AT25-04: LDEO OBS Cascadia Instruments and Recoveries

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We have three instrument types to be recovered:

Type A. Standard deep OBS. 10 to be recovered. Relatively straightforward instrument with dropweights and acoustic release. Radio, flag and strobe. We usually hook them from the stbd waist deck. Approx 700 lbs in air; the sensor package hangs ~4' below the frame so the crane/boom needs at least 8' of clearance over the rail. They can be slid about a smooth deck, have a footprint of 3'X4' and can close-pack but don't stack.

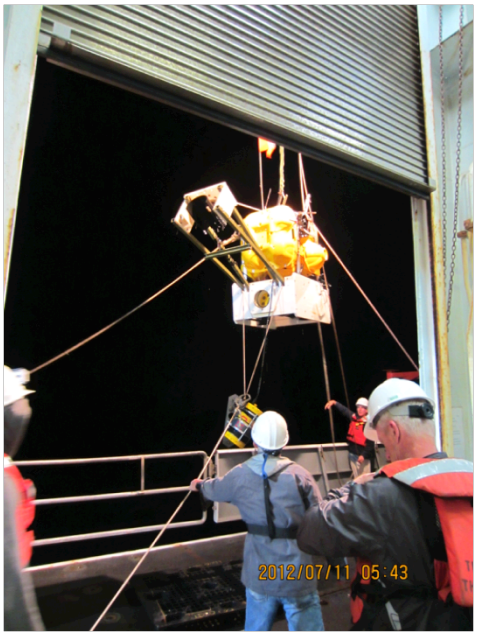

Figure 1. Type A-standard deep OBS recovery. Note the sensor package suspended beneath the frame.

Type B. Trawl-resistant OBS (TRMs). Two types (**B1** and **B2**). 10 of each type (20 total) to be recovered. The TRMs were designed to be used to water depths of 1000 m (the maximum trawling depth along Cascadia) and are lowered to the seafloor using an acoustic release at the end of a line. TRMs that are shallower than ~150 m have popup releases, while TRMs at 150-1000 m w.d. require ROV recovery.

The TRMs are inverted steel half-clamshells with a diameter of ~8', a height at the central peak of ~4' and a loaded weight of ~1600 lbs. Pressure cases are mounted on the interior walls and a sensor case is suspended on tight tethers beneath the central peak. They have bails on top and holes along the base for handling.

The JASON group did a number of TRM recoveries in 2012, and their approach was to attach a lifting bridle that was suspended from Medea, then recover Jason, Medea, and the TRM.

Type B1. TRMs without popups. We have 10 non-popup TRMs to be recovered, by JASON, in water depths of 214-914 m.

Figure 2. Type B1 (non-popup TRM) instrument.

Type B2. TRMs with popups. The popup TRMs are identical to the non-popup TRMs with the exception of a steel chimney mounted on one end to accommodate the popup system. We have 10 of these to recover, from water depths of 50-150 m.

The popups are operated acoustically and release a ~18-diameter float (no strobe) on 0.25" Dyneema. Each popup line is ~twice w.d. so there is floating line to be brought in before taking up the slack on the winch. We will have a MASH2K winch from the WHOI pool on board with AHC that will be calibrated for the Dyneema. We plan on using the A-frame to bring these TRMs on board. We'd like to bring these TRMs up as vertically as possible, otherwise the Dyneema can be cut by the chimney edge if the line is too oblique.

About 50% of the popups didn't work in 2012, and these instruments had to be rescued by JASON. We're expecting much better popup performance in 2013, but it is highly likely that some will require JASON recovery.

Figure 3. Type B2 TRM, showing popup float and protective chimney. The line is contained in a vertical canister beneath the float.

TRM handling and storage

1. Staging space. After recovery, the TRMs need to be secured on deck with enough space to open the doors and remove the sensor, datalogger and battery pressure cases (Figure 4). This staging area needs to be ~ 9' by 12'.

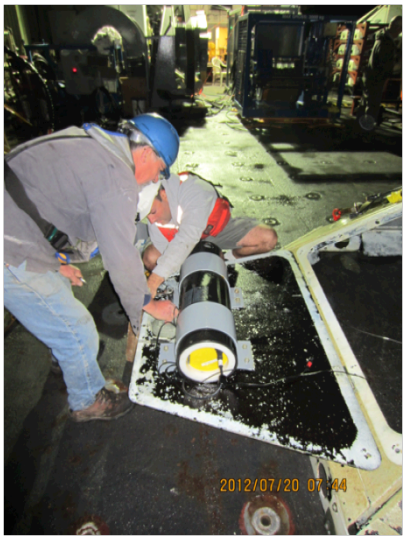

Figure 4. Open door (there's one on each side, just like a flipped Delorean) with the datalogger pressure case. A similar pressure case for the battery pack is mounted on the other door.

