HAWAI'I UNDERSEA RESEARCH LABORATORY
QUICK LOOK REPORT
DIVE: P5-623
(Note: This report compiled by Bob Embley)

MISSION STATUS

Location: Summit of Clark Volcano, Kermadec Arc

Latitude: Begin 36° 26.8'S **Longitude:** 177° 50.50'E

Mission Date: April 07, 2005 **Duration:** **6 hours** (Bottom Time)

Maximum Depth (m): 1072

Project Title: New Zealand American Submarine Ring of Fire Leg II
KoK-O5-06

Principal Investigator: Alex Malahoff

Address: New Zealand Institute of Geological and Nuclear Sciences
Phone:

Observer 1: Alex Malahoff **Observer 2: None (Co-Pilot)**
Address: Same as above **Address: --**

Pilot 1: Terry Kerby **Pilot 2:** Max Cremer

Scientific Data Acquired: Digital video, digital still images, samples of rock, minerals, hydrothermal effluent, microbial mats, CTD

Objectives:

(1) Explore and image the summit of Clark volcano and collect biology, microbiology, chemical and geologic samples

(2) --

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

The dive began east of the summit and traversed up to the summit. The major discovery was of a field of sulfide chimneys on the northern summit ridge just south of the norhren summit.. The vent field (~100 m in diameter) consists of lots of diffuse venting and several chimneys is about. Mkr 14 was placed at the "Twin Towers" vent site, which consisted of two large chimneys. A temperature of 221°C was measured near the baae of

the largest one. The southern summit was not hydrothermally active. Lots of broken corals and displaced rocks attested to recent dredging/trawling activity on the southern summit.

Species List:

Don't know all of species found. Anemomes, corals, long-necked barnacles, others.

MISSION EVALUATION:

A. Limitations, failures, or operational problems noted:

- None

B. Recommendations for corrective action or improvement:

- Gyrocompass would be a good improvement
- New navigation system needs to be looked at carefully to determine what is best solution drifting of fixes during ship turns.

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

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

- Same

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

Dive PV-5 623 Sample List

Sample Number	Time (L)	14-Apr-05 Latitude Min/decM 26°S	Time Zone: -11 Longitude Min/decM 177°W	Depth(m)	Comments
PV-622-1-B	9:43	26.893	50.533	994	Sponge
PV-622-2-R	9:43	26.893	50.533	994	Lava with Fe-oxide crust
PV-622-3-SS1&2	10:10	26.815	50.432	929	White films; venting on wall
PV-622-4-MIN	10:28	no position	no position	895	Sediment scoop of sulfides and ash (92.6°C)
PV-622-5-SS3,4,&5	10:28	no position	no position	895	Suction sampled near vent
PV-622-6-B	10:51	no position	no position	884	Long-neck barnacles (15°C). Highest temperature 106°C
PV-622-7-R	11:00	no position	no position	883	Small venting chimney (T = ?)
PV-622-8-R	11:04	26.831	50.375	879	Piece broken off large (6 m tall) chimney (185.2°C)
PV-622-9-MS-blue	11:21	26.831	50.375	879	Sampled vent fluid (185.2°C)
PV-622-10-GT-white	11:21	26.831	50.375	879	Sampled vent fluid (185.2°C)
PV-622-11-R	11:54	26.850	50.366	872	Small rock samples off base of twin towers chimney
PV-622-12-MS-white	12:04	26.850	50.366	872	Sampled vent fluid (221.1°C)
PV-622-13-GT-black	12:04	26.850	50.366	872	Sampled vent fluid (221.1°C)
PV-622-14-SS6	12:04	26.850	50.366	872	Suctioned bacterial material near vent
PV-622-15-B	12:27	no position	no position	872	Yellow Deudrophilla plus urchin
PV-622-16-SS7	13:38	80 N of w.p. #3	80 m N of w.p. #3	879	Suctioned nontronite with green material; Max. Temp. 56°C
PV-622-17-R	13:38	80 N of	80 N of w.p.	879	Sample of nontronite crust

		w.p. #3	#3		with green material
PV-622-18-MIN	13:38	80 N of w.p. #3	80 N of w.p. #3	879	Scooped green and red nonronite
PV-622-19-B	14:33	27.001	50.384	870	Red Corallium Regalia
PV-622-20-R	15:15	27.067	50.350	848	Mn-coated lava with anemone

