

***Jason Dive J2-222, August 17-18, 2006 (GMT) Roger's and Roman Ruins***

**08:04 Off Deck**

**09:17 On Bottom: 3° 43.05'S, 151° 40.59'E, 1690 m**

**23:50 Off Bottom: 3° 43.39'S, 151° 40.30'E, 1650 mbsl**

**01:11 On Deck**

**Aim:**

The goal of the dive is sampling solid / fluid sample pairs at Roger's Ruins (Marker 8) and Roman Ruins. Preceding the sampling at RR&RR, we will explore the area around the landing site, which is the location of a small magnetic low. We look around Marker 8 at Rogers Ruins to get a more comprehensive picture of the field and sample at a locations of black smoker activity away from Marker 8. After sampling the fluid/solid pairs, we explore and sample volcanics from the rift zone SW of Roman Ruins to the southwest.

**Co-ords for the landing site:**

- **Lat/long: 3°43.05'S, 151°40.59'E, 1690 m**
- **UTM: 353022, 9588988**

**Summary**

**Vanko:** The bottom in the landing area is heavily sedimented, with only a small scattering of volcanic rocks (irregular, a meter and less across). The mud seems to host an abundant infauna and we see a brittle star. We drove NE across a small crater, then explored the outer flanks of this ridge on a bearing to take us toward Roman Ruins.

**Bach:** Moving on to Roger's Ruins over sedimented terrain of blocky and pillowed lava. The NE-most extension of the Roger's Ruins site is at x2678, y3460, z1720 (vvan# 54415), where a small chimney complex of sparsely colonized (shrimp, snails), mainly inactive chimneys with one orifice slowly emitting gray smoke were spotted. The Marker 8 site is found 20 m to the south of the location of this chimney complex. The area around Marker 8 (vvan# 54500) is characterized by up to 8-m tall chimneys with black smokers near the marker and light-gray to clear fluids issuing from smaller spires just a couple of meters NE of Marker 8 on the other side of the tallest chimney complex at this site. On the southwestern side of the mound hosting the central Roger's Ruins vents and about 10 m south of Marker 8 are a few <8-m tall spires gently venting light gray fluids. We decided to sample a light-colored fluid from the side of the Marker 8 chimney complex that is opposite to the black smoker vents (vvan# 54536). We sampled a tall spire emitting clear to light-gray fluid (x2663, y3428, z1710; vvan# 54563). The entire spire broke off, much too large for sampling. We broke it up into several pieces and picked a sample (J2-222-1-R1; vvan# 54609) that represents the base of the spire, about 1/3 of the way up the structure. Temperature measurements of the gray fluid venting from the stump of the sampled spire gave 268°C. Two IGT bottles were fired here; the thermocouple failed on the first bottle (No.4), but the second bottle (No.3) gave a maximum temperature of 274°C (vvan# 54705). We next sampled an inactive spire that

was standing immediately next to the active one and was knocked over during fluid sampling (sample J2-222-1-R2; vvan# 54779).

Having accomplished the sampling tasks at Roger's Ruins, we continued 60 m in a southwesterly direction to explore the nature of a pronounced elongate mound in the map. After crossing over inactive oxide deposits (vvan# 54828), we got to the mound, which turned out to be a short coulee-like flow with very steep front and sides. A volcanic rock sample was taken here from debris that had fallen off the flow front (x2632, y3379, z 1714; vvan# 54870). We continued on to the Roman Ruins hydrothermal site through sedimented terrain of rubbly lava flows. The SM2000 map shows several solitary chimney complexes NW of the main Roman Ruins field that we decided to examine. Just SW of the base of the first of these chimneys is a large oxide mound emitting clear fluids (88°C) (x2699, y3295, z1702; vvan# 54964). We leave Marker 20 at this site. The chimney complex, which is 12 m tall in the center, is mostly inactive, except for gray smoke oozing out from small spires near its base. Another, very similar oxide mound/chimney complex feature is located 30 m to the northeast (vvan# 55067). 20 m further east is a large chimney wall of several chimneys fused together. Hydrothermal activity is exceptionally high here, the highest we have seen in the Roman and Roger's Ruins area (vvan# 55088). We were trying to sample black smoker chimney and fluids at a location of vigorous venting (x2749, y3299, z1678; vvan# 55127), but could not retrieve any of the fragile chimney tips and billowing black smoke on one side and stacks of spires on the other did not permit us to set up for fluid sampling here.

