HAWAIʻI UNDERSEA RESEARCH LABORATORY
QUICK LOOK REPORT
DIVE: PIV-138

MISSION STATUS

Location: Volcano 19, South Tonga (Tofua) Arc

Latitude: ***Begin*** 24° 48.48'S **Longitude:** ***Begin*** 176° 59.95'W

Mission Date: June 21, 2005 **Duration:** 7 hours 30 min (Bottom Time)

Maximum Depth (m): 562 m

Project Title: SITKAP
(Submersible Investigations of the Tonga-Kermadec arc using PISCES)

Principal Investigator: Prof. Peter Stoffers, Kiel University
Guest Scientist from Canada, Mark Hannington

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Observer 1: Lonny Lundsten **Observer 2:** None
Address: 441 Dickman Ave Monterey, CA 93940
Pilot 1: Terry Kerby **Pilot 2:** Collin Wollerman

Scientific Data Acquired: Video, hand-held still photos, rock samples, bio sample, scoop samples, geological map

Objectives:
Objectives: Land close to the pit on the SE corner of the cone to sample bivalves (WP1). Transit to the area of active venting at the southern end of the summit (WP2, 430 m). Investigate the possibility of more active venting near the southern field. Transit to the large barite chimneys (WP3, Marker 37, ca. 385m). Investigate smaller chimneys surrounding the main barite tower. Sample a range of chimney types, knocking over one or two with active flow to create better vents for fluid sampling. Resample vigorous flow at the top of the large tower. If time permits, investigate areas of the cone along the 450 500 m contours for additional venting.

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

Summary: The dive was launched in excellent weather conditions, allowing a bottom time of about 7.5 hours. We descended near the 560 m pit crater to the south east of the youngest volcanic cone in the hopes of finding more mussels and live clams. We found clam shells and mussel shells lying upon the sediment, though all were dead. We sampled a few shells, which can be used for identification purposes. Numerous diffuse venting sites existed and some small chimneys were observed. One Bathymodiolus mussel was sampled. We began making our way toward M38 and although we did not find it, we were very near to it. We sampled the temperature of several vent sites along the way and also took chimney samples at a few locations. We observed that a chimney structure that was seen the previous day and had been knocked over had "re-grown" by about 30 cm overnight. We also observed a small flame structure at one of the vents. We began making our way towards the Tower site since it was getting late in the day and we needed to take water samples at that location. While on route to the Tower, we were in a field of diffuse venting with flanges regularly distributed upon the seafloor and noticeable schlurring at each one. Just below the thin crust on the surface we found the sediment to be bright green and very deep. We took a scoop of sediment and a sample of the crust at this unusual location. After arriving at the Tower site we knocked over several chimneys, hoping that we could create a more robust flow for sampling, though it didn't work as well as we had hoped. We sampled fluids at a chimney (white major, blue gas tight), which had a temp of 130 degrees C. We decided to head back towards the high temp (flame structure) that we had seen earlier in the vicinity of marker 38 to get our final water samples. On the approach to M38 we observed a nice chimney structure with a very large flame and black smoke emanating from a vent near the seafloor. We observed this structure for sometime and sampled with a Major (blue) and a Gas Tight (green). At this point we proceeded in the direction of M38, located the site and left the benthos.

Species List:

Sample Number	Time (L)	Latitude Min/decM 24degS	Longitude Min/decM 177degW	Depth(m)	Comments
PIV-138-A1	9:47	24 48.412	176 59.961	558	Bythograeidae (3)
PIV-138-A2	9:47	24 48.412	176 59.961	558	Bathymodiolus
PIV-138-A3					Polynoidae
PIV-138-S1		24 48.412	176 59.961		Mussel Shells
PIV-138-R1	10:35	24 48.4763	177 00.0032	541	Chimney Sample crystals and pyrite visible
PIV-138-R2	10:56	24 48.4763	177 00.0032	542	Large old chimney fragment
PIV-138-R3	12:53	24 48.401	177 00.137	415	green crust (59 degrees C)
PIV-138-R4	14:24	24 48.251	177 00.114	393	samples from chimney material that fell on the porch (130 degree
PIV-138-Scoop 5	12:53	24 48.401	177 00.137	415	Green Sediment
PIV-138-Major (White)	14:24	24 48.251	177 00.114	393	Tower site
PIV-138-Major (blue)	14:30	24 48.251	177 00.114	393	Tower site
PIV-138-Gas Tight (blue)	15:09	24 48.389	177 00.175	433	Black flaming smoker site
PIV-138-Gas Tight (Green)	15:19	24 48.389	177 00.175	433	Black flaming smoker site

MISSION EVALUATION:

A. Limitations, failures, or operational problems noted:

None.

B. Recommendations for corrective action or improvement:

Visibility on the observer site limited.

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

Yes, for all objectives.

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

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