

PLUME CRUISE 1/TUIM01MV UNOLS CRUISE REPORT

prepared and sent: February 04, 2005

UNOLS CRUISE report:

<http://www.gso.uri.edu/unols/pcarform.htm>

- 1) ship: Melville
- 2) cruise dates: dec 30, 2004 - jan 25, 2005
- 3) chief scientist: gabi laske
- 4) master: murray stein
- 5) marine technician: cambria colt
- 6) cruise number: tuim01mv / plume 1
- 7) type of work: deployment of passive seismic OBSs/dredging
- 7a) funding source: NSF
- 8) area of operation: NP12
- 9) person to complete form: gabi laske
- 10) institution: sio
- 11) email: glaske@ucsd.edu
- 12) position on cruise: chief scientist
- 13) extent of meet objectives: 100% or more

BRIEF DESCRIPTION OF SCIENTIFIC OBJECTIVES:

The primary objective was to deploy 35 passive seismic broad-band OBSs around the Hawaiian Islands to seismically image the Hawaiian mantle plume.

The secondary objective was to dredge in 5 general areas for ancient corals and deep rift volcanic samples.

A third objective was to perform seabeam surveys on transits between stations that fill some of holes that still exist in publicly available bathymetry maps.

The primary objective had the highest priority. Dredging would only be done if time permitted. The scientist who had the necessary expertise to chose the dredge sites was therefore picked up in Kona only after it had been clear that the OBS deployment went according to plan. We were able to carry out 11 dredges, after all OBSs had been deployed.

Two important factors contributed to fulfillment of our cruise objectives:

- the Melville crew was willing to speed up the transit between San Diego and Hilo to make up for a 20h delay in the departure. The delay was due to the late arrival of the WHOI OBSs. The Melville picked up the science party in Hilo at 8:20am on January 7th, 2005; only 20min behind the originally assumed pick-up time.
- the weather was unually benign for this time of the year.
The swell was expected to pick up on January 17th when waves from a large storm system in the North Pacific would hit the westfacing beaches of Hawaii and produce a 20-foot swell elsewhere. Fortunately, we deployed instruments on the lee side of the islands at the time. Later during the cruise, when we dredged near the islands, the winds were not the usual trade winds but either Kona winds or none at all. This allowed us to dredge in the infamous Alenuihaha Channel between Big Island and Maui,

where we could get two important coral samples and beach deposits.

The progress of the cruise was slowed down somewhat by the MEDEVAC of a crew member (see below), but at the end did not compromise our planned deployments.

We were also able to accommodate NOAA PIs' Gregory Johnson and Elizabeth Steffen request for deploying 15 ARGO floats en route from San Diego to Hawaii. Dr. Steffen joined the cruise from San Diego to Hilo to deploy these instruments. We also accommodated a request by PI Peter Lonsdale to take a small detour to augment his seabeam database.

SUGGESTIONS OR COMMENTS FOR IMPROVING SCIENCE PARTY PARTICIPATION:

All members of the science party did an excellent job and contributed to a successful cruise. There is not much that could be improved. We invited guests from a French and a Taiwanese institution who were interested in the design of our instruments and how we deploy them. We also had an undergraduate volunteer on the team who was not affiliated with any of the PIs' institutions but wanted to learn about fieldwork at sea. The plan was also to have a journalist on the cruise but he had to cancel his participation due to a skiing accident. He will participate in our next cruise. We invited Dr. Dave Clague from MBARI to oversee the dredge work after one of our PIs had to cancel his participation in the cruise. Given the variety of participants, we think that we found a healthy mix to foster international ties and contribute significantly to the E&O of our project.

SUGGESTIONS OR COMMENTS FOR IMPROVING THE PRE_CRUISE PLANNING AND COORDINATION, LOGISTICS, OR SHORE SUPPORT:

Again, there is not much to improve. The chief scientist participated in the pre-cruise meeting of SIO ship operations and we had a scientific pre-cruise meeting two months prior to the cruise to discuss cruise specific items. The logistics prior to the cruise were complicated by the fact that the WHOI instruments were not ready to be shipped on time. The delayed shipping of parts for the WHOI instruments made it necessary to assemble them on the San Diego to Hilo transit. Having the instruments available this late before the deployment was not originally planned. In fact, the PIs, which include the WHOI lab manager, feel extremely uncomfortable to having deployed instruments that have never been tested before. We therefore seek permission to split our recovery/redeployment cruise next year into two cruises that are 1-2 months apart. This time would give us the opportunity to evaluate the collected data and possibly adjust the instrument configuration before they would be reused for our second deployment.

The shore support was excellent, given our tight time constraints around the Christmas holidays. The team went out of their way to get our cruise going as fast as possible.

SUGGESTIONS OR COMMENTS REGARDING THE OPERATOR SUPPLIED SCIENTIFIC EQUIPMENT AND THE TECHNICAL SUPPORT FOR THIS CRUISE:

The supported equipment was adequate and the technical support was excellent. The resident technician was very knowledgeable and hard working and had excellent people skills. The computer technician also was extremely helpful and friendly and his help was much appreciated.