Dive 623 Dive Log
28-Apr-05

Pilot - Terry Kerby
Co-Pilot - Max Cremer
Scientist - Alex Malahoff

Note: Time Zone = +12

Time (L)	Z (m)	Lat. 36S	Longitude 177E	Observations
9:13:00	1072	36 26.835	50.651	On Bottom
				Ballasting, see pahoehoe lava
				Need range to WP1; not much current, silt cloud hanging
9:17:00				Bearing 301, range 40 m
9:20:00				Ballasting, see pahoehoe lava
9:22:00				On Bottom, ballasting
9:24:00				Red fish: Orange Roughy?
9:30:00				start moving; observing hydrothermal alteration; mention Orange Roughys
9:32:00				Seeing yellow alteration
9:33:00				They're seeing lots of Orange Roughy; Using the port camera, not so good
9:35:00				Not giving any depth or headings into microphone
9:35:00	1050			Light dusting of sediments on what looks like pillow lava tubes but camera isn't so great
9:35:48				Nice view of flows as sub travels over bottom. Looks like series of flows that have
				broken off fronts
9:37:10	1033			More talus with sediment pockets between; have been seeing some yellow staining
9:38:00	1028			Going up steeper slope, more talus
9:39:00	1012			Going up wall of lava outcrops; think I see some truncated pillows
9:39:50	1014			At base of massive lava columns, from mass-wasting
9:40:00	998			Moving up vertical lava wall with dike or lava column sticking out as vertical column
				Sponges, other sessile stuff; they claim they see Mn coating on rocks
9:42:00	993			Stopping to look at mineralization
9:44:45	995			Settled down, stopped on bottom
				Sample Station P5-623-1B; sponge
9:04:00				**P5-623-2R; almost same spot as sponge**
9:53:16	995			Moving away from sample station upslope
9:54:00	992			Seeing small hydroids on rocks? Sub is hovering in same spot
9:55:20	992			Have turned to right and settled down to get video of yellow stuff
9:56:30				Turn and head upslope again at 329
9:56:45	986			Going upslope, seeing yellow staining but nothing obviously

				active
9:57:30	982			Going upslope over old talus? Some light staining
9:58:20	975			**Nice view of outcrop of sheet flow-like lava**
9:59:00	973			going up slope of sheet flows with some hydrothermal staining
9:59:20	971			Arrived at base of outcrop of truncated pillow lavas; appears to be ridge left from mass-wasting
10:01:30	961			seeing orange roughy fish on slope of basalt talus with sediment intermixed
10:02:30	955			seeing steeper slope aheaad
10:03:00	951			
10:03:30	950			see wall of lava-cut across it obliquely ~1 m high
				Going along side of channel in slope-lavas are breccia with sediment infilling
9:04:30	941			Across channel still on breccia with sediment fill
10:05:00	933			come over some edges of flows, small scarps
10:05:50	933			Looking at wall of pillow (?) outcrops with staining in veins between; stopping to look at vertical wall of outcrop
10:07:45	933			Settling in to sample small active vent on wall of lava. Fluids leaking through the massive flows
10:08:00	930			Nice video closeup of hydroids? In venting
10:09:30				Moving to better spot
10:10:00	930			At new spot, very close to first spot
10:10:00				**Samples P5-623-3-SS** Jars 1 and 2 of microbial mat and other small organisms on
10:23:30	930			very diffuse venting area on outcrop wall
10:23:30				start moving upslope again
10:23:56	922			Massive sheet like flows here
10:24:19	913			Going over stained bottom, mostly talus and slabby lava.
10:25:30				Lot of small patches of active venting, some sponges, roughy. Talus with hydrothermal alteration and small deposits
10:27:00	892			See active site of diffuse venting - stained area probably mat
10:27:45	896			At active site stopped on bottom. Small chimney.
10:28:00	929			

Time (L)	**Z (m)**	**Lat.**	**Longitude**	**Observations**
		36S	**177E**	
10:28:00				**PV-623-4-MIN; sediment scoop of sulfides(?) and other**
	895			**PV-623-5-SS3,4,&5; suction samples near vent**
				PV-623-6-B; Long-necked barnacles
				PV-623-7-R; small chimney
				PV-623-8-R; piece broken off of chimney
10:29:00	895			Stopped considering what to sample
10:32:45	895			**Nice video closeup of bacteria and venting**
				Nice closeup of venting
10:34:00	896			Sucking up scaleworm and bacteria
10:33:30				

