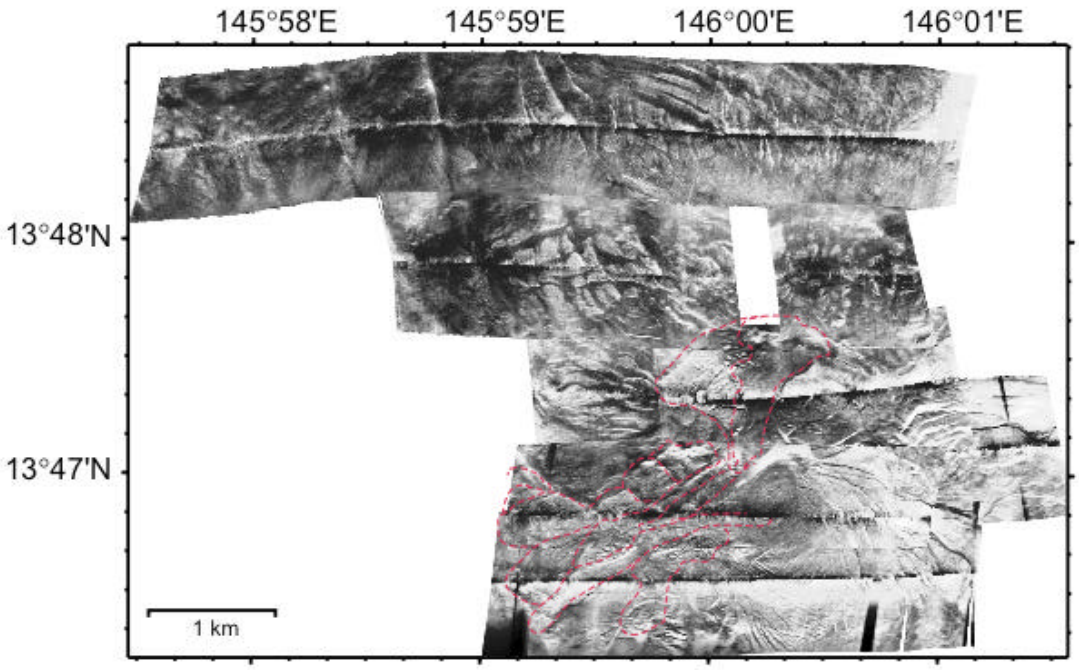
3-D Anaglyph of EM300 data

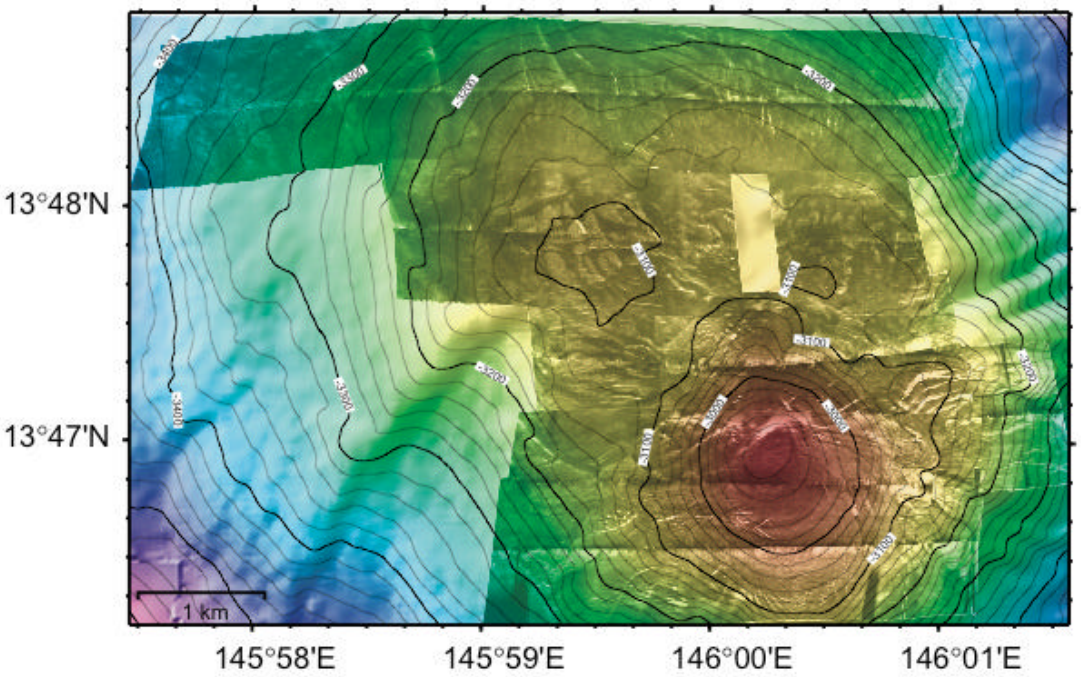




EM300 was collected during transponder surveys

DSL-120 at the summit and up the south flank





Improvements suggested

DSL-120 surveys were optimized for side-scan imagery and bathy is still not fully processed.

