

Jason Dive J2-213, August 7-8, 2006 (GMT)

09:02 Off Deck

10:30 On Bottom: 3° 43.40'S, 151° 40.65'E, 1693 mbsl

00:04 Off Bottom: 3° 43.21'S, 151° 40.55'E, 1650 mbsl

01:14 On Deck

Aim:

The goal of the dive is sampling solid / fluid sample pairs at Roman Ruins (Marker 4) and Roger's Ruins, followed by a detailed sonar survey of the Roman Ruins field. We also hope to pick up hydrothermally altered rocks/precipitates from exposed escarpments. Preceding the sampling and surveying at RR&RR, we will explore the area around the landing site, which is the location of a pronounced magnetic low.

Co-ords for the landing site:

- **Lat/long: -3°43.40'S, 151°40.65'E, 1690 m**
- **UTM: 353134, 9588344 (WGS84 Zone 56S)**

Summary

The area around the landing site is thickly sedimented lava terrain with occasional pillows or blocks cropping out. There is no indication of hydrothermal activity here. We are heading 293 for the Roman Ruins hydrothermal field and cross two mounds that are both heavily sedimented lava. We came across what looks like faults in the map, but could see nothing but sedimented slopes. The first flow front (x2840, y3082, z1692; vvan#32457) is that of a steep-sided block lava flow. 30 m into the block lava flow, Eh drops from 180 to 117 in an area of highly broken up lava and occasional oxide patches. Exploring a mound SE of the Roman Ruins field and find tall chimneys with some gray smoke venting from tops (x2761, y3130, z1687, vvan# 32154). The area between that mound and the south slope of the large Roman Ruins mound is littered with small active chimney, producing lots of gray smoke. We examine the south slope of the Roman Ruins mound, looking for exposed footwall. For the most part, the slope appears to be covered mostly with max. fist-size angular clasts of lava and fallen chimneys. The only rock that might be altered footwall we could find in a 30-minute survey was whitish slabs in an area of fallen chimney. Hoping it might represent anhydrite or clay-altered rock, we took a sample here (J2-213-1-R1, x2761, y3130, z1687, vvan#32514). It turned out to be degraded sulfide once more. A fresh reference sample is also taken from this location (vvan# 22639).

We next headed to the Marker 4 site to sample high-temperature vent fluids and corresponding chimney material. The crest of the mound has chimneys lining up WSW-ENE, most of them are inactive bar diffuse venting near the bases with patches of snail colonies (vvan# 32708). At the marker 4 site we broke a chimney sample off a spire that was vigorously venting black to gray smoke (z2719, y3168, z1668, vvan# 32747) but could not retrieve a fluid sample here.

We are sitting at a vigorous black smoker chimney at x2726, y3166 but with no visibility so move off and look for a better target. Try one place, knocking down inactive tall copra-form chimneys some 4 meters tall but cannot get access to a smoker orifice. We

move on and come across a likely target: tall orange-stained chimneys, some active. Sit at a gray smoker type of chimney at x2722, y3161 and get a large spire sample of the active chimney after breaking it off (about 75 cm long). We try to reduce the size but are unsuccessful and stick in the sample basket (J2-213-3-R1). Now get water samplers set up. Take two gas tight samples and a major sample (red bottle #4), here: (J2-213-3-W1-IGT7, J2-213-3-W2-IGT6, J2-213-3-W3-M4) max Temp 278C. We now head off on course 350 to look for some altered basement rocks that host the sulfides here. Pass over a black smoker 9.5 m tall, and move into a small hollow basin. We turn around and look at the slope and search for a rock sample. We take one small sample from near a sulfide stump (4-R1, x2707 y3189 z1683), which turns out to be an unaltered lava. We continue on course 350 and see another white-stained area of lava. We try for a long time to get a sample here and finally pick up a piece that is probably talus (5-R1 x2706 y3201 z1688 DVLTarget 47) that also turns out to be relatively unaltered dacitic lava. We move on now to Rogers Ruins. Smoke in the water column at 16:19. Pass over smokers and beehives at 16:27. The bottom drops away and we traverse lavas with sediment dusting. More smoke in Medea cam at 16:36 and Fe staining and oxide crusts on lava terrain. Roger's Ruins comes into view at 16:56 and we see a couple of big smoker chimney edifices separated by a few meters. We move up and position in front of the most prolific black/gray smoker of the bunch. We are able to break off a nice intact active chimney spout (J2-213-6-R1, x2669 y4330 z1709; vvan 33425) from a larger edifice. We set up for taking water samples from this structure.

IGT water samples J2-213-6-W1-IGT3 and J2-213-6-W2-IGT4 each were sampled with very stable temperatures of 320°C (vvan 33506), then a majors sample was obtained (213-6-W3-M2). We dropped marker #8 before leaving station 6, then backed off and dropped down slightly, where we picked off a small white diffuser chimney (J2-213-7-R1; vvan 33668) whose basal orifice after sampling was measured at 202°C.

We then got underway toward the Roman Ruins high-resolution survey starting point, on a heading of 109° and a range of 150 m. On the way there were short, bright orange-capped oxide chimneys (vvan 33747) with active shimmering water. For the rest of the transit we saw old volcanic rocks with sediment between them, including some very large (3-5 m) irregular pillow-like forms.

The SM2000 high-resolution survey began at about 19h30 GMT and continued to the end of the dive at 00h01 GMT. Flying at an altitude of 15 m off the seafloor, numerous large clouds of black smoke were observed, as well as quite a few tips of tall chimneys, many of which have not yet been visited during our dives here. One chimney in the central Roman Ruins mound required quick evasive action to avoid a brush with Jason. We left the bottom at 00h04GMT at position x2874 y3301.