		Scoop Sample (GET NUMBER) 92.6 C
10:49:00	893	moving away from site upslope towards summit
10:50:45	890	Bearing 288
		seeing lots of white mat now fractures in rocks on this slope
10:51:45	884	Stop at Barnacle site
10:57:30		Start moving upslope again; see small sulfide chimney right away and stop
	883	getting good video of chimney at 10:59
11:03:30	882	measured temperature; SAMPLED SMALL CHIMNEY moved slightly
11:03:30		Moving upslope to large chimney; pattern of white filled fractures
11:04:30	879	Arrived at group of several small chimneys that are white and venting clear fluids
		Stopped considering what to sample; nice video BUT THEY DID NOT TAKE
		OFF THE OFF THE TIME CODE TO GET GOOD SHOTS
11:04:45	879	**PV-623-9-MS-blue; PV-623-9-GT (white);**
		PV-623-11-R
11:07:45		Manuvering around to try to sample chimney
11:08:42	880	Nice closeup of venting from chimneys
		Measured temperature; 185 C
		Taking water samples
		Put out Mkr 14 right on chimneys; can see that chimneys are lined up but not clear what the orientation is
11:17:00		End Tape 1
11:21:00	879	**PV-623-9-MS-blue; PV-623-10-GT-white at Temperature of 185 C**
11:47:00		Begin Tape 2 - Apparently they are missing time period 11:17 to 11:47
11:49:00	866	Chimney video survey
11:50:10		Chimney coming into view
11:51:15	869	Video survey
11:52:15	870	Going up and down Twin Towers chimney getting video GOOD VIDEO
		until about 11:54. In sight of Mkr 14 at large chimney
11:54:00	872	**PV-623-11-R; small rock samples at base of Twin Towers chimney**
12:00:00		
	872	**PV-623-12-MS-white; PV-622-13-GT-black**
		PV-623-14-SS6; Near mat near vent
12:21:00	872	Trying to get gas tight sample at base of large chimney
12:27:00	872	**PV-623-15-B; Yellow coral plus urchin**
12:28:45		Going to summit bearing 330 deg
12:29:20		Moved a few meters 12:28:35 - 12:29:20
12:30:00		Still messing around near chimneys
12:32:15		Heiko shoulder not operating; still near chimneys trying to sample
12:34:00	871	Start moving towards summit of Clark Volcano
12:35:00	875	Moving towards summit, hard to see bottom on video
12:36:45	881	See bottom, looks like hydrothermally stained area, basalts? With Mn?

12:37:45	875			looks like basalt columns here
12:38:30	876			Going over Mn and Yellow- stained basalt looks
12:39:30	865			Climbing towards summit; dropoff to left. Looked like small crater
12:40:30	855			Old talus; coming up towards summit stained rock.
12:41:10	853			Coming to summit; essentially there
12:41:45	853			Working way towards the summit
12:42:30	851			Talus or brecciated flow, lot of corals here
12:43:20	847			All talus or breccia with some corals, staining, fish
12:44:15	847			
12:45:00	846			Same, prety much lots of lava blocks and breccia
12:47:00	846			At summit of Clark Volcano; stopping for position
13:00:00				Start moving again
13:01:30	845			Start moving SE
13:02:35	844			Moving SE; still lot of broken up lavas on top; could be partly from dredging the top
13:05:00	852			Can't see bottom right now, dropping off
13:08:30	871			See bottom again; covered with anenomes and corals, looks like intact basalt lava; lots of
				yellow coral; also some iron deposits; seeing broken coral….

Time (L)	**Z (m)**	**Lat.**	**Longitude**	**Observations**
		36S	**177E**	
13:10:00				See large broken slab on surface as if it's been torn up by dredge; stopping to take picture
13:12:10	866			Turning aorund to continue
13:14:10	876			Are looking at Mkr. 14 by small vent again
13:15:45				Moving Mkr 14 to Twin Towers
13:15:00	880			Can see Twin Towers ahead; Need to figure out what course they're on
				As they're moving slope drops off to left so appears that towers are lined up perpendicular
				to slope
				Note large mound at base of Twin Towers
13:17:00	872			Moved Marker 14 to base of large chimney
13:18:00				As they swung around there was a distinct pillow lava with corals on it.
				SOME NICE VIDEO OF TWIN TOWERS IN
13:23:30				Going to move S-SE; backing off and turning to port
13:25:00	874			Driving over lava with corals and white staining in fractures
13:26:15	881			See some more small chimneys on slope to left; white staining in mosaic of fractures
13:27:10	882			**seeing very distinct line of vents (small chimneys) perpendicular to slope dead ahead**
13:27:30	887			**Right at chimney line - they're on the right now.**
				DVD has glitch in it; goes from 13:2730
13:27:45				Change direction, turning to port after passed by chimney line
13:28:10	891			Slope on left; going north
13:28:30				Just saw crab; appears that they reversed course and are heading back north now; still seeing

