

Benthic Event Detection System

2014 Status Report

M B A R I



Program Number: 901006
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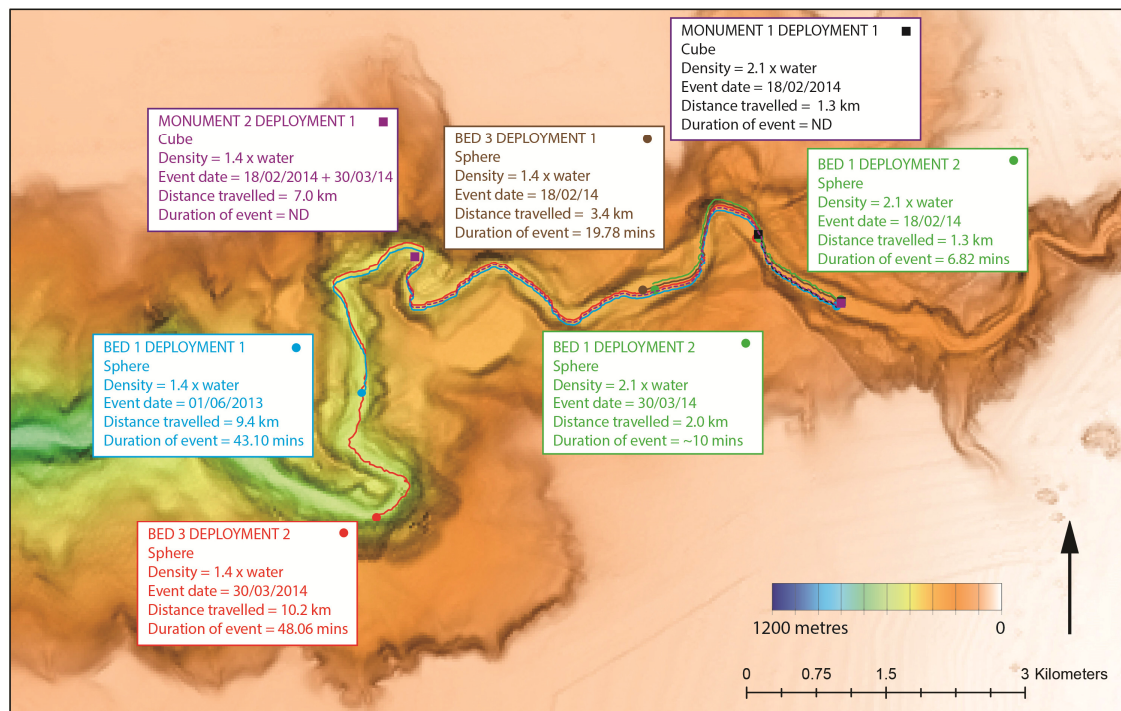
Development efforts in 2014 focused on refining the instrument in preparation for the Coordinated Canyon Experiment (CCE) set for fall of 2015. Specifically, two different package densities and two different package shapes have been tested side by side. Over the course of the initial prototype deployment, 3 canyon events have been recorded. These data have helped steer the requirements for the CCE.

Density and Shape Deployment

In late 2013 4 instruments were deployed side by side. Two spherical BEDs and two cubical monuments (one of density 2.1 and the other 1.4) were used in the test. Results from 3 different canyon events were somewhat as expected. Lighter instruments went further down the canyon (up to 10 km over the course of 48 minutes) while heavier packages travelled closer to 2 km in 10 minutes. Shape did not seem to matter as much as anticipated. A graphical collection of all the events to date was created.



Figure 1 –Spherical BEDs and cubical monuments of varying densities were deployed side by side for a 2014 experiment.



18 Feb 2014 - Both beds started on surface and movement was initiated at the same time for both.
 30 March 2014 - Bed 3 started on top of seafloor whereas Bed 1 was buried. Bed 3 set off 1 minute before Bed 1.

Figure 2 –Graphical representation of all events to date.

Visualization and Data Retrieval

More development effort went into shore side data visualization and access. Currently STOQS provides users with the option to view an animated representation of an event and a graphical view of various measured data.

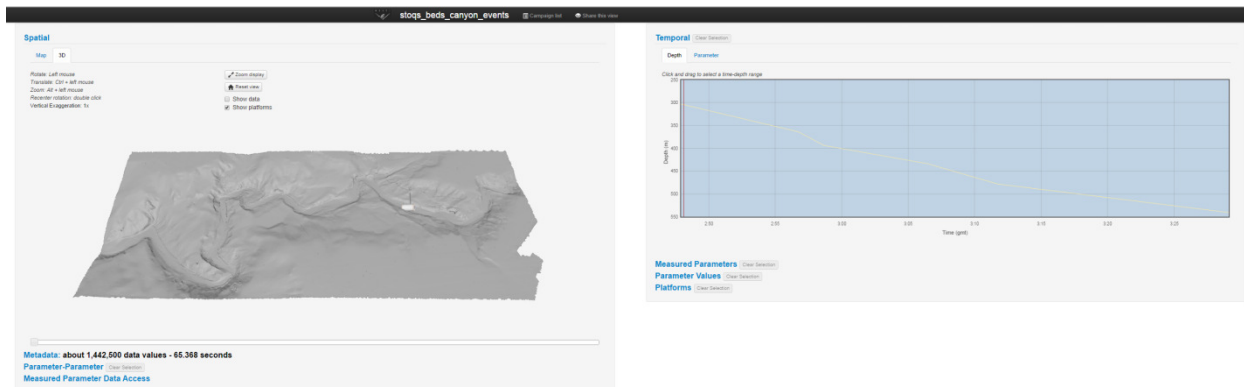


Figure 3 – Image shows BED #1 in a 3D STOQS animation moving down the canyon. On the right-hand side is pressure sensor data.

Data retrieval from the Waveglider continued though not without setbacks. A bad serial port was discovered on the Hotspot's Sensor Management Computer (SMC) which caused characters to be dropped while transferring data. Many attempts to retrieve data from BED #1, which contains two events, have left the unit's battery depleted. Recovery efforts with the R/V *Rachel Carson* have been made, but the unit is estimated to be buried 2m beneath the seafloor. One final effort with a working SMC serial port is scheduled for early 2015.

Over the course of our prototype deployment, this incident combined with the longer than expected length of events, has prompted a design change to the BEDs. For the CCE experiment they will now feature a galvanic release and solar powered Argos locator. The team still plans to geolocate the BEDs with the R/V *Paragon* and transfer data acoustically with the Waveglider. However, this added design change will increase the chance of recovery of the entire BED package allowing for full resolution data recovery. Given the novel nature of this data and the low relative cost to retrofit the units, the decision was made to proceed and procurement for 2015 has taken place.

CCE Workshop and Publications

In early June 2014, MBARI hosted a workshop to refine plans for the Coordinated Canyon Experiment. The workshop participants were impressed with the functionality and capabilities of the BEDs: in particular they were enthusiastic that the BEDs offer the potential to investigate dense near-bed sediment layers that have hitherto been impossible to measure using conventional techniques e.g. flow measurements using ADCPs. As a result, the BEDs are likely to play a prominent role in the experiment.

Additionally, Bob Herlien presented a poster "Benthic Event Detectors: a Novel Instrument for Characterizing Sediment Transport Events" at the 2014 Ocean Sciences Meeting in Honolulu. An electronic copy of the poster is available here:

<http://www.eposters.net/pdfs/benthic-event-detectors-a-novel-instrument-for-characterizing-sediment-transport-events.pdf>