Towing of DSL-120 was complicated by high relief and strong currents (bottom and in water column).

Launch and recovery of J2 could be improved by L/R from a starboard side A-frame

More samplers are needed for J2 ops - e.g., push cores, major water samplers (especially if elevators are used)

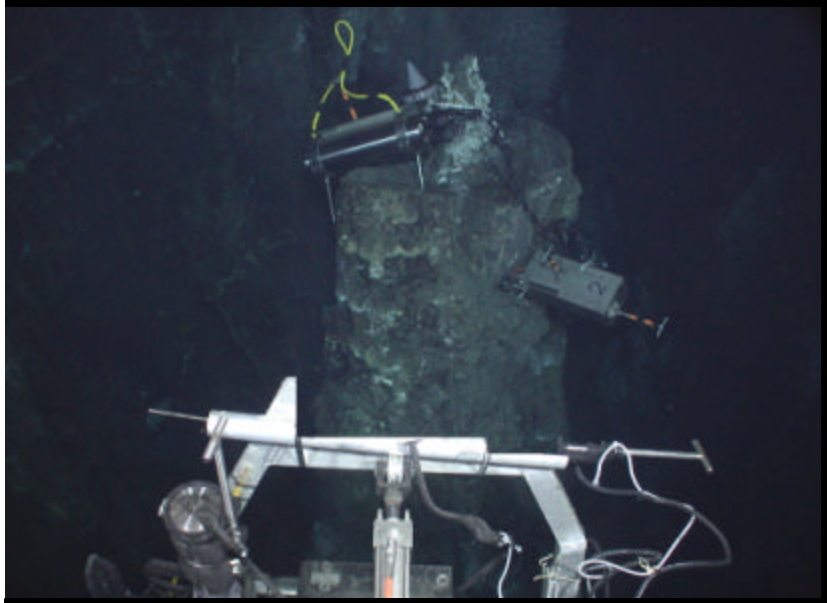
May 21 - 9 June Alan Chave
Fred Duennebier

H2O Service Cruises (Jason II)

- Two cruises on TGT (May and Sept/Oct)
- Goals of first cruise were j-box recovery for major modification, near bottom geomagnetic survey, installation of UH temporary j-box to power H2O seismometer during j-box modifications
- All goals were met except that temporary j-box did not work; Jason II performance was excellent

- Goals of second cruise were re-installation of j-box, installation of bio-observatory and 2 geomagnetic observatories, installation of UH small experiment module
- Outcome was the “cruise from hell”
- UH-designed j-box power supply delivered in non-working condition without engineering support or spare parts, delaying sailing by 1 day to get parts
- Power supply repairs occupied over 1/2 of cruise time

- Emergency medical evacuation resulted in loss of 1/2 of station time
- Broken shackle during initial j-box deployment resulted in its loss, requiring 3.5 d search to recover
- J-box power supply partially failed upon power up after installation
- UH small experiment module did not fully work
- Bio-observatory and geomagnetic observatories not installed due to lack of time
- Jason performance was excellent



J2 hovering ~6 m off bottom

Reamer bit

TN-157 Thomas G. Thompson & J2
Endeavour Segment, Middle Valley, and Flanks
June 18-July 1, 2003

First time with MBARI drill & switching sled out at sea.

J2 worked exceedingly well- Eleven lowerings, ~139 hours bottom time.

Successfully/efficiently drilled clean sulfide (45 min) and basalt holes (2 hr)-7 cm x >54 cm

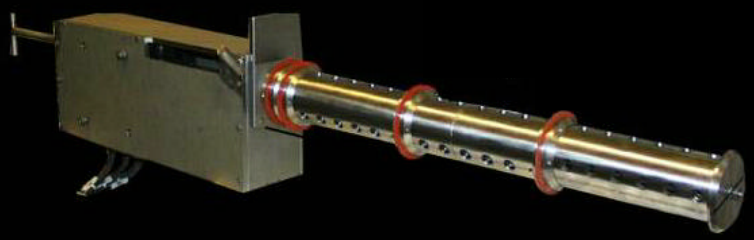
Mothra field mapped with SM2000 (300 x 700 m).

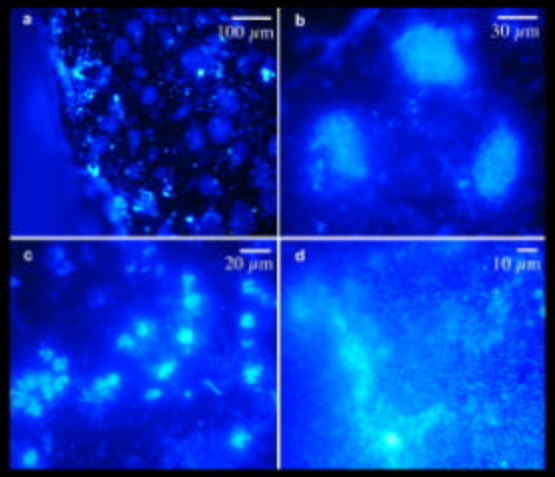
Installed 3 sulfide-microbial incubators, down-loaded data at ODP sites, and switched out batteries.

