# RV Langseth
# Data Reduction Summary

# MGL0906

## Kaohsiung, Taiwan – Kaohsiung, Taiwan

PRELIMINARY

v0.2, 2009-06-04

Lamont-Doherty Earth Observatory, Columbia University

**Mon May 04 00:00:00 2009**

| Date | Julian Date | Time | Port |
|---|---|---|---|
| 2009-05-04 | 2009-124 | 0000 UTC, 0800L | Kaohsiung, Taiwan |
| 2009-06-04 | 2009-155 | 0000 UTC, 0800L | Kaohsiung, Taiwan |

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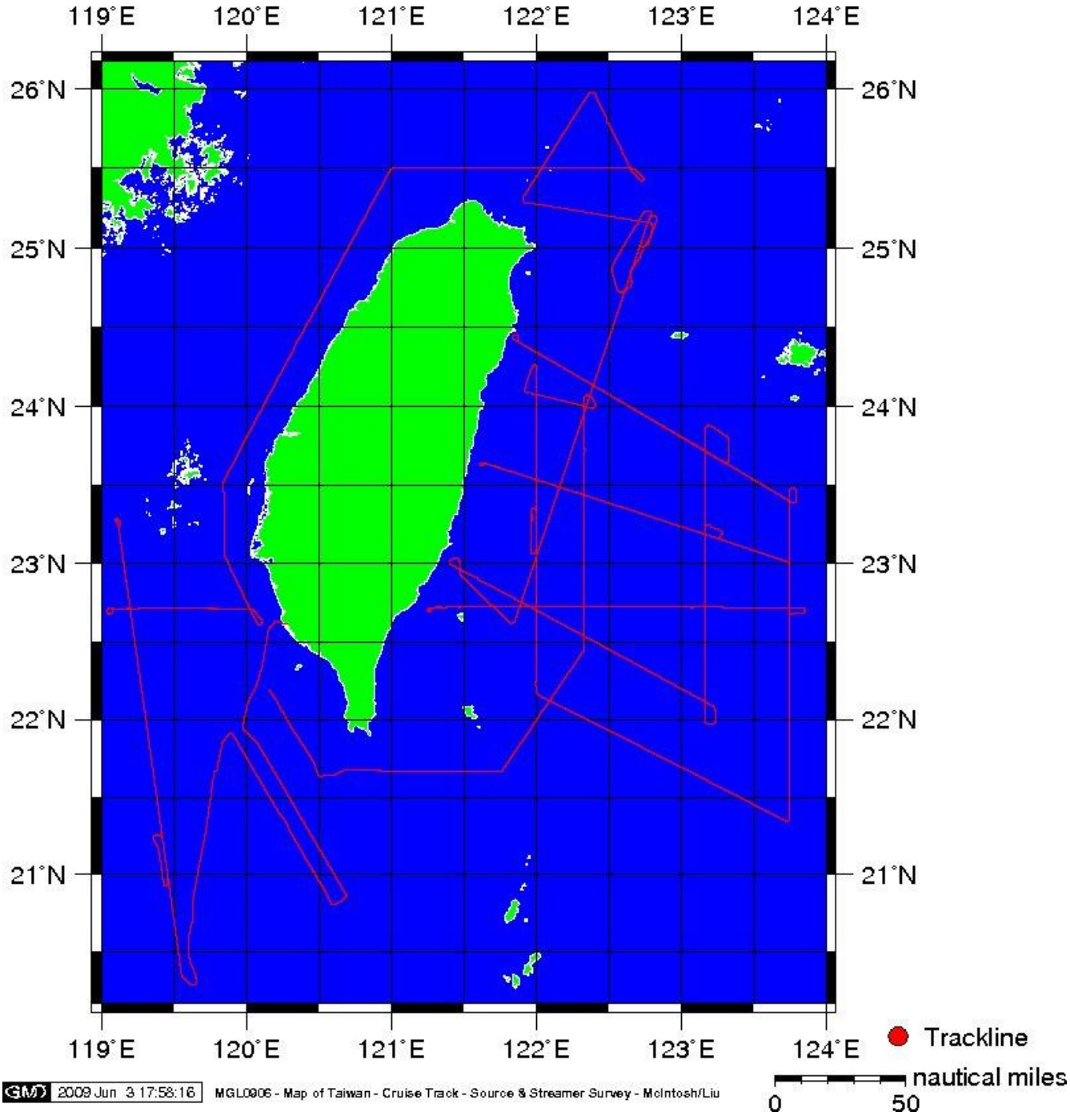
Please refer to the Langseth Data Report Supplement for information regarding data formats.

