R/V Marcus G. Langseth

Office of Marine Operations

Lamont-Doherty Earth Observatory

MGL0902 Data Report

PRELIMINARY

2009-01-13 - 2009-01-20
Nuku'alofa, Tonga - Nuku'alofa, Tonga

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1 Background and Scientific Objectives

The objective of this cruise was to deploy a set of sound-channel-moored hydrophones stations along the East Lau Spreading Center (ELSC), where they will remain for a period of 18 months. The experiment is designed to overlap spatially and temporally with a scheduled 10-month deployment of broadband ocean bottom seismometers (OBSs) beginning in Nov. 2009 and an active source seismic experiment scheduled for Jan/Feb. 2009. Although these seismic projects are aimed at studying mantle processes, the extensive seismic network also can be used to provide constraints on the locations, depths and focal mechanisms of shallow hypocenter events within the Lau Basin.

The deployment of an autonomous underwater hydrophone (AUH) network will create a rare opportunity to compare the results obtained using both technologies and develop new methods for jointly analyzing these seismic and hydroacoustic datasets. Since T-wave location accuracy and signal characteristics may depend on seafloor depth, morphology, and faulting style, the morphologic and tectonic diversity within the Lau back-arc system provides an ideal and unique environment for our experiment. The lessons learned from this joint deployment have the potential to significantly impact the interpretation and processing of future hydroacoustic datasets, enhancing our ability to extract quantitative information regarding earthquake source parameters and processes.

The record of seismic activity provided by the AUH-OBS and AUH-only observations will be used to constrain the tectonics of the region, monitor and characterize episodes of submarine volcanism and identify earthquake activity that may impact ELSC hydrothermal sites, which are the focus of a long-term, interdisciplinary monitoring effort.

2 Personnel

2.1 Science Party

Bohnenstiehl, Del	Chief Sci, NCSU
Matsumoto, Haru	Co-Chief Sci, OSU
Shanley, John	Mooring Tech, NOAA
Monigle, Patrick	Graduate student, NCSU
Bowman, Jeff	Graduate, NCSU

2.2 Shipboard Technical Staff

Johnson, Anthony	Tech-in-Charge	ajohnson@ldeo.columbia.edu
Koczynski, Ted	Technician	tedski@ldeo.columbia.edu
McKiernan, Bern	Technician	bmckiern@ldeo.columbia.edu
Martinson, David	Technician	dmartins@ldeo.columbia.edu
Spoto, Tom	Chief Sound Source	spoto@ldeo.columbia.edu
Gutierrez, Carlos	Sound Source	
Goodick, Brian	Sound Source	

2.3 Marine Crew

OLoughlin,James	Captain
Zeigler,Stanley	Chief Mate
Wolford,David	2nd Mate
Crum,Breckenridge	3rd Mate
Woronowicz,Jason	AB
Cereno,George	AB
Baxter,Gordon	AB
Redito,Ricardo	AB
Maea,Viliami	OS
Applewhite,Nicky	OS
Karlyn,Albert	Chief Engineer
Chizmar,Peter	1st Engineer
Reed,Joshua	2nd Engineer
Vetting,Ryan	3rd Engineer
Billings,Jack	Oiler
Billips,Charles	Oiler
Uribe,Guillermo	Oiler
Brodock,Gary	Steward
Rios,Ricardo	Cook

3 Instrumentation

All science instruments aboard the Langseth are listed in the science sensors spreadsheet in the docs section of the cruise archive. Summary notes on operation during this cruise are listed below. Seismic equipment is not listed here, refer to Part IV for the seismic summary. Other instruments not listed were not in operation.

For details on the data formats and interpretation notes, see Appendix A, Data Formats, included on the cruise archive.

3.1 Instrumentation Overview

Instrument	Description	Data Set	Data Output	Files	Interval
CNAV	C-Nav DGPS	full	nmea	MGL-cnav.*	1s
CNAV	Furuno FE700 Echosounder	none	nmea	MGL-bath01.*	1s
EM122	EM122 center beam depth	full	nmea	MGL-bath02	1s
EM122	EM122 depth to spectra	full	nmea	MGL-dbt02.*	variable
GYRO	G	full	nmea	MGL-gy01.*	1s
KNUDSEN	Knudsen 320B/R Echosounder	partial	segy	See below	variable
MAGGIE	Geometrics 882 Magnetometer	n/a	nmea	MGL-mag01.*	1s
PCO2	Lamont PCO2 System	full	ascii	MGL-pco2.*	variable
POSMV	Applanix POS/MV Integrated Nav System	full	nmea	MGL-posmv.*	1s
SEAPATH	Applanix POS/MV Integrated Nav System	full	nmea	MGL-seapath.*	1s
DS50	Furuno DS50 Speedlog	full	nmea	MGL-slog01.*	1s
SPECTRA	Spectra Seismic Nav System – header log	n/a	ascii	MGL-slog01.*	variable
TAGGER	TM-4 Event Logger	n/a	ascii	MGL-tagger01.*	variable
TSG	Seabird SBE23 Thermosalinograph	full	ascii	MGL-tsgraw.*	6s
TSG	SBE23 converted output	full	ascii	MGL-tsg.*	6s
GRAV	Bell Aerospace BGM-3 Gravimeter	full	ascii	MGL-vc01.*	1s
WEATHER	RMYoung Met System	full	ascii	MGL-wx01.*	1s
WEATHER	Weather output to DP system	partial	nmea	MGL-mwv01.*	1s
XBT	Sippican MK21 XBT probes	8 drops	binary, ascii	see below	variable

All timestamps in this report are presented using UTC time and day of year in order to avoid confusion with local time changes.

3.2 Instrumentation Detail

Instrument Detail not available at time of writing.

4 Seismic Summary

No seismic operations were conducted during this cruise.

5 Client Instrumentation

Nine moorings were deployed during this cruise. Refer to the cruise archive document MGL0902/docs/Lau09HydrophoneLocations.doc for mooring information.

6 Gravity Ties

Gravity tie information not available at time of writing.

7 Archive Contents

Not available at time of writing.