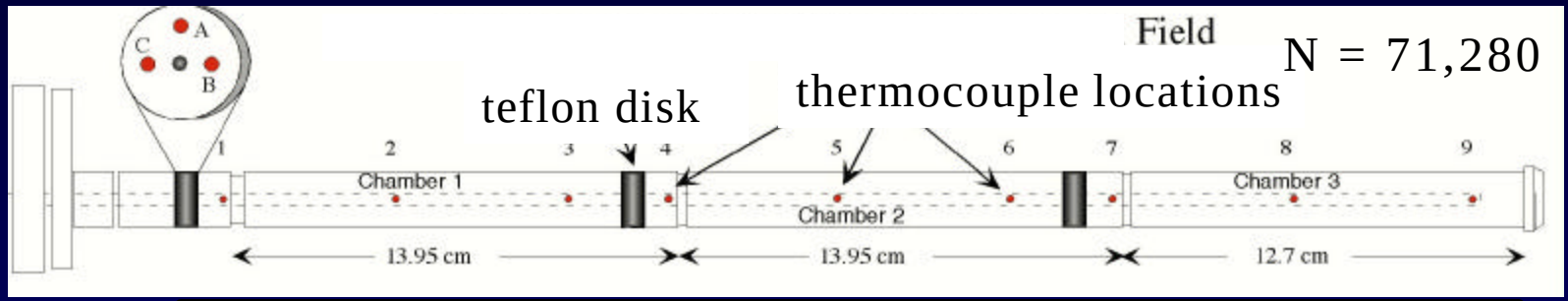
REVEL program included 3 K6-12 teachers (Wisconsin, California, New York)

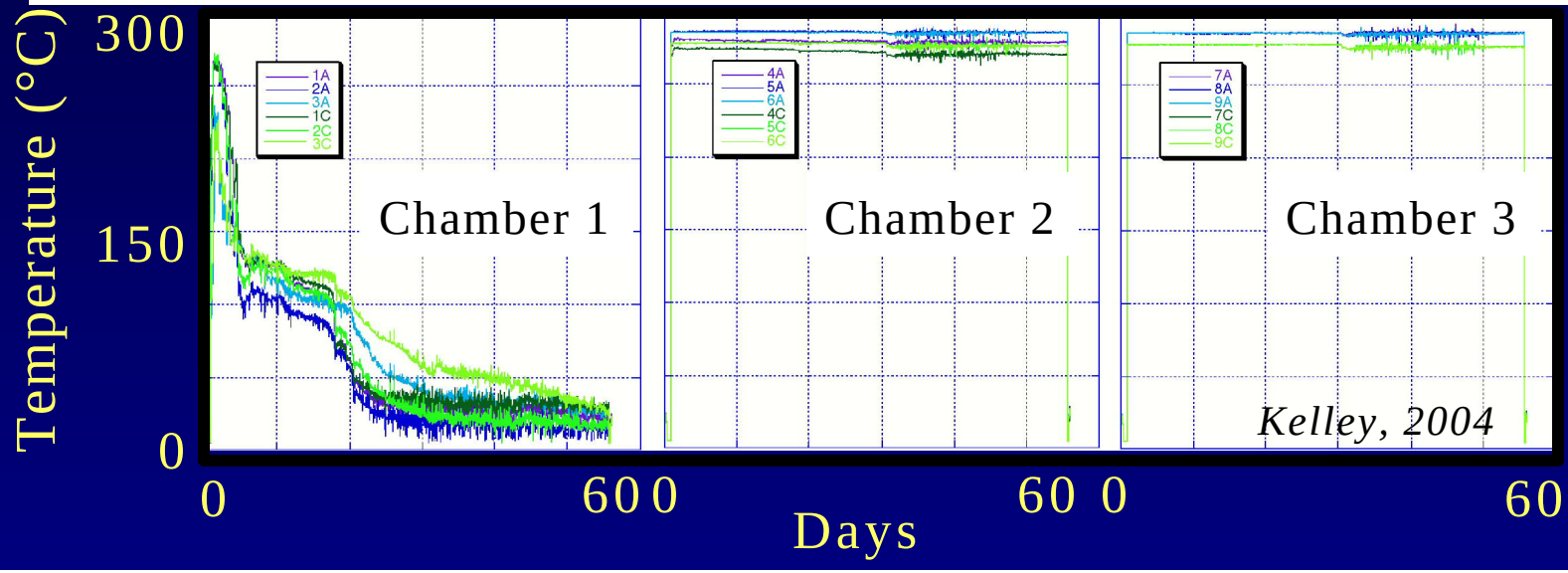
Microbial Incubation Experiments-What is the upper temperature limit to life?

27 temps/20 min x 56 days









Matt Heinz

6 July - 19 July P. Johnson

J. Voight

19 September - 15 October Ken Smith