HAWAI'I UNDERSEA RESEARCH LABORATORY
QUICK LOOK REPORT
DIVE: P5-619

MISSION STATUS

Location: Giggenbach volcano, Kermadec Arc

Launch Latitude: 30° 02.0'S **Longitude: 178° 42.6'W**
Land Latitude: 30° 01.962'S **Longitude: 178° 42.654'W**

Mission Date: April 16, 2005 **Duration:** 4 hours 35mins (Bottom Time)

Maximum Depth (m): ~183 meters

Project Title: New Zealand American Submarine Ring of Fire Leg I

Principal Investigator: Bob Embley

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Observer 1: David A. Butterfield **Observer 2:**
Address: PMEL/JISAO, Seattle, WA, USA **Address:**

Pilot 1: Terry Kerby **Pilot 2:**

Scientific Data Acquired:

Objective: Sample hydrothermal fluid and gas at Giggenbach volcano.

Observations, findings, etc: (Also see Appended Dive Log)

The main objective of the dive was to sample a range of vent fluids from Giggenbach caldera, including the marker 12 area in pit and marker 10 to the SW. The dive was delayed due to communication problems with the fluid sampler on deck. Underwater cables were re-connected and problem went away. The comm. problem returned during descent, but was resolved prior to landing at 134 meters depth. We drove a vector to marker 12 area and found the pit. We selected the vent next to marker 12 and set up with the fluid sampler. We took 3 pistons, two bags, and 3 gas-tight samples in the boiling vent. We moved down slope to take more samples, lost the grip on the intake nozzle, drifted down to the bottom of the pit, and then could not get the sampler working again. We surveyed the pit thoroughly, took a gas scoop sample at the boiling vent by marker 12, then gradually climbed up to the east and ended the dive.

Species List: NA

MISSION EVALUATION:

A. Limitations, failures, or operational problems noted:
Communication problems with fluid sampler

B. Recommendations for corrective action or improvement: NA

C. In your opinion, did the mission essentially achieve its purpose? NA

D. Compare actual work accomplished with the work that was expected to be accomplished. NA

E. List specimens or samples collected on the mission. (See Sample List Below):

Sample Number	Time (L)	Latitude Min/decM 30°S	Longitude Min/decM 178°W	Depth(m)	Comments
P5-619-1-HFS6	10:56	2.178	42.627	163.5	mkr 12 boiling vent. Piston water sample
P5-619-2-HFS5	10:59	2.178	42.627	163.5	Piston water sample
P5-619-3-GT-Blue	11:01	2.178	42.627	163.5	Gas-tight on HFS
P5-619-4-GT-Yellow	11:02	2.178	42.627	163.5	Gas-tight on HFS, re-triggered at 11:12
P5-619-5-HFS22	11:05	2.178	42.627	163.5	Piston water sample
P5-619-6-GTBlack	11:09	2.178	42.627	163.5	Gas-tight on HFS
P5-619-7-HFS18	11:09	2.178	42.627	163.5	Bag sample with GFF filter
P5-619-8-HFS9	11:15	2.178	42.627	163.5	Unfiltered bag sample, small volume
P5-619-9-Gas	14:15	2.178	42.627	163.5	Gas in scoop with pressure relief; collected above boiling vents at mkr 12

Dive Log:
08:00 In sub to check out HFS and launch. Initial check looked ok, but then lost comms. Checked inside connectors, no problem found. System came back on but went out again on second approach to launch site. Secured power, Colin re-made underwater cable connections, cleaned comm. connector, and system came back on. Started third approach to launch site about 08:55

Air temperature 21C. Surface water temperature 22C. Bottom temperature at 145 meters is 16C.

09:38, 145 m depth, 30deg01.962'S, 178deg42.406'W. Arrived on bottom. Marker 12 area vector range 300 meters at 255 degrees. Landing site has lots of various small fish, purplish bacterial mat on 5-20cm size pumice. Took hand-held photos. Current seems to be coming from direction 320degrees from our compass. We drive W/SW from this point and see only pumice with bacterial mat coating and small fish along the way.

10:00, 178.709W, 30.0334S, 119m, we have started to see yellow staining on the seafloor, sign of sulfur and hydrothermal alteration. We continue to follow the vector toward marker 12.

10:27, 168m, 178.711W, 30.0334S. Terry has recognized the area of the pit near marker 12. We see mussels, white staining, and signs of hydrothermal discharge.

