

Jason Dive J2-207, July 30-31, 2006 (GMT)

12:17 Off Deck

13:59 On Bottom: 3° 9.92'S, 150° 16.82'E, 2480 mbsl.

23:37 Off Bottom: 3° 9.99'S, 150° 16.76'E, 2468 mbsl

01:28 On Deck

Aim

The primary aim of the dive was to sample fluids and coexisting solids at sites of active venting of high-T fluid within the original Vienna Woods area, with a secondary aim to further examine the extent and characteristics of the field.

Landing coordinates

- 3° 9.92' S, 150° 16.80' E
- UTM 197677 E, 9649735 S (WGS84 Zone 56S)

Summary

Jason landed on track in an area of moderately sedimented, lobate pillow and sheet lavas and began moving along a course of 300° towards the first target area, some 80m away. Approximately 30m south of Target 1, the ROV encountered snail colonies associated with generally weakly active (shimmering water) complex multispired sulfide edifices, often coated from base to tip with velvety bacteria and with abundant fauna (snails, crabs, holothuria and shrimp) around the more active crests. It then crossed a narrow 1-2m deep hydrothermally active fissure containing abundant snails, followed by another biota-rich weakly active chimney field, Target 1 (local grid x3240, y5745, z2482).

At Target 1, gastight water samples J2-207-1-W1-IGT7 & 1-W2-IGT3 were collected from a 15cm vigorous 282°C clear to grey smoker at the crest of a 10m high edifice with multiple small venting spires at its tip (local grid x3243, y5747, z2470; virtual vane sequence from 16818 to 16952). The external temperature of the wall of the vent was 32°C. The small spire was then collected (J2-207-1-R1; vvan no. 16977) and a large water sample was also collected from the broken orifice (J2-207-1-M1). The ROV then tracked across sedimented lavas with scattered inactive sulfide spires to Target 2.

At Target 2 (local grid x3336, y5785, z2474; beginning at vvan no. 17000), an area of biota-covered actively venting sulfide spires similar to those seen at Target 1, a complex multiconduit orifice was sampled from the crest of a snail-encrusted 9 m-high spire (J2-207-2-R1; vvan 17166). The sample was venting clear to grey fluid at a temperature of 272°C. Following this, a gastight water sample (J2-207-2-W1-IGT4; vvan 17200) was collected from the orifice. It was not possible to accurately measure ambient temperature. An additional attempt to collect fluid was aborted when bottle IGT5 failed. The ROV then tracked towards Target 3, initially across moderately sedimented hackly lavas with scattered extinct chimneys and then over lightly sedimented lobate pillow basalts with abundant cracks and fissures. Proximal to Target 3, areas of white mat and biota are associated with diffuse clear venting.

At Target 3 (local grid x3277 y5904 z 2475; beginning with vvan 17308), a gastight water sample (J2-207-3-W1-IGT8; vvan 17390) was taken from small spire on top of a complex 9 m-high structure, which was venting clear to gray fluid at 284°C. Ambient temperature against the wall of the spire was ~18°C. The vent was then sampled (J2-207-3-R1; vvan 17450) and a further gastight sample taken (J2-207-3-W2-IGT6), with a lower peak temperature estimated to be 230°C (a flooded thermistor housing affected the calibration meaning the instrument read 250°C).

With all water samples taken and no temperature probe aboard Jason, the remainder of the dive was devoted to observations and rock sampling. Dead snails and inactive chimneys were observed in an area of lightly sedimented pillow flows on the way to the next target. The larger area around waypoint 4 is marked by pillow flows hosting a fallen chimney, snail beds, and venting of shimmering water. A sample from the edge of a ledge-like apron surrounding the base of an inactive chimney was taken (202-4-R1; vvan 17684). Further sampling in the area yielded weathered and possibly mineralized volcanic rock with a corrugated surface near the base of a chimney (207-5-R1 and 5-R2; vvan 17784 and 17795), and the roof of a bulbous lava structure with an irregular surface (207-6-R1; vvan 17852 to 17880).

The vent site at Waypoint 4 (x3167, y5880, z2480) is where sample 202-7-R1 was previously taken, upon which fluid venting was triggered. A c. 30 cm high beehive-shaped diffuser had grown back within the 4 days since Dive 202. Fluid temperatures could not be measured. The vent site is situated on top of large pillows, and sulfide precipitation is in part developed within cracks in pillows and in lava exposed near the flow front of the pillows. Attempts to sample the stained and presumably mineralized(?) rock underlying the active chimney yielded a vesicular volcanic rock with some Fe-oxide staining (207-6-R1; vvan 18077 to 18087). Following the rock sampling, Jason returned to the beehive structure to determine whether it could be sampled. Although it seemed to be as weak as cigar ash, the pilot (Phil) was able to use the starboard claw to obtain Sample 207-7-R1, which consists of fragments of the young, extremely friable beehive structure that were deposited into a biobox (vvan 18118 to 18240).

Further exploration of the Vienna Woods field visited a field of multiple inactive chimneys, up to 12 m tall, in an area around x3217, y5721 (previously visited and sampled during Dive 200, samples 10, 11, and 19).

The remainder of the dive was committed to exploring the nature of collapse features visible in the ABE map. The collapse feature at x3150, y5620 corresponds to a large collapse pit in sheet flow. The large, but lower relief depression around x3250, y5580 is a former lava pond with sedimented flat sheet lava and occasional ridges of hackly lava that are separated from the surrounding heavily sedimented and deeply fissured (up to 10 m deep) pillow terrain by small-offset faults, that are locally developed in the form of staircase faults.