

2010 NDSF Science User Reports

December 12, 2010

Alvin and Sentry Reports

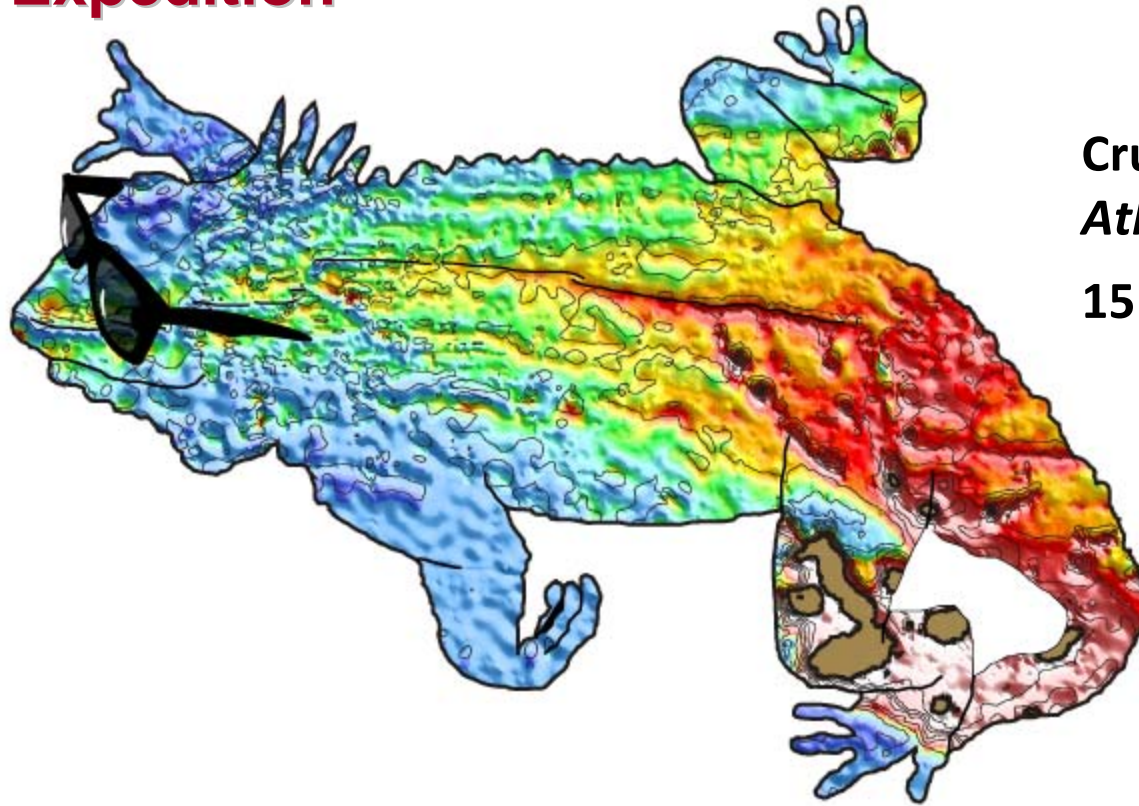
John Sinton

Atlantis/Alvin/Sentry

March 15 – April 14, 2010

GRUVEE

Galápagos Ridge Undersea Volcanic Eruption Expedition



Cruise AT15-63 of *R/V Atlantis*

15 March -14 April, 2010



UNIVERSITY
of HAWAII
MĀNOA



UNIVERSITY OF
SOUTH
CAROLINA



UNIVERSITY
OF MINNESOTA



<http://www.soest.hawaii.edu/gruvee>

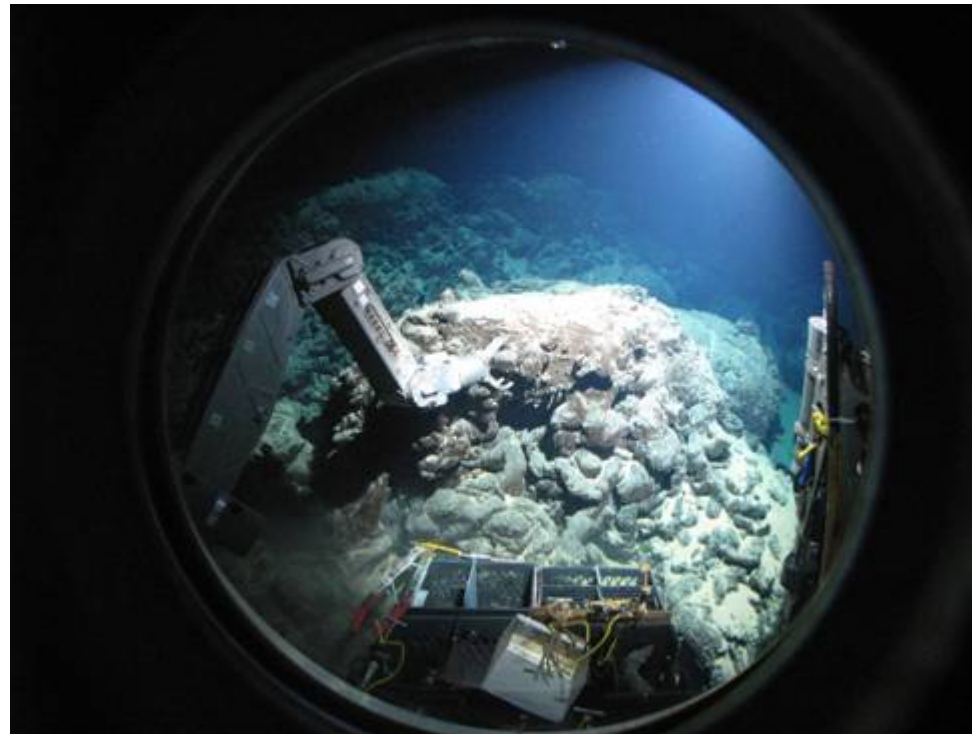


Cruise Objectives:

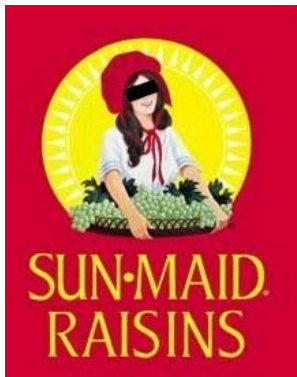
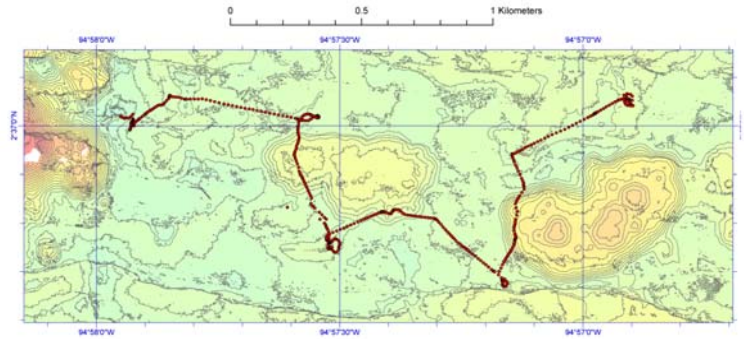
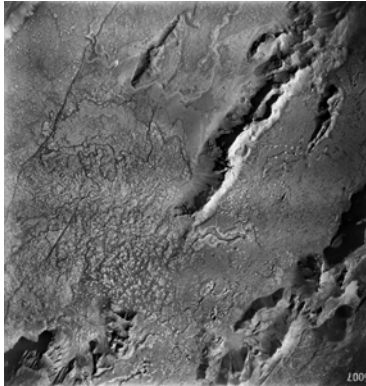
Mapping and sampling of volcanic flow fields* on the seafloor

