

Axial/Endeavour 2011 cruise, Jason dive tasks (12 total dive days, 3 transit days, 15 days total)

Chadwick/Nooner (3 dive days @ Axial):

One long (3-day) Jason dive to make pressure measurements at array of 6 seafloor benchmarks. We will either conduct 3 or 4 transects across the array of 6 benchmarks. Each transect takes about 13-14 hours; 3 transects would take ~42 hours or 4 transects would take ~55 hours, so we should have time for 4 transects. We will probably coordinate the Zumberge operations around this dive (deploy their instrument before our dive, move it into position during the dive, and then download data 3-4 times during the dive). They will probably want to revisit their instrument late in the cruise also to check on it and download more data. It's possible we may include some fluid sampling during this dive.

Sasagawa/Zumberge (1 dive day @ Axial):

Plan is to freefall an instrument (before a dive), move it on the bottom with Jason, release some of the flotation, recover the glass balls on the surface with the ship. Then want to periodically talk to instrument via acoustic link from Jason to check on it and download data. They plan to leave the instrument deployed for 2 years. It will be released in the future either acoustically or by ROV (TBD).

Have to know the specific site and depth of deployment ahead of time. Current plan is to deploy it near benchmark AX106, near ASHES. Have to connect acoustic interface to Jason.

Butterfield (2 dive days @ Axial):

Fluid sampling at Axial seamount (1 dive ASHES, 1 dives east side). We will use the HFPS (Beast), mounted in the aft of Jason with intake nozzle/temperature sensor mounted on the front. HFPS is approximately 90 pounds in water. We would also like to carry as many gas-tights as possible on the sampling dives (in the past, the maximum has been 6 GTs with 3 mounted near HFPS and 3 in front. The ASHES dive (<12 hours bottom time) will be shorter than the dive on the east side (18-24 hours bottom time). If possible, we will fit in a third short dive. Additional fluid sampling might be piggybacked on the Chadwick and Zumberge dive(s) if there is sufficient payload and space.

If it is possible to arrange the schedule so that fluid sampling dives are spaced out with other dives in between, that would greatly help the science team to have time for sample processing.

If the PIs for the Endeavour dives can accommodate HFPS on any of their dives, we would like to have HFPS on to take fluid samples. If this is not possible, we would like to take Ti major samplers for time-series fluid chemistry.

Note: HFPS uses Jason's 250V DC power, plus RS232 comms. Wiring has not changed over the past 3 years. Gas-tights mounted in back take one hydraulic actuator per sampler.

Detailed goals:

- Recover RAS with Jason at marker 55(33), east caldera. Install a new RAS. Sample fluids.
- Sample ASHES field with HFPS and gas-tights for time series chemistry/microbiology.

- Sample International District field with HFPS and gas-tights. Include sampling of the borehole near base of El Guapo (need to remove the simple insert to do this).
- Sample high-T vents at Vixen/Casper and surrounding diffuse vents.
- Endeavour: any sampling of opportunity, observe instruments at Grotto.

Lilley (3 dive days @ Endeavour):

Goals are to pick up and redeploying a temperature/resistivity probe (aka "pig"), water sampling, and testing an underwater gas chromatograph at High Rise vent field. The instrument to be recovered and redeployed is 26 lbs water weight and requires RS232 communication via an ICL loop that I will provide. The gas chromatograph has an air weight of 160 lbs and a water weight of 36.5 lbs. The pressure case is 12" dia by 28" long with electrical connections at either end. It requires 24v DC, has a temporary surge of 5 amps with a continuous draw of 1.5 amps. Communication is via RS232. We also will run a Seabird pump that requires a switchable 9-18 v supply at about 100 ma. Probably 3, 16 hour dives.

Zhou (1 dive day @ Endeavour):

The first priority is to recover a vent experiment at S&M vent (Main Endeavour Field) deployed in 2006. If there is time left, we would like to sample some sulfide chimneys in the cruise area, and to test an instrument to measure temp and chemical gradients of focused hydrothermal venting if the instrument can be ready by the time.

Lee/Girguis (2 dive days @ Endeavour):

Deploy and recover timelapse cameras that are 12"x12"x24" at Endeavour (possibly Grotto). Camera weight in air is variable depending on configuration (range 20-40 pounds). Weight in water neutral using syntactic foam. Possible recovery and redeployment of small temperature loggers attached to metal chain at Neptune Canada site at Grotto.

Collect a variety of sulfides to conduct high temperature incubations on board ship. Ideally, these would be coordinated with the Butterfield fluid sampling and Lilley GC work. Also, if personnel work out as such, we might ask for one or two collections of tubeworms.

Tasks between Jason dives

Fowler: (mooring work @ Axial between Jason dives)

Deploy 1 OBH mooring. Turn around 3 BPR moorings. Turn around 1 RAS mooring. Can help deploy Zumberge/Sasagawa mooring.