

22 January 2009
10:00 am Harbor View Conference Room

MBARI Project 900907 Meeting
High Resolution Near-Surface Seismic Refraction Tomography

Attending: David Caress, Rich Henthorn, Mark Chaffey, Paul McGill

Functional Requirements

Overall System

- Acoustic system combining on-bottom sources and receivers capable of propagating sound through the seafloor to lateral ranges of more than 100 meters.
- Data must allow reliable identification of refracted arrivals allowing resolution of subsurface sound speed structure.
- Depth rating 3000 m (300 m in first year).

Acoustic Source

- Integrated with ROV Ventana
 - Exportable for use on ROV ROPOS and ROV Jason
- Depth rating of 3000 meters required
 - 6000 m desirable for possible future use with different receivers
- User-defined, repeatable, calibrated source wavelet.
 - Source can be changed interactively during experiments
- Source timing and navigation recorded
- Maximum pulse length at least 100 millisecond
- Minimum pulse spacing 1 second

Acoustic Receivers

- Deployable from ROV
- Depth rating 3000 m
- Record full bandwidth of source wavelets
- Record continuously for at least 10 hours (24 hours desired).
- System time can be synched with source system
- System time can be measured relative to source system

Combination of Source and Receivers

- Travel time accuracy should be accurate to uncertainty of arrival picks in time series.
 - Travel times are the difference between the source time and the arrival time in the processed receiver data.
 - Klauder wavelet analysis of 1-6 kHz sweep has 0.5 msec width

- The finest useful travel time accuracy is +/- 0.25 msec
- A 2000 m/s sound speed in sediment translates to 2 m per msec
- 3 kHz wavelength => 0.33 msec period