* Volcanic products of single eruptive episodes

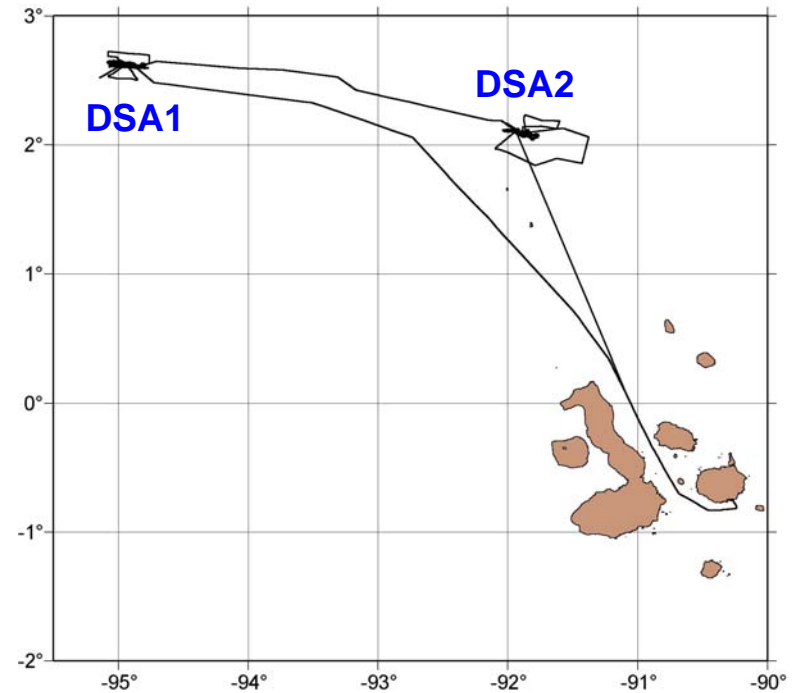
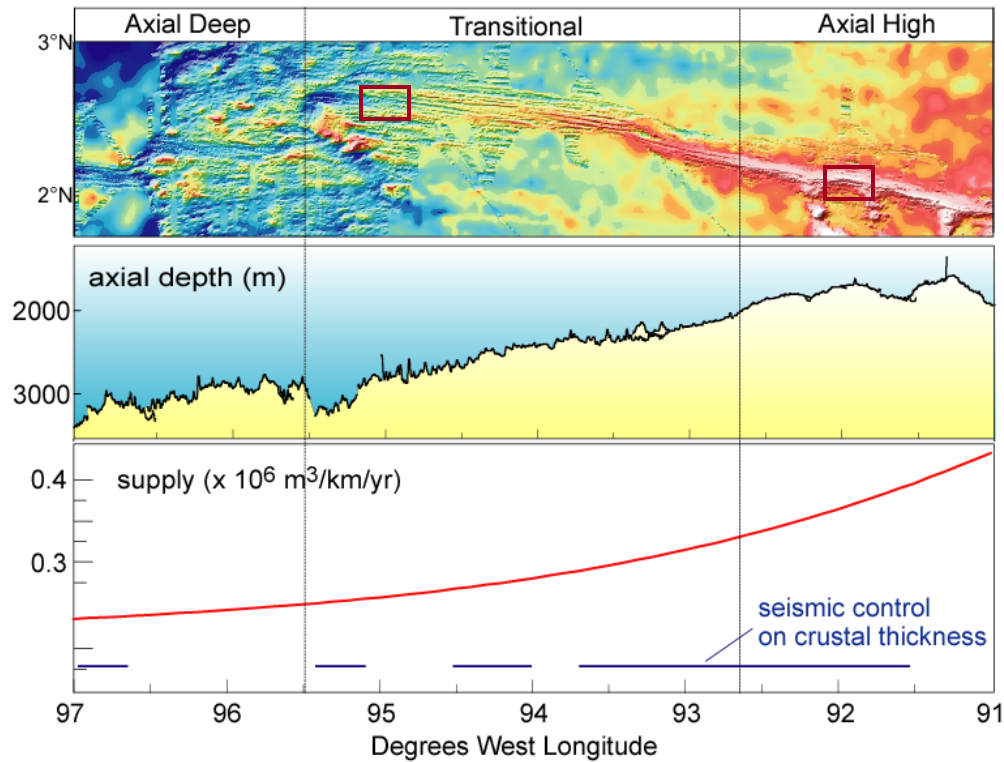
An expedition dedicated to deciphering eruptive history of mid-ocean ridge areas without prior knowledge/expectation of recent eruptions

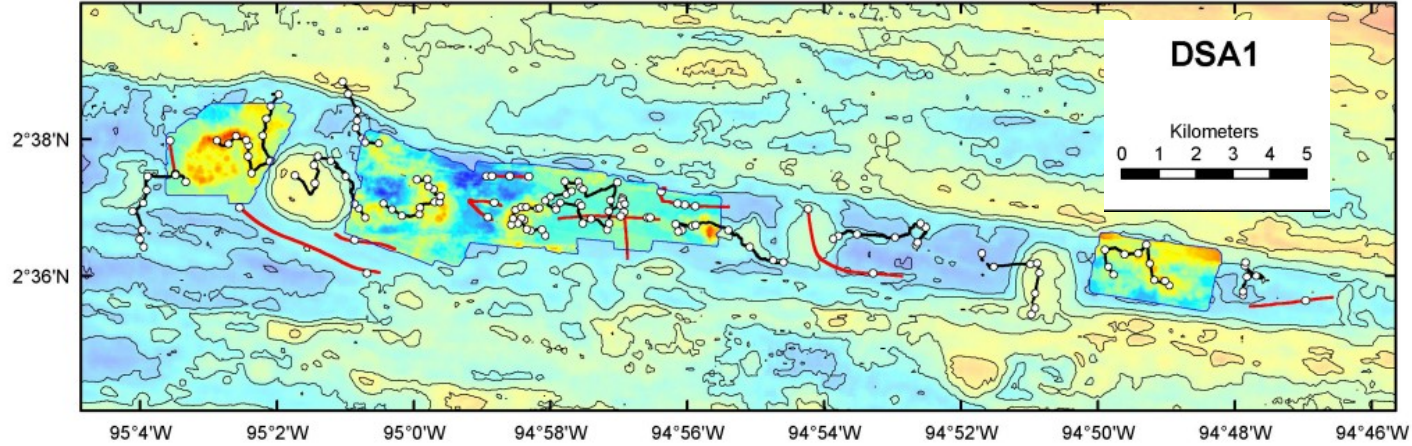


Old Time Geology with Modern Tools



Near-bottom investigations in two Detailed Study Areas (contrasting depth, bottom roughness, crustal magma supply)