		white staining; anenomes?
13:29:30	891	On slope (up to left), in dark lavas with small sediment pockets
13:29:40		Turning to starboard to head south again
11:30:00		Turning south again
11:30:15	897	Going south again?
13:31:20	899	Changed course to right (south) Doesn't look like there's anything hydrothermal here, just lava blocks and sediment
13:32:30	898	going along slope; slopes up to starboard; not much hydrothermal
13:33:00	889	in basalt breccia, not much hydrothermal here; covered with Mn crust
13:33:40	887	Seeing bacterial mat again; seeing small oxide chimneys coming from lava
13:34:30	879	wall to left, out of oxide chimneys
13:35:00	879	some warm wate coming out of small yellow chimney
		Stopped for a minute
		Floc coming out of seafloor cavities
13:37:00	879	Stopped to take temperature
		~55 deg C water coming from out of hole (where chimney got washed away when submerine set down.
		Taking mat sample (suction sampler) from 55 deg vent; GREENISH fliamentous material
		GREEN ROCK?? PV-622-16-SS7;
		PV-622-17-R of green rock
		PV-622-18-MIN of green crusts (sediment scoop)
11:47:00	879	Still at sample station END DIVE TAPE # 2
13:48:00		Still at sample station BEGIN DIVE TAPE # 3
13:54:00		Video of what appears to be greenish altered rock sample
14:00:00		0
14:01:00		Starting to move off station
14:02:00		on course heading south
14:03:00		Going over lava,some oxides. Now seeing more anenomes in one spot
14:03:30	886	Seeing edge with yellow deposits; stopping briefly
14:08:30	886	Starting to move off again
14:10:00		lava with some yellow deposits
14:11:00	888	Seeing corals, gorgonians; stopping to look
		Sampling corals
14:16:00		Going forward again over rocks with corals, anenomes etc. Lot more sessile life hre.
		Heading south; running out of power on 24 v batteries.
14:19:30	890	Got off into space, then came back onto bottom; lots of sessiles here; no hydrothermal
		lavas (breccia) with sponges, corals, other
14:21:30		Lot of dead broken coral on bottom; probably from trawling or dredging
14:22:00	874	Huge Paragorgia in sight broken off very recently; stopping to look and take pictures
14:28:00		Just moving back on course after looking at huge broken Paragorgia
14:28:45		Taking a quick look at an orange precious coral; lots of anenomes also around.

14:33:00			870	**PV-623-19-B; Red coral**
14:36:45				Going to continue to SW
14:37:00				Begin moving SW again; seeing more broken corals etc.
14:38:00	860			seeing broken corals all over the place; some still intact though
14:39:00	854			Cme on another Paragorgia with large chunk taken off, but still appears to be rooted and alive
14:39:07				Fresh rock broken by trawling or dredging
14:39:30	854			looks like ridge of brecciated basalt
Time (L)	**Z (m)**	**Lat. 36S**	**Longitude 177E**	**Observations**
14:40:30				lots of small yellow and white corals, now see large crab; lots of anenomes as well
14:42:00	842			Same type of terrain;lots of corals, some broken
14:43:20	846			Similar terrain
14:43:25	847			Turning left
14:44:45				Turned to go up to high spot
14:46:00				going east towards southeren summit of Clark Volcano
14:47:00	843			At summit, parking to get position; turning right to get set up
14:47:30	844			Completely stopped
14:58:00				Move off spot, manuvering; Goint to start Moving SW some
14:59:00				Start moving SW
15:00:00				Seem to be going off into deeper water
15:02:30	852			Slowing up, turning ? Lose bottom
15:03:00				Coming about to ??
15:03:00				have turned and now sub is settling down onto bottom
21:40:00	853			Stoppped now
15:04:45				Now moving forwared again
15:05:20	849			more dead corals Are settiling down again
15:10:30				Moving a few meters to get sample
15:12:15				Nice picture of Orange Roughy hanging there Manuvering around
15:13:45				stopped again
15:15:00			848	**PV-623-20-R** of Mn-coated rock with anenome
15:17:36				END DIVE 623

DATA RELEASE

Data may be retained by the project leader for up to 2 years after the mission date with the following exception. NOAA may request to use photos for publication or publicity purposes at any time.

Fill in the appropriate statement below and sign this form.

I hereby release the data archived by HURL for public consumption following mission held on in the following way:

a. CTD data by (date)

b. video and images by (date)

c. other (date)

d. I will give my written consent to individuals wishing to use these data prior to the above dates depending on the nature of the request(s).

Principal Investigator