HAWAII UNDERSEA RESEARCH LABORATORY

QUICK LOOK REPORT MISSION NO. P5-500

MISSION STATUS

Location: Kealakekua Bay at 750 m depth (NW from shore)

Mission Date: Wednesday, November 13, 2002

Maximum Depth: 753 m

Project Title: Microbially Mediated Glass Alteration

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Scientific Data Acquired : Prepare an abstract outlining your objectives, techniques, findings, etc.

The goal of this dive was to locate a site near Kealakekua Bay where a historic eruption occurred in 1877. Rocks from the eruption may outcrop at numerous depths; we were attempting to establish a deep site at 750 m where volcanic venting may have occurred. Using the maps provided by the Moore and Clauge "Coastal lava flows from Mauna Loa and Hualalai volcanoes, Kona, HI" paper (Bulletin of Volcanology, 1987, v. 49, p. 752-764), we relocated the young looking submarine volcanic vent and associated pillow flows that they had mapped in 1975 and established a site for our exposure charges.
The P-5 was dropped to the north of the proposed site. We descended to 750 m and began to contour to the SE. When we first reached 750 m (9.03am), we observed numerous pillows that were strongly oxidized on one side. At first we thought that this was the site, but the flows appear to be much older and more weathered than expected for the young submarine vents. Following instructions from the KOK, we continued to the SE, away from the pillows and into a region of gently sloping (to the NE) sands. Sporadic rock fields were observed. Outside temperature was approximately 3.6 degrees. At 10.52 we encountered the beginnings of an extensive pillow pile. The pillows are large with considerable banding on the surface and are coated with a light dusting of sand and what literally looks like spiderwebs of goo/snot (infrequent). As we continue to the SE, the pillows drop away steeply on the starboard (west) side in long cliff formations. We observed a ledge to the port side that looks like it may be a good site for leaving the

exposure charges (this does later become the exposure site). We continue to the SE for 9 more minutes, alternating between pillow cliffs and boulder fields where the cliffs have apparently collapsed. Eventually we reach the SE edge of the formation, where we return to sand. At this point, we followed the boulders up to 700 m on the port side and then contoured back along the volcanic vent to the NW. We again see numerous pillow cliffs steeply rising both up and down, with small ledges scattered between them and some zones of collapse. We decided to return to 750 m to find the ledge site at the top of a pillow cliff for our exposure charges. At 12.10, we establish the site on top of a flat-topped rock that sits slightly above the surrounding pillows on the ledge. We put out 3 SIO exposure charges and 2 large rock charges and 1 WHOI charge. Unfortunately, the rope and float on SIO #15 broke away. We also placed Marker #2 on an adjacent rock. We tripped the Niskin bottled at 12.58 to collect water representative of the site (we are curious about the organic carbon loadings here) and used the Titan arm to break off the top of a hollow pillow. When collected the pillow top, the position given by the KOK was Lat. N. 19 deg. 27.865, Long W. 155 deg 57.142. After establishing the site, we moved upslope to the NE and noted many rocks with white alteration rinds (collected an example). We attempted to collected small pillows or examples of vesiculated glass, but each sample was obliterated by the Titan arm. Glass samples appeared to be too fragile to collect and the rosette sampler was not in operation. Therefore we picked up larger, more coherent, partially oxidized rock samples with Fe-ox banding. Moving upslope, it appears that the top of the formation may be approximately 680m. We also noted that at the top of each ledge (above each pillow cliff), the surface is strongly cratered, as if large gas explosions or releases had occurred. Essentially, the entire vent is a series of connected cliffs that have level-appearing, but highly "pockmarked" tops, that are stacked upon each other. To refind our site, the easiest way is to start at 750 m at the SE edge and contour NW for approximately 8-9 minutes until you are sitting on top of one of these cliffs.

MISSION EVALUATION:

Limitations, failures, or operational problems noted:

On this dive the Titan arm was barely operational and the sampling Rosette and slurp gun were not loaded onto the PV. Therefore, we couldn't take scoop samples or collect slurp samples. Also, the attempts to collect rocks with glassy surfaces typically ended up in crushing the chosen sample, but alternative samples were collected

Recommendations for corrective action or improvement:

After this dive there will be a service day in Honolulu to exchange the P5 with the P4.

In your opinion, did the mission essentially achieve its purpose? Compare actual work accomplished with the work that was expected to be accomplished.

Yes, this main goal of this mission was easily achieved. Chuck (pilot) and HURL crew did a great job of locating the site of the 1877 historic eruption. We established a site for the exposure charges that looks relatively sheltered from debris, and should be easily relocated by following the 750 m contour from either edge of the site. We also collected several rock samples and some water around the site. The only type of sample we could not obtain but would have liked were slurp samples of glass freshly scratched from the pillow surfaces.

List specimens or samples collected on the mission.

Deployments:
Marker #2: SIO exposure charges #13, 14, 15, , SIO 450g charges #41, #42, and WHOI #8
Note: Rope and float broke away from #15 (w/3 black stripes). Perhaps this sample should not be left as the longest exposure because will be hard to find once the others are removed.

Sample pickups:
Niskin adjacent to Marker #2
Five rocks from the ledges on top of the pillow cliffs. These rocks were from small pillows and include both the internal pillow with iron-oxide staining, white leached layers, as well as "pillow-tops".

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

_____(project title)

held on November 13, 2002 (date) in the following way:

a. CTD data by any (date)

b. voice transcripts, video, and still camera film by Nov. 2004 (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