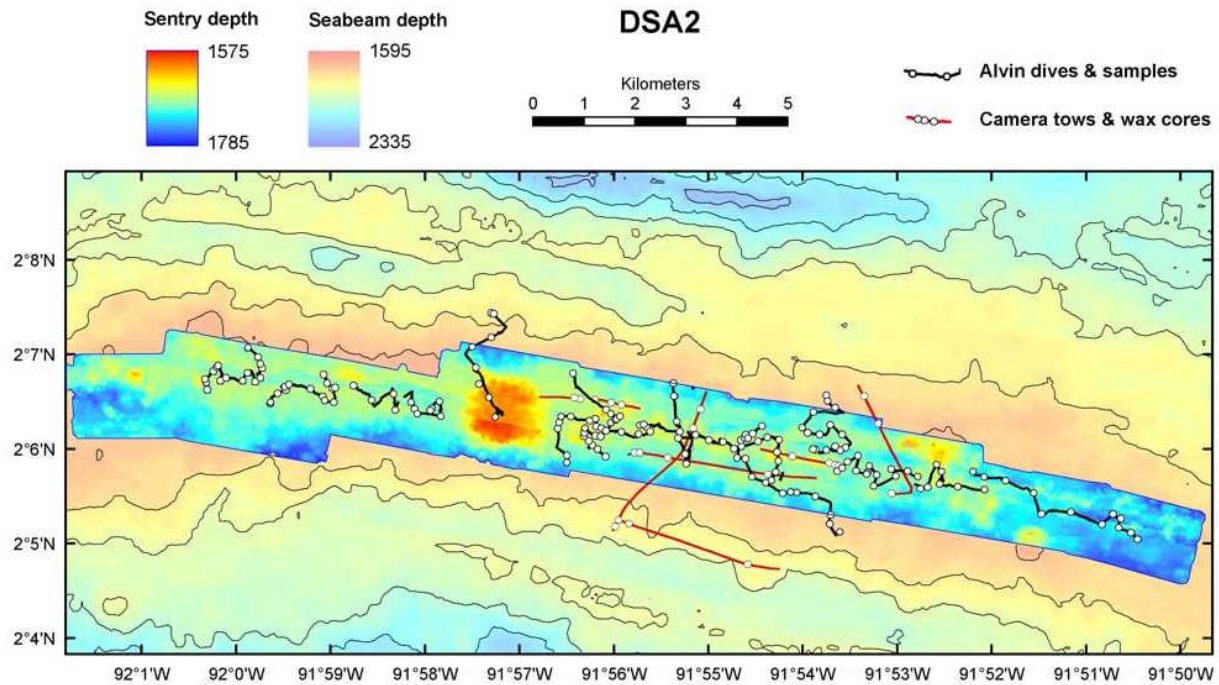




12.5 of 13 planned **Alvin** dives

9 successful **Sentry** deployments (5 in first 9 nights; 4 in last 4 nights)

10 successful **TowCam** deployments



13 of 13 planned **Alvin** dives

7 successful **Sentry** deployments (all of the last 5 were spectacularly successful)

5 successful **TowCam** deployments

Alvin is ideal for mapping at the scale of individual lava flow fields

- maneuverable; versatile; interactive & tactile, really close viewing; 3-D depth perspective; fun