10:35, 164m, 178.7108, 30.0334 at marker 12. Upon arrival at marker 12, we set up to take samples with HFS. Temperature climbed quickly and stabilized at 203 to 204C at our depth of 163.5 meters. Took 3 piston samples, 2 bag samples and 3 gas-tights from this vent. Details of these are in the sample log. Sampling continued from 10:56 to 11:28. The vent was too hot to pump directly through filters, so I did not take any here. After getting 8 samples, I wanted to look for another sampling site, and potentially do a vertical transect of the area of boiling. Note: the depth in the Pisces dive log is incorrect for this time period.

11:54, 168.9m We stopped to look at another boiling vent, but did not sample.

11:58, 169.3m, below marker 12. We set up to do more sampling with HFS, and measured temperature up to 198.2 and still rising, when the sub moved and we lost the grip on the sampler intake before we were ready to take a sample. In the process of trying to recover the intake nozzle, we drifted down the hill all the way to the bottom of the pit before we could get hold of it again.

12:00 to 12:45, 183.7m, 178.7105W, 30.0334S. Bottom of the pit below marker 12. There was a site of good diffuse venting at the bottom, coming up around the base of a large boulder that had fallen into the pit. Unfortunately, I could not get the sampler to operate again after the tumble down the slope. I tried power down/up at least 8 times over the rest of the dive, and it would not come back. Tried Gary's computer, but that was not the problem. Must be something to do with the cabling or sampler. The sampler was dead for the rest of the dive, so we could not continue water sampling. We have only the gas "scoop" sample capability remaining.

At the bottom of the pit, there was diffuse venting but no boiling, a very large boulder and lots of debris, including mussel shells. Any venting in this area would have to come up through continuously accumulating debris from above.

Note: when I got to the trouble-shooting of the sampler, we first eliminated cable issues, then I opened the case to find it was flooded with seawater due to a damaged o-ring. It must have flooded during dive 614 at Monowai. I spent 30 hours washing the entire case and contents, replacing the PC104 computer, flush pump controller board, cleaning and drying the pump/valve controller board, and reassembling. There were just enough spare parts to make the sampler work again. It was fully tested on deck with the deck power supply before the ship arrived in port at Tauranga.

12:48 to 13:10, during this time we make a clockwise circuit around the pit near a depth of 171 meters. Very near the bottom of the pit, we see flat fish and take some photos. These are larger and rounder than the flat fish sampled at Macauley. At 13:09, we see a reddish layered deposit with a near vertical face. According to the sub compass (which did not seem to be accurate during this dive) the trend of the wall face was 055 degrees, dipping at an angle of about 10 degrees below horizontal to the east. The navigation track does show us driving nearly due east along this wall at the north end of the pit. I was intermittently trying to get the sampler to come back on during the period from 12:30 to 13:30.

13:40, 129m, 178deg 42.588W, 30deg02.041S at the top rim of the pit, there is intense venting over an area about 2x4meters, enough to push the submarine up and register a temperature of over 18.5 on the sub external temperature probes compared to 16 degrees ambient temperature at this depth.

14:15, 163.5m, at marker 12. Over approximately 5 minutes, we collect gas bubbles into the modified scoop sampler. It was filled approximately ½ full with gas. After taking this sample, we were obliged NOT to descend more than 10 meters or so in order to avoid compressing the scoop sampler and causing either contamination by seawater or possible cracking/implosion of the plastic. The suggestion came down from the surface to explore due north, but we found that direction to be deeper, so we drove along at approximately the 130m countour. Our compass direction was telling us we were heading NE, but the navigation track shows that we were moving E/SE. We continued nearly straight going gradually up, and ended the dive near where we had started, in a very similar environment with no sign of hydrothermal activity.

15:10, 110m, Final position 178.7064degW, 30.0363degS

Upon ascent, we watched the gas sample. At 70 meters, it started to vent gas bubbles, and continued to vent gas until we reached the surface. The HFS started to vent gas out of the exhaust tube and intake at about 15 meters and blew out a significant amount of gas in large bursts. Could not see gas directly coming out of the piston samplers, and no apparent bag explosions. Piston samples were approximately ½ gas and ½ liquid. Bag samples had less gas.

We scooped up lots of rock over the course of the dive, almost all of it pumice from the pit. Most of it was gone by the time we were on deck.

Notes: GMT: -11; e.g., 10:00 a.m. Local = 2100 GMT
This QL Rpt was prepared by Andrew Opatkiewicz by simply cutting information from Dave Butterfield's dive log into the QL form.