**Cruise Track**



# I. Background and Scientific Objectives

The TAIGER is an US-Taiwan collaboration research project jointed by scientists from France to investigate the mountain building processes, plate boundary dynamics, and seismogenic processes on and around Taiwan. Both natural earthquakes and large airgun array will be used as sources for seismic imaging of the interior of the deep crust and upper mantle. On land seismographs and broadband ocean bottom seismometers will be deployed for a longer period of time (up to one year) to observe the natural earthquake activities (passive source experiment), while large multichannel seismic system of the new US seismic research vessel R/V Marcus Langseth and short-period ocean bottom seismometers will be used to image crustal transects during the active source experiment. Taking the opportunity of having a modern multichannel seismic vessel coming to Taiwan, the marine geosciences community in Taiwan has obtained additional funds from several agencies in Taiwan to carry out an expanded TAIGER survey. The R/V Langseth is scheduled to conduct the TAIGER active source survey in the areas around Taiwan, in the northern South China Sea and in the western Philippine Sea from March 31 to July 20, 2009.

The purpose of this expanded TAIGER survey is to have a complete investigation on the Taiwan arc-continental collision system and its adjacent continental margins and marginal seas, thus to have a better understanding on the structural characters and tectonic evolution of the region. There are several important scientific issues as well as issues having societal impacts can be addressed by conducting additional marine seismic survey, as described below:

1. The subduction system south of Taiwan to northern Luzon Island: The area south of Taiwan is a transition zone from subduction to arc-continent collision. Two E-W trending profiles across the Luzon subduction system have already been planned in the TAIGER survey, however, we would like to lengthen these two profiles to cover the northern South China Sea Basin and the Western Philippine Basin, and to add couple more transects southward to the Luzon Island. From a recent USGS report on the potential risk of large Tsunami hazard zones around the Pacific region, the subduction system from North Luzon to Taiwan is ranked among the highest. Additional seismic profiles across this region will help to understand the tectonic processes, and provide critical information for earthquake and tsunami hazards investigation.
2. Structure and evolution of the northern South China Sea continental margin: The early evolution of the South China Sea Basin and its relationship to the Huatung Basin/West Philippine Basin is still unclear. It has been suggested that there may exist a fossil plate boundary in the most northeastern corner of the South China Sea Basin. We would like to collect several long MCS/OBS profiles across the continental margin of the northern South China Sea to better constrain the structural and tectonic evolution of this region.
3. Seismogenic processes and earthquake hazards off eastern Taiwan: There is a highly active seismic zone off eastern Taiwan in the western Ryukyu forearc region where the Ryukyu subduction system transforms into Taiwan collision system westward. Earthquakes of magnitude 7 or larger occur frequently, and the risk of tsunamigenic large earthquakes (magnitude > 8) is very high. Two of the planned TAIGER onshore-offshore transects will pass through this region roughly in E-W trending, we propose to collect additional two N-S trending MCS/OBS transects in this region. One of the added transects will pass through the center of the most densely distributed earthquake zone. This profile is the key profile of the Taiwan-France cooperative ACTS project, and French OBSs will participate in this part of the investigation.
4. The nature of the Gagua Ridge and evolution of the western Philippine Sea Plate: The Gagua Ridge is a N-S trending linear volcanic ridge separating the Huatung Basin and the West Philippine Basin. This ridge has been suggested to be a fossil plate boundary, but the nature of it is still unclear. We suggest to lengthen the planned E-W trending TAIGER profiles and to add additional MCS/OBS transects across the Gagua Ridge so that this series of transects from north to south could provide insights on the nature of the Gagua Ridge and tectonic evolution of the western Philippine Sea Plate.
5. Gas hydrates on different tectonic settings: Marine geophysical and geochemical data have shown that gas hydrates are present both in the passive northern South China Sea continental margin and the accretionary wedge environment southwest of Taiwan. The area SW of Taiwan thus provides a rare opportunity to compare the formation, migration and accumulation of gas hydrates in both active and passive tectonic settings. The Central Geological Survey of the Ministry of Economic Affairs, Taiwan, has funded 12 days of MCS/OBS surveys off SW Taiwan for the purpose of imaging the deep crustal structures of this region where the accretionary wedge of the Luzon subduction system meets with the passive continental margin of the South China Sea.

Taiwan will also provide additional ships during the TAIGER active source experiment to deploy and retrieve OBSs, thus reducing the time spent for handling OBSs onboard R/V Langseth to a minimum. We expect R/V Langseth will be used to collect 2-D MCS data during most of her survey time, and the seismic data collected will greatly enhance the understanding of the regional tectonics, crustal structures and seismogenic processes of the region.

**Figure 1A - Source & Streamer Survey, track and shot log**