6 pilots

Excellent pre-cruise planning

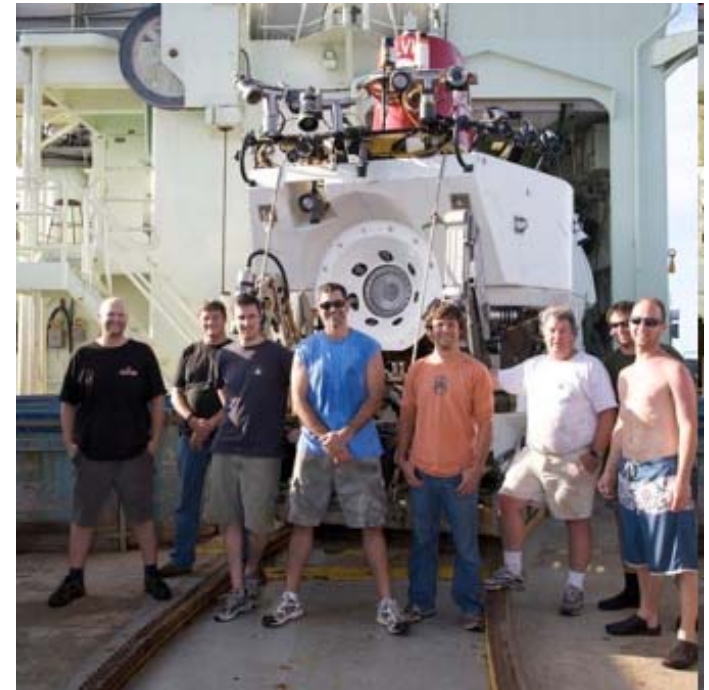
Uniformly superb dive experiences



GRUVEE stats

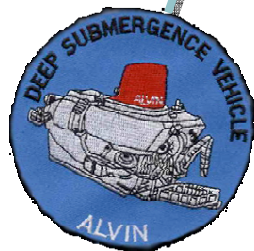
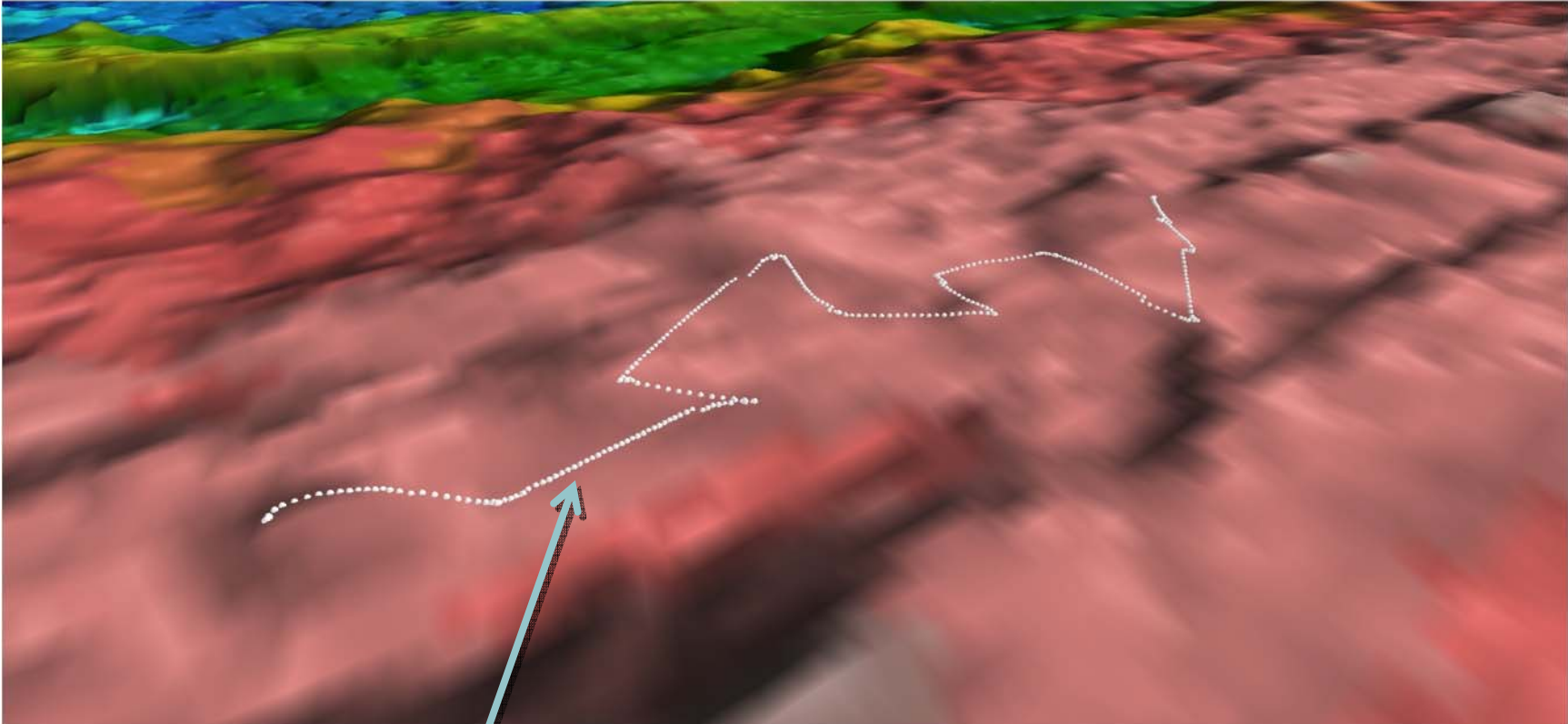
~130 km of dive track

299 rock samples



Why use AUV Sentry?

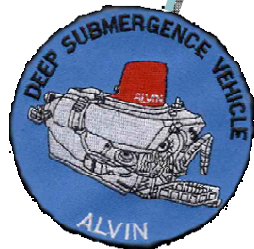
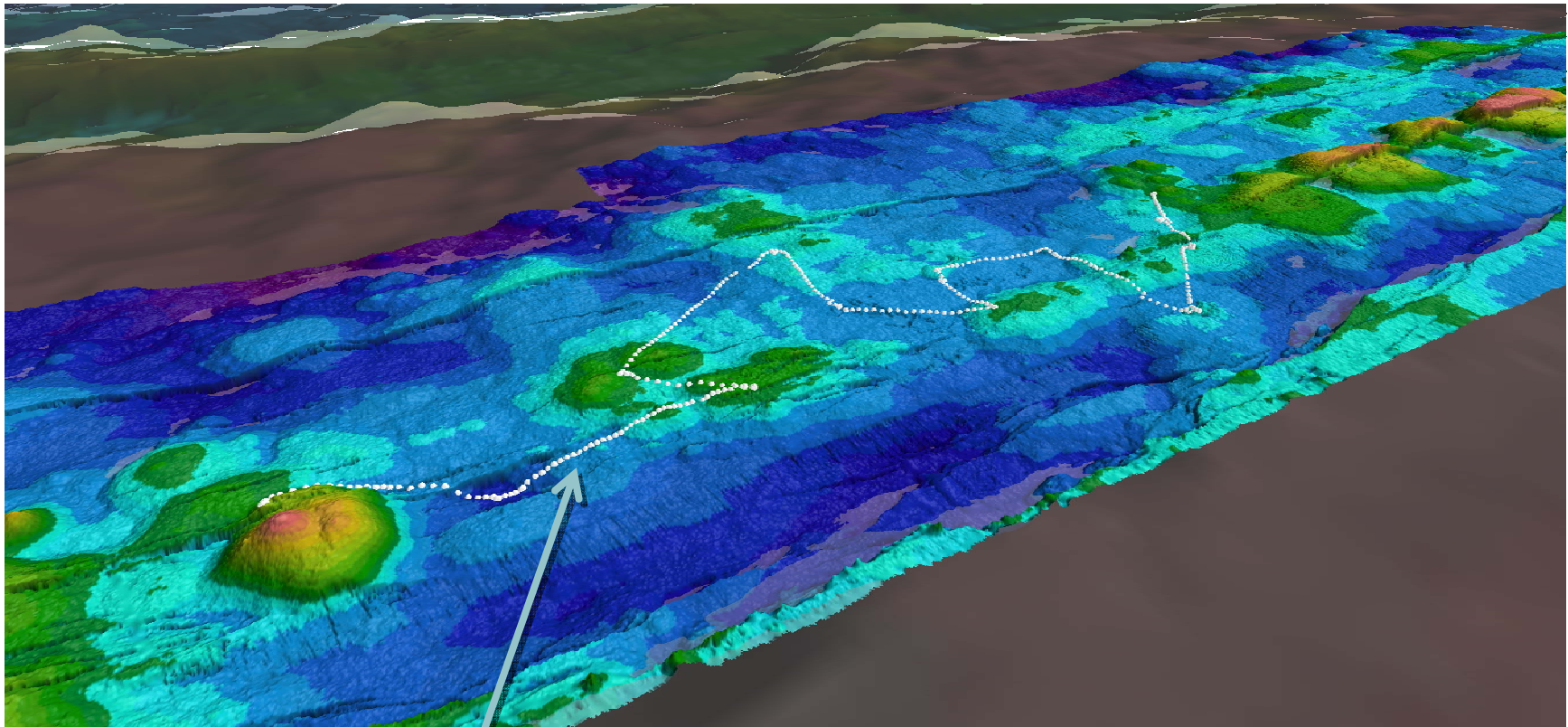
30m-gridded bathymetry from R/V *Thompson*



Alvin 4610: 3 km track, 30 m relief

Why use AUV Sentry?

1m gridded bathymetry from AUV Sentry



Alvin 4610: 3 km track, 30 m relief

AUV Sentry

Night program on GRUVEE cruise

Occasional technical issues

One major failure (leak and electrical fire): back in the water 3 nights later!!

