

ROV Jason / Medea

9 Cruises total June 2011 - June 2012

**NE Pacific - Juan de Fuca Ridge Flank: Hydrogeology,
Servicing CORK observatories**

June 29 - July 14, 2011

Astoria, OR -> Astoria, OR

R/V Atlantis

**NE Pacific - Juan de Fuca, Endeavor and Axial Segments:
Recovery, deployment and servicing of in-situ instrumentations / fluid and
microbial mat sampling / study of inflation-deflation at Axial seamount**

July 19 - August 1, 2011

Astoria, OR -> Astoria, OR R/V Atlantis

**NE Pacific - Juan de Fuca Ridge - Endeavor segment: 3 interrelated projects:
Heat flow and magnetic studies, high speed optical communication system**

August 4 - 28, 2011

Astoria, OR -> Astoria, OR

R/V Atlantis

Cruises continued

NE Pacific - Hydrate Ridge : 2nd cruise of a field program studying the biota at carbonate hard-grounds / recovery of numerous experiments and extensive push-core sampling

August 31 - September 8, 2011

Astoria, OR -> San Francisco, CA

R/V Atlantis

East Pacific Rise: 2 projects: Geodetic study at the EPR near 9°50'N / transit over ~100km along axis to recover a separate set of up to 20 moored pressure sensors

October 4 - 25, 2011

San Diego, CA - > Balboa, Panama

R/V Atlantis

This cruise had not been reported on in the December 2011 summary

NE Pacific Santa Barbara, CA

SEEPS 2011: Study on the on the Ecology and Evolution of Petroleum Seeps

September 13 - 29, 2011

San Francisco, CA -> San Diego, CA

R/V Atlantis

Cruises continued 2012

Mid-Atlantic Ridge, Hydrothermal Field Studies, Von Damm Site and Piccard Site

Sampling for rocks and minerals, fluid chemistry, micro- and macro-biology

January 6 - 28, 2012

To/From: Fort Lauderdale, FL

R/V Atlantis

Eastern Mediterranean, Hypersaline Anoxic Brine Pools

February 5 - March 15, 2012

To/From: Woods Hole, MA

R/V Atlantis

Not included in this summary

Mid-Atlantic Ridge Flank, 'North Pond'

IODP Borehole and CORK servicing

April 11 - May 10

Freeport, Bahamas -> Ponta Delgada, Azores

R/V M. S. Merian

1. Pre-Cruise Planning:

All PIs felt that pre-cruise planning went well in general with only some issues:

- **Web sites** for Atlantis and Jason cruise planning merit updating. Information is scattered among various sites that are not linked.
- Information pertinent to a Jason cruise and that the PIs rely on from the internet is **NOT** available via the ship's intranet. Shorebased available web pages for Jason should be duplicated on the **shipboard intranet**.
- For the **use of elevators** there is not a clear listing available for elevator components (weights, buoyancy pack, frame dimensions) to plan and prepare elevator loads correctly and in advance
- One issue that was requested but not met was the **calibration of the CTD**.

2. Mobilization/Demobilization:

Mobilization went well except for issues with the ship's agent

- The performance of the ship's agent in one of the ports was unacceptable, he was unprepared and unresponsive. Lack of agent's attention caused loss of science time. Departure was delayed by one day. In a different instance there were miscommunications about the transport of a piece equipment.
- For a different cruise the ship's sailing was delayed by 12 h because new parts for ship's bow thruster did not arrive in time.
- On another cruise the agent was *not as efficient as would be desired* which resulted in a hunt for packages and chaos with deliveries to the ship.

Demobilization went well

3. Operations - Vehicle:

In general Jason performed very well except for some issues

- *Minor ground faults on both manipulators*

There were several dives that were impacted by faults that occurred on one and or the other manipulator or both

- *Ground faults on Jason*

A persistent ground fault on Jason throughout one cruise manifested itself at depth.

During one cruise a major ground fault was traced to chafing of the umbilical between Jason and Medea.

On a different cruise a ground fault on Jason impacted dive time.

- *Introduction of the new LARS system did not go well at first attempt - Jason was bounced on the rail. Temporarily the old LARS crane was used as backup until the new LARS system was brought back into service.*

There was no concern with the weight of Jason in air instead the weight of the vehicle in water when carrying a larger payload was of potential concern and additional syntactic foam might be needed.

- *The CTD on Jason was off-scale in the brine pool.*

Some dives had to be canceled due to *weather*

3. Operations - Vehicle (continued):

Ship related issues:

- R/V Atlantis lost **dynamic positioning** on 6 separate occasions while Jason was in the water.
- The **winch** on the R/V Atlantis for Medea developed a leak -> to fix the leak the seawater cooling system was turned off and was not turned back on again when operations resumed.
-> Early during the next dive the winch quickly overheated.
- After the first 24 hours of ROV operations, a problem with a sheave in the **ship's winch system** caused a kink in the deep-tow cable used for the Jason. -> This led to dramatic shorting and a rapid shut down of all power to the vehicle, at depth. Repairs to the winch were required before Jason was recovered. -> Once back on ship ~ 2500m of cable had to be replaced and tested before Jason operations could be resumed. 1.5 days of operations were lost

4. NDSF - provided equipment

Navigation (USBL) worked well on all cruises except for:

- It was noted that when USBL and DVL were used in concert, post-dive processing of the navigation still propagates erroneous data if the DVL was left running while the vehicle was on the bottom for extended periods (e.g. during sampling). This is the same problem that was reported a year before.