Tivey: Could not get a sample at the initial location due to density of smokers. We drove around the sulfide complex (a few meters) to see if we can get access from the other side. We knock down a couple of old sulfide spires several meters high in order to make some access space. We set up to try and get an active smoker chimney but it is crushed. Will Sellars tries to get a sample of another tall stick-like chimney and it collapses. We try a few more and all efforts are clumsy and it looks hopeless. We decide to move into the next edifice which is a few meters to the south. We arrive at a forest of chimneys many of them smoking. The "forest" has large multiple meter tall tree trunk type of smokers along with small stubby chimneys and sizes in between. At 14:45 we see a good set of smokers with access and set up to sample. After several attempts we finally get a good active chimney sample (J2-222-4-R1, x2763 y3261 z1680 DVL target#62). We now pick up the gastight fluid sampler and begin that sampling. We obtain two good gastight samples (J2-222-4-W1-IGT2, J2-222-4-W2-IGT1) with high temperatures of 339 and 341°C respectively. We get a good major water sample as well (J2-222-4-W3-M4). We are done with fluid samples and try to get an inactive chimney but it collapses, we are left with a foot-long piece in the manip, we keep that as a sample (J2-222-4-R2). We deploy Marker #18 here as well (Mkr#18 x2764 y3264 z1679 DVL Target#63).

We being moving on course 270 for short distance and see many black smokers with some pumping out a lot of black smoke. At 15:46 we arrive at another field of tall sulfide chimneys, some of which are smoking black smoke. We see chimneys aligned in straight lines azimuth ~265. At 15:55 we come across white-colored smokers with gray fluid emanating from them. We drop down to look at the base of the chimneys. We find sulfide crusts and sediment but no obvious outcrop of lava. At 16:03 we come to an 11 m

tall active chimney with white smoke, lots of small chimneys around. After waiting for an interminable amount of time (16:40) we finally get down and sample old oxide crusts that are manganese covered and look like lava until we try and grab some, when it is easily crushed (J2-222-5-R1, x2719 y3273 z1695 DVL target 64). Shimmering water is found nearby.

We move on heading to the main Roman Ruins field on course 153. We come across a small hummock that could be lava or simply manganese coated oxide crust. At 16:49 we see what looks like volcanic lava. Immediately after, we find more active smoking sulfide chimneys. The chimneys become increasingly more densely packed together. We stop and sample what looks like outcrop beneath an old sulfide chimney. The rock breaks off easily (J2-222-6-R1, x2727 y3228 z1682) making us suspect it is either highly altered or oxide crust. We head 144 and come to a large sulfide smoker complex. At 1704 we break out into flat sulfide coated pavement with collapsed sulfide chimney spires littering the area. We cross a talus ramp and then see small foot high chimneys growing out of the talus now dead. The chimneys get taller as we get closer to the main field. At 1712 we are in another forest of chimney, mostly tall spindly looking spires. At 1715 we come across some low lying mushroom like sulfide with flange-like protrusions. We sample one of these (J2-222-7-R1, x2750 y3211 z1678), this one was still smoking. We move off to the south and west and again and at 1724 we are in another active smoker area. Tall skinny smokers and tree-trunk ones. We start to try and sample of the sulfide here.

Vanko: The sampling goes awry as the targeted chimney goes crashing to the seafloor. We move 10 m NNE to a large mound of sulfide chimneys, most inactive, but some with gray smoke. The biology here is fairly scant, with the most obvious being clusters of snails on some chimneys. We decide to sample a gray smoker, and begin by culling some inactive spires that are in the way. In the process we decide to take one of the culled inactive pipes (Sample 222-8-R1, vvan 55979). We then succeed in obtaining a sample (Sample J2-222-8-R2; vvan 56029), followed by temperatures of two remaining orifices (254°C from an orifice to the left and 288°C from an orifice on the right). It's not clear which of these was the main conduit for the sampled chimney.

We next moved off the mound, into the saddle between mounds, to look for volcanic rock. We found some and sampled it (J2-222-9-R1 and R2, vvan 56123, 56130).

From Marker 4 we got underway on 319° for 260 m to a mound along strike and SW of Rogers Ruins. Traversing hackly and ropey lava, we encounter shimmering water at x2666 y3236 z1690. A very odd sea creature is imaged at 19h50 (vvan 56247). Reaching the waypoint we find just lava, and we fire the Niskin bottles and get underway on 197° for 60m. We pass hackly pillow lavas, some quite large and beautiful, very cracked (vvan 56327). Next we are underway 153° for 50 m and soon drop over a fault-like scarp oriented NE-SW. We have entered a tectonized zone leading SW into the "grand canyon" which is our final waypoint point in the dive plan. We did find an interesting pillar of lava, about 1 m tall and 1 m in diameter, with flinty-looking volcanic fragments that had irregular and vein-like white staining (vvan 56435). This is sample J2-222-11-R1 (vvan 56449).

Bach: We explore the axial graben, following steep fault walls with lightly sedimented talus in otherwise heavily sedimented terrain. The flows here are uniformly thick and steep-sided with autobrecciated margins that shed off big blocks of massive lava. One of these large lava blocks was sampled at x2374, y2894, z1651 (sample J2-222-12-R1, vvan# 56696). A 20-minute comparison of the resolution of both downward looking sonar systems on J2 was conducted before we left the seafloor.