We used Sentry data:

- To plan Alvin dives

- As a map underlay during Alvin dives

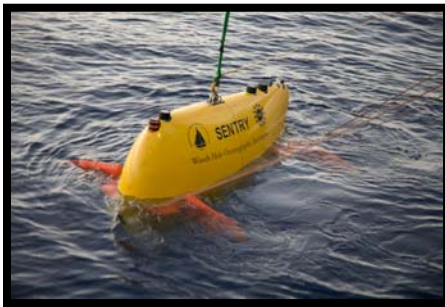
- To interpret lava flow field boundaries and other features post-cruise

**Overall Assessment: The best seafloor mapping tool presently available;
superb complement to Alvin for regional geological studies**

GRUVEE stats

DSA1: 194 km of track; 32. km² of seafloor mapped

DSA2: 220 km of track; 42.3 km² of seafloor mapped



Scott McCue



Rod Catanach

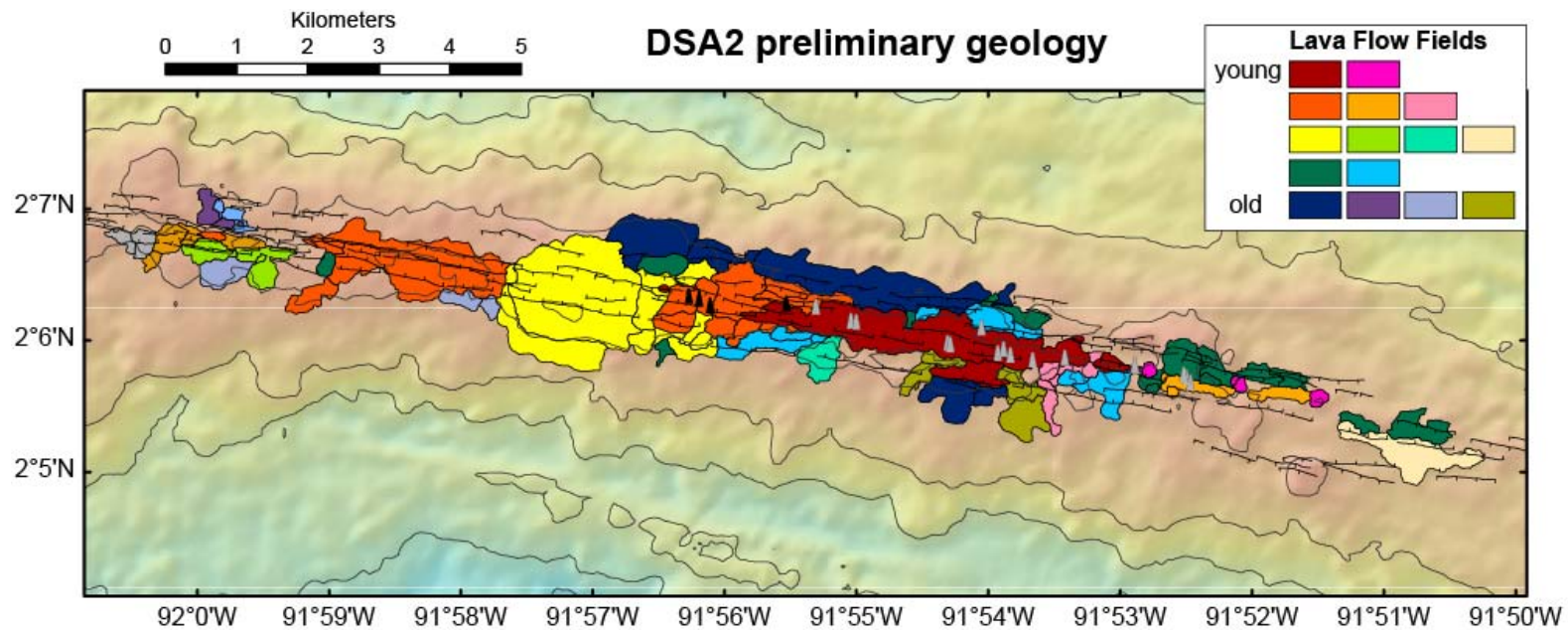
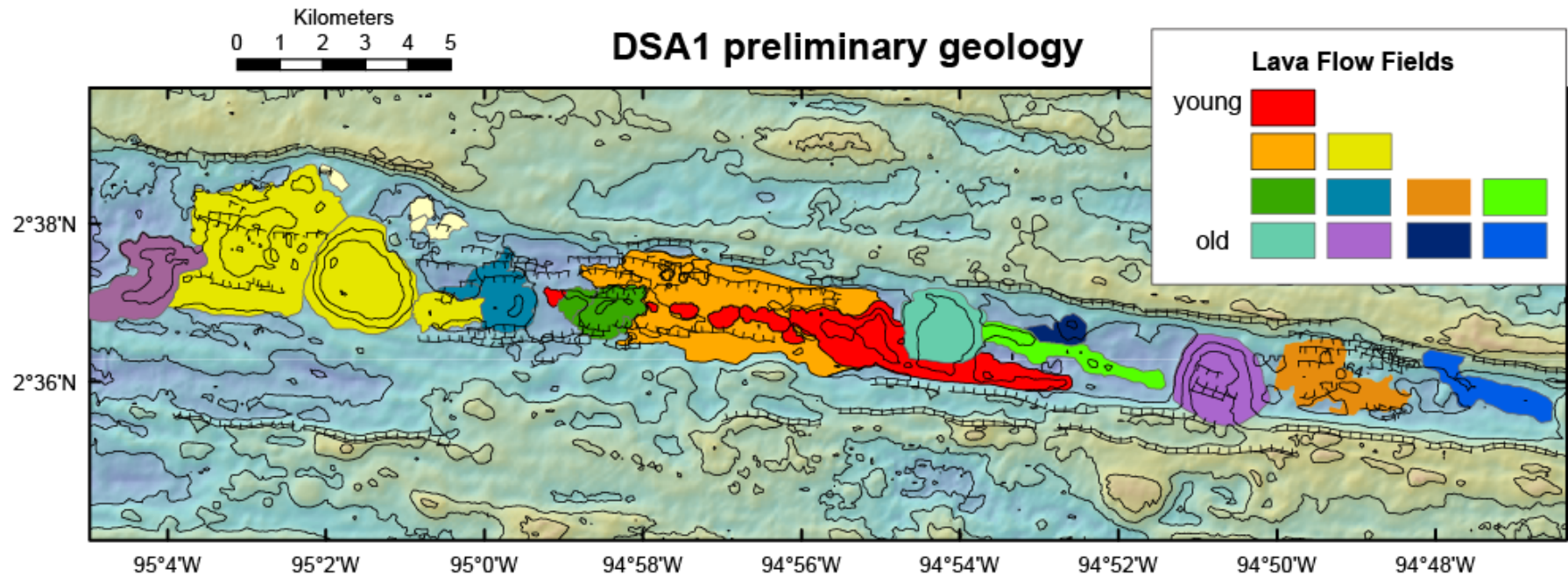