We had two technical problems during the cruise, the first of which seems to occur on many other OBS cruises:

1) we had significant problems ranging to our OBSs on their way down and on the ocean floor to determine its exact position. To range to the instruments, we planned to use the ship's 12 kHz hull transducer together with the OBS team's Edgetech acoustic deck unit. The original plan was to range to the instrument constantly while sailing along a circle at 5km-radius, centered on the OBS drop site. Repeated loss of contact, and given time constraints, we finally decided to range to the instruments from only 5 points: directly from above the OBS and from the 4 corners of a square, at about 1.5-2 km from the OBS drop site. This is far from being ideal! Instead of the ship's hull transducer (whose specs could not be found out), we tried to improve the situation with our own Edgetech transducer that was lowered over the starboard side of the ship. Initially,

this appeared to have helped but it later turned out the improvement was due to the fact that the ship stopped and not the different transducer. Possible ways to improve this situation were discussed on board but no single solution has yet been identified:

- a transducer that is in tune with the OBS teams' Edgetech deck units may help
- we believe, but are not 100% certain, that the hull transducer was below the laundry room near the bow of the ship; it is believed that this could have been a source of noise; it is considered possible that a transducer placed somewhere else may give better results
- a transducer in a well rather than attached to the hull may help (perhaps the OBS teams could provide this transducer for the particular cruise)
- a transducer attached to a pole (John Hildebrand model) that is operational even when the ship is moving may help;
- we achieved good communication when the ship stopped and declutched (which is very time consuming); this points toward ship noise as a significant problem and we are uncertain as to how this could be fixed

2) the winch that operated the dredge bucket was sometimes unreliable; sometimes, it would operate only at certain speeds but not slower; being able to control the speed of the dredge is essential to recover the bucket once it gets stuck on the ocean floor.

During the final preparation for one dredge, the winch suddenly would go only in one direction but not in the other. The chief engineer was able to fix this problem within an hour but we worry that we would have lost the bucket if it had been on the ocean floor already. We are not sure what the problem was but perhaps the winch could use a service check.

SUGGESTIONS OR COMMENTS REGARDING ANY ASPECTS OF THE SCHEDULING PROCESS OR SHIP ASSIGNMENT:

Our cruise was postponed by 18 months, mainly due to the fact that the OBSs were not ready to be deployed. On the other hand, I am extremely happy with the service that ship scheduling provided. In our ship request form, we had asked for the R/V Roger Revelle or a similar size ship. For some time, we were on the schedule of the R/V Thompson before we were finally assigned to the R/V Melville. In retrospect, I believe that this was the best option for us (though the Revelle would have worked equally well). Being a chief scientist from SIO and dealing with ship operations at SIO was a very fortunate coincidence that allowed me to coordinate our somewhat difficult start of the cruise. I deeply appreciate all the help that I got from SIO ship scheduling (Dr. Knox and staff) and operations (Captain Althouse and staff).

SUGGESTIONS OR COMMENTS REGARDING ANY SAFETY ASPECTS OF THE CRUISE, SHIP, CREW OR SCIENCE PARTY:

nothing to comment. Safety issues have been addressed adequately. The science party had weekly fire drills and 3 meetings where safety instructions were given

(basic safety, fire, abandon ship), while the ship crew had their own drills. Lifelines were deployed everywhere. Lines were removed below the aft A-frame only for the few minutes when the dredge bucket would be deployed and recovered.

SUGGESTIONS OR COMMENTS REGARDING ASPECTS OF SHIP'S CAPTAIN AND CREW SUPPORT:

The crew was excellent and I would sail with them again. The captain and many crew members interacted extremely well with the science party which made this cruise a fun cruise. The bridge officers (Captain, 1st, 2nd and 3rd mates) communicated well with the watchstanders in the main lab and were extremely helpful when we requested course changes for additional surveys on transit between stations. The food was excellent, and the whole team did an excellent job to keep the engines, and everything else, running for us.

SUGGESTIONS OR COMMENTS REGARDING THE VESSEL AND ITS INSTALLED EQUIPMENT:

see comments on transducer and dredge winch above!

Additional comment on equipment available on the R/V Melville: I have not been on many other ships but the variety of cranes available on the Melville came in handy. We had originally planned to use the small aft crane on the starboard side to deploy the SIO OBSs and the side A-frame for the WHOI OBSs. We arranged the SIO instrument frames and WHOI containers and instrument frames accordingly. Due to the request for a later cruise however, the side A-frame was moved and a WHOI van then blocked the A-frame so that we could no longer use it. The hydro-boom that is located on level 01 above the front hangar was then used instead, which worked out extremely well. I am not sure if other ships allow this kind of flexibility.

Nice decks to work on! One picnic table near the starboard hangar was initially felt not enough for all the people. At the end, this was not an issue because some brought their own deck chairs along.

State rooms were rated excellent by many experienced seagoing team members. Team very much appreciated computer lab, reading room and lounge though most of the team used the main lab most of the time. The main lab is excellent and very well designed. Ethernet access from staterooms and many connections in the main lab were much appreciated!! Also, internet access (though web access was limited to two computers) was extremely appreciated! Email access through any ethernet connection tremendously helped to keep the "usual" academic life going while at sea. Not lastly, updating the cruise plan and keeping "stay-at-home" co-PI informed during the cruise did benefit from this service!!

It would have been nice to have more wall space to put up maps and posters but the space available was ok. Excellent laundry facility. Excellent exercise equipment. I have been on other ships that had only one exercise bike!

The jacuzzi (hot tub) on level 01 was very much appreciated!

NUMBER OF SCIENCE DAYS LOST DUE TO:

- weather: none
- ship, ship's propulsion, power, crew, etc: 0.85 (20.5h)
- ship's scientific equipment: none
- user provided equipment: none

reasons for days lost:

We lost 20.5h due to MEDEVAC of a crew member. The crew member appeared to have become sick with the flu, vomited for four days, eventually ran a high fever and became severely dehydrated. The situation was so bad that no IV could be placed to rehydrate him. We went into port in Hilo to leave the crew member at a hospital. The order of stations to be deployed was then rearranged to make up for some of the time lost.

About 1h was lost during the repair of the winch operating the dredge bucket (see above).

Despite this loss of time, we are extremely happy about the progress and turnout of the cruise.

sent to:

- ship operator
- yourself
- PI
- UNOLS Office
- facilities program manager