2. Deck space

The empty TRM shells stack on steel racks, footprint 7.5'X8.5'. Each empty TRM + rack is ~1600 lbs, and the maximum we've stacked on any ship is 4 high (6100 lbs). The racks can be bolted together in 16 places. For 20 TRMs, we need 5 stacks + 1 staging area if we go 4-high.

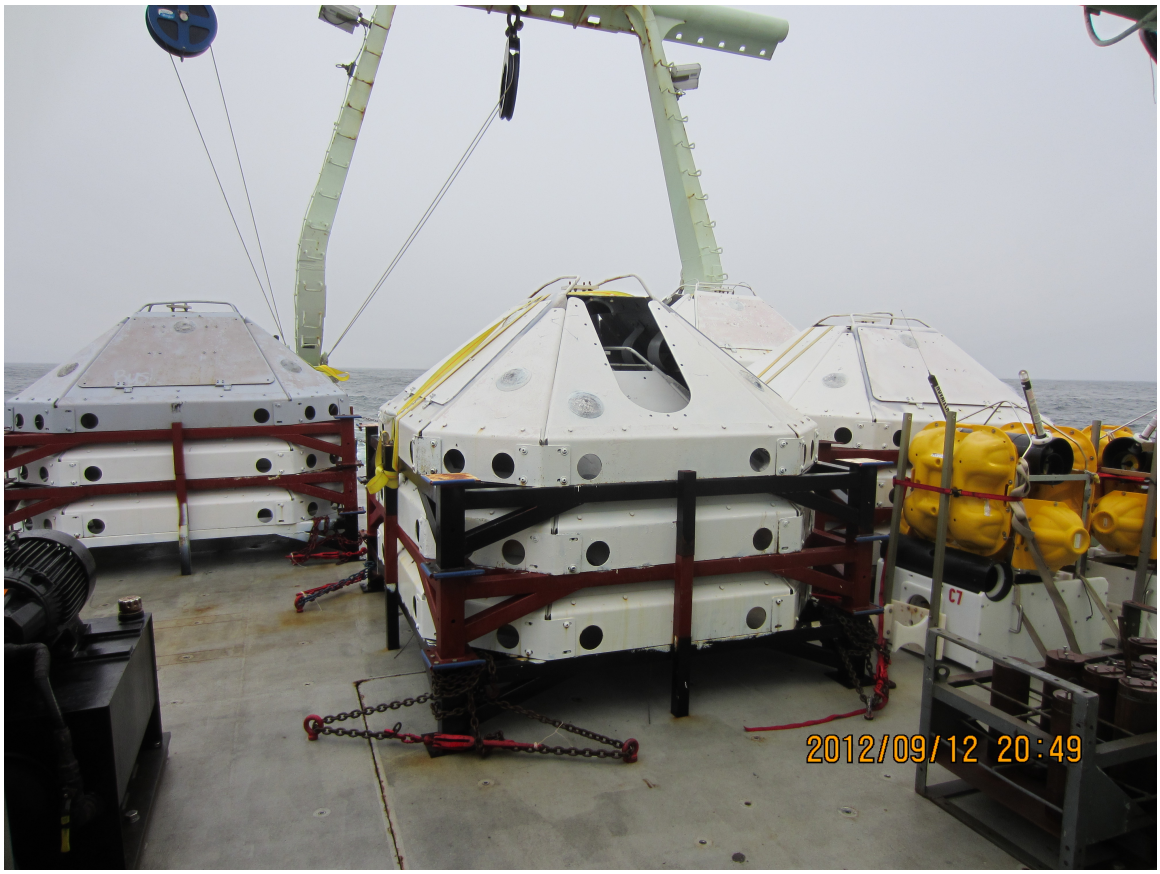

Figure 5. Empty TRMs stacked on deck.

Summary of deck space requirements:

TRM staging area 9'X12'; beneath A-frame is fine.

5 spaces for TRM stacks, each 7.5'X8.5'

10 spaces for deep OBSs, each 2'X3'