Dana Yoerger



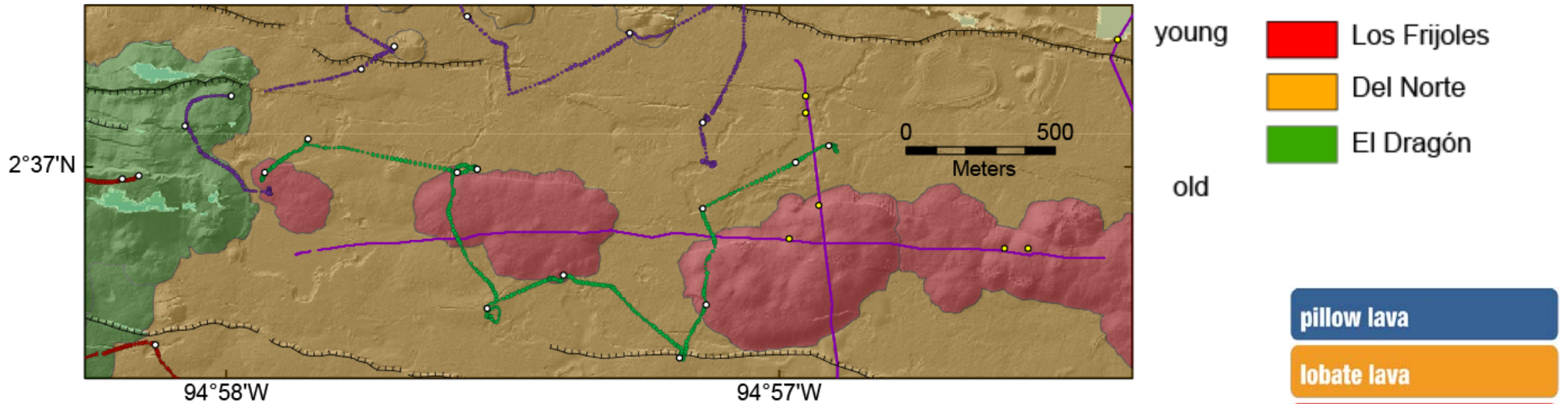
Al Duester

Lava Flow Fields of the Western Galápagos Spreading Center

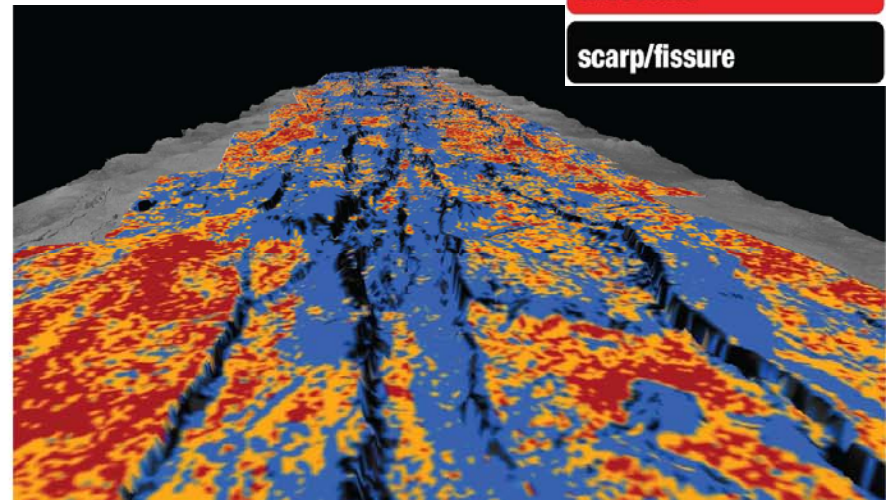
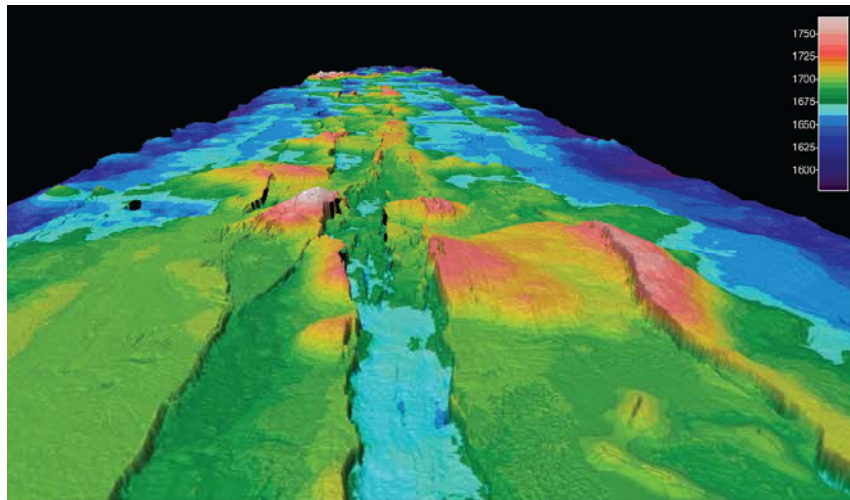


GRUVEE Cruise Results

See: Sinton et al., **V12A-01** Colman et al., **V41A-2262**
Cushman-Patz et al., **V41A-2251** McClinton et al. **V41A-2263**
Sinton et al., **V52A-06** White et al., **V52A-07**



ANFIS classification of seafloor data



← ~1.8 km →

R/V Atlantis Cruise AT15-63

Alvin Dives days
Sentry
TowCam typically 2 programs each night
Box cores
Seabeam surveys



Capt. Colburn



XPLdr Strickrott

Maurice Tivey
(Presenter - Andy Bowen)