Cameras

HDTV worked well in general with some issues:

- It still yielded relatively dark video imagery.
- The PIs found that the cameras mounted on the pan-and-tilt platforms on Jason provided a poor 3-D perspective of the environment they were working in.

Image quality

- On several cruises it was noted that the camera used by the pilot (In-Site Mini-Zeus HDTV camera) seemed to be superior to the new NDSF HDTV Science Camera.

4. NDSF - provided equipment (cont.)

Cameras continued...

- The PI worked closely with Jon Howland, along with other experienced members of the science team and the Jason operations team, to conduct a thorough like-for-like comparison of the NDSF HDTV camera and the Pilot's COTS In-Site Mini-Zeus HDTV camera.

-> In it's "sweet-spot" range of focus and field of view, the NDSF camera appeared preferable for videography/cinematography providing a greater depth/warmth of color-range when collecting "eye-candy" video footage.

However, the NDSF HDTV camera was found to be inferior to the InSite Mini-Zeus for science use in **two important regards**.

- 1. *Biology*: At full-zoom, the NDSF camera could not examine fauna in as great a detail as the pilot camera was able to do
- 2. *Geology*: When zoomed out, the NDSF camera had a wider field of view than the Pilot Camera but the lighting projected from the vehicle was insufficient to take advantage of this - most of the field of view was just black. - In contrast- the restricted field of view of the pilot camera when zoomed out still allowed the PI to see out further ahead of the vehicle than the science camera thus it the Pilot Camera was used for directing geological field operations

4. Operations - NDSF Equipment (continued):

Reson multibeam system

- The system was used for sea floor mapping - no problems were encountered at sea but the data had not been worked up at the time of the debrief call.
- Multi-beam mapping surveys were conducted at 2 sites and although the PI brought a dedicated colleague along on the cruise to process the data the PIs did not have a good quality working map from the Reson to help guide operations before the end of the cruise.
- On a specific cruise the PI hoped to use the Reson for mapping, yet the density contrast between seawater and brine was too great and the sonar could not penetrate into the brine layer so the Reson was removed from Jason after that.

4. Operations - NDSF Equipment (continued):

Other equipment

- A bug was found in the *Event Logger software*. If the “&” character is used when typing a string of text into an Event entry, everything that follows the “&” character is deleted when the entry is completed and the operator hits “return”.
- It was noted that an off-line version of the *Jason Virtual Van* now exists that is exported to DVD, BUT that version of the VVan is not searchable in the same way that the online version is. This greatly reduces the usefulness of the VVan log, and a search function in the off-line/DVD version of the Van should be incorporated.
- *Payload* remained an issue for Jason operations on one cruise because of the use of a heavy sampling device (95 lbs). ‘Surplus’ components had to be removed (cameras etc.)
- The *slurp sampler* was connected in reverse for the first dive - preventing PI to get important samples - an idiot-proof set of markings was added thereafter ...

5. User-provided equipment

Handling and interfacing user-provided equipment worked really well in general.

Pelagic pumps, injector cores, fluid samplers, in-situ mass specs, Pizzaro 3D camera worked well.

Interfacing equipment for fluid sampling as well as downloading data from pressure sensors and CORK installation worked well.

There were some problems

- A user provided GC was interfaced for the first time with mixed success due to problem on the instrument side
- A long-term deployed equipment failed because of corrosion problems around penetrator fittings for connectors.
- Initial problems with newly developed microbial samplers (SUPR sampler, multi-carousel microbial sampler) were solved at the end of the cruise and the systems should be available for other users in the future

8. Data hand-over:

- Data hand-over went well for the most part with some remarks:
- For a 9-dive program that generated hundreds of DVDs which the PI considered an obsolete way of operating.
- There was also confusion in terms of what the PI needed to procure in terms of Hard Drives.
- A set of HD video files recorded to the hard drive were initially assigned incorrect filenames and this had to be corrected after the cruise.
- One issue that arose was that the PI came to sea with 4TB of available hard drive only to find that the cruise generated 15TB of data – it is not only the HD Camera that generates large data-volumes.
- The PI believed that she had received a complete set of the data at the cruise end but was subsequently informed that some of the Jason vehicle navigation data had probably not been provided as a copy.
- On one cruise there were no HD clips recorded from one dive.
- Less satisfactory was the hand-over of the DVDs which were presented to the PI in a *used cardboard box* on the final day of the cruise. The NDSF might think about providing a better way of handing over important data to the PI...
- the PI has found that 6 of 51 DVDs reviewed were in fact blank disks with no data. Another DVD had no annotation along the top of the screen as expected.

10. User Recommendations:

- While the HDTV camera itself behaved well, it was recommended that some formal training for the science team be provided during the first few watches of any cruise.
- The new HDTV camera still needs attention in terms of control box response times, better lighting, and the monitor in the control van assigned to display its video-feed.
- The Brow Camera should be replaced by the Mini-Zeus.
- It is highly recommended to notifying Chief Scientists prior to the cruise about how much is data storage capacity is needed.
- The PI was impressed by the caliber of the Pizarro 3D imaging capability - one caution, however, would be the requirement not just for additional hardware on the vehicle but, in parallel, the additional hardware required aboard ship and the suitable skill-set needed to process the data in a timely fashion in the way
- The PI thoroughly recommends the use of recording to hard drive from the HD camera – the quality of the materials obtained for outreach are exceptional.
- The practice of establishing a standard pattern of both generating a dive-plan ahead of each dive and taking the time to talk that through with the Expedition Leader is probably worth considering.