Atlantis/Alvin

July 6 – 26, 2010



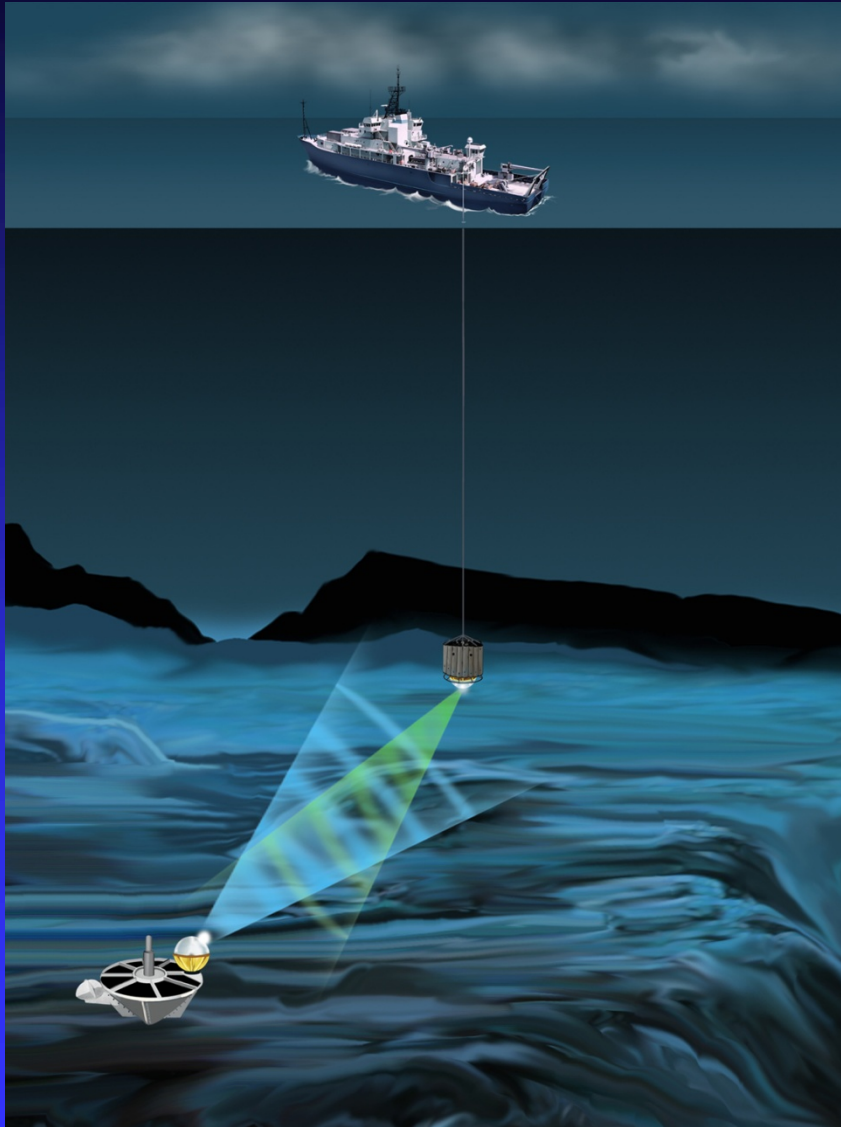
Tivey, Farr, Ware and Pontbriand

ALVIN installation and testing of an integrated optical/acoustic communication system for seafloor observatories: A field test of high data rate communications at CORK 857D

AGU 2010 Abstract U43A-0005
Thursday pm session

Funded by NSF OCE-0926849



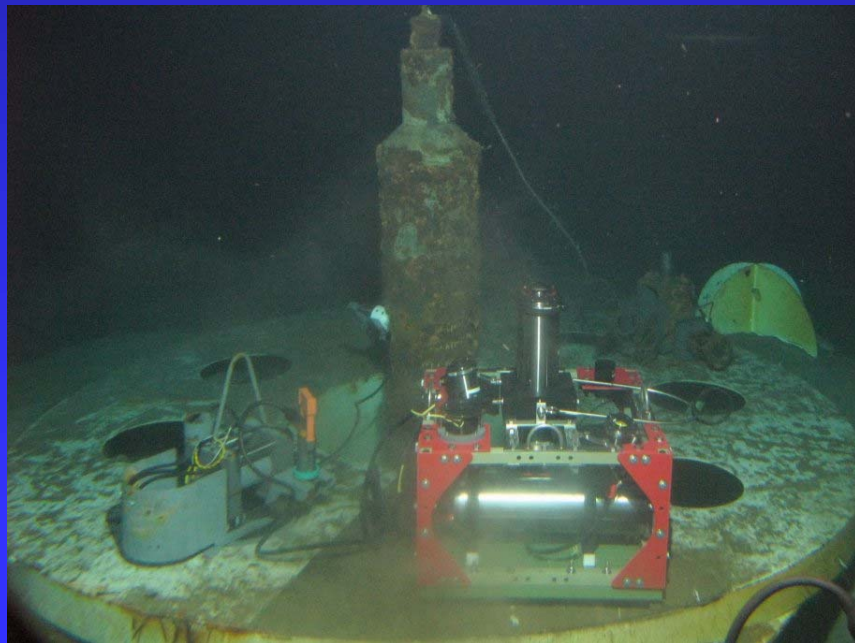
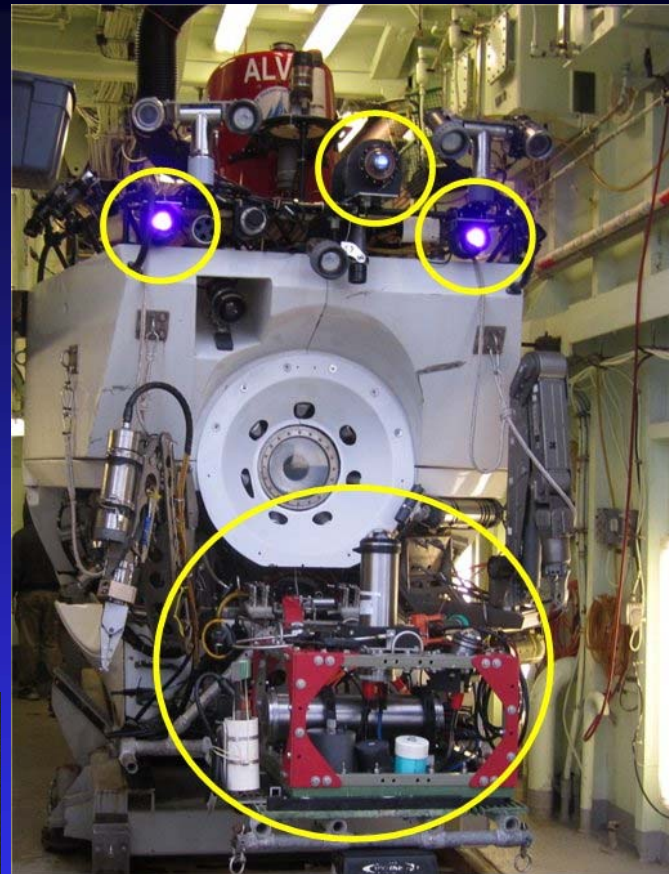


CORK Optical Communication Project

Wireless (optical) data
transfer from seafloor
instrument to surface
vessel

Increase power to the
CORK observatory for
higher bandwidth
operation

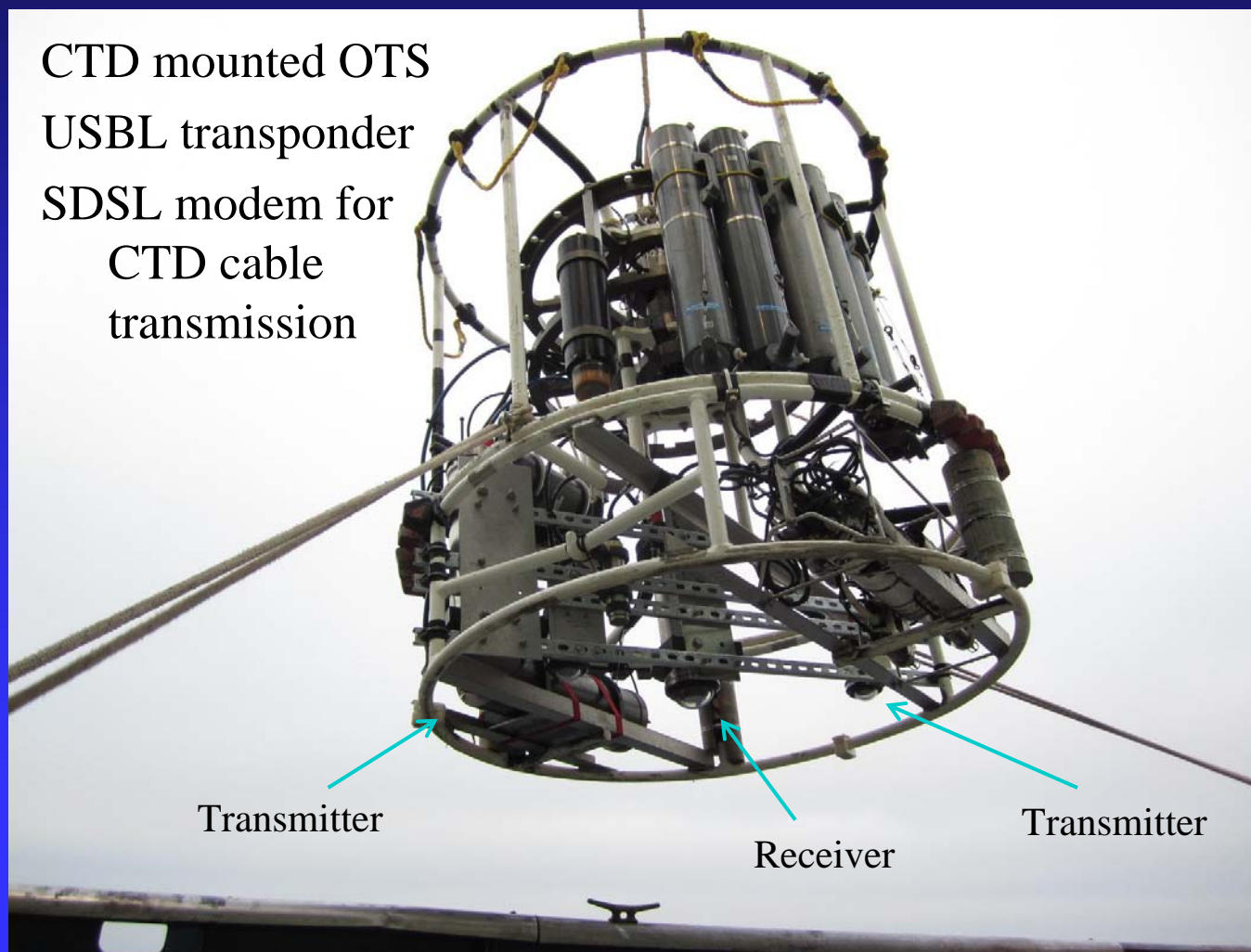
- Alvin optical telemetry system mounted on light bar
- CORK system on basket to be deployed



- Installed seafloor optical telemetry system at CORK 857D (Middle Valley)

Lowered CTD Optical Telemetry System

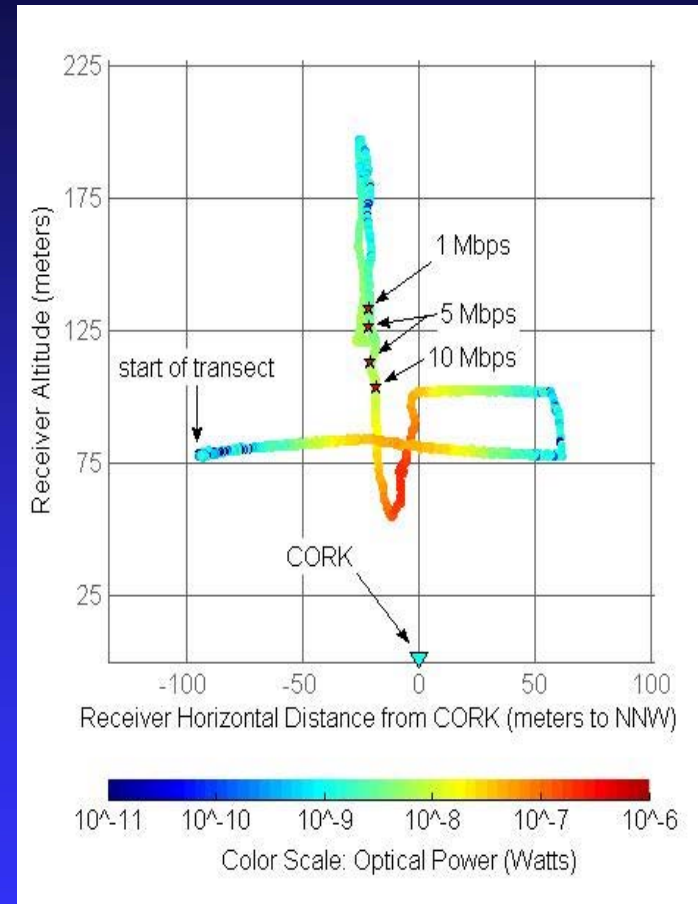
CTD mounted OTS
USBL transponder
SDSL modem for
CTD cable
transmission



Data/Results

Transfer rates along transects with lowered CTD mounted unit

Range (meters)	Data transfer rate (Mbps)
108	1, 5, 10
118	1,5
128	1,5
138	1



Thanks to: RV Atlantis crew and ALVIN technicians and pilots
 Dr. Earl Davis and Bob Meldrum of Pacific Geoscience Centre, Canada
 Dr. Keir Becker and Katie Inderbitsen of the University of Miami

**Marv Lilley
and Raymond Lee
(Presenter – Peter Girguis)**

Atlantis/Alvin

July 6 – 26, 2010

Samantha Joye

Atlantis/Alvin

Nov 6 – Dec 3, 2010

Samantha Joye – Cruise reflections

"I won't arrive in time for the DESSC meeting but I have to tell you that this is the most professional, efficient and personable ALVIN group that I have ever worked with. This is the ALVIN 'Dream Team' and I hope, that during the ALVIN overhaul, every effort will be made to keep this team (i.e. retain the pilots!) in tact. Bruce, as usual, was an outstanding expedition leader and they gave us 120% all the time. I cannot praise them enough. It was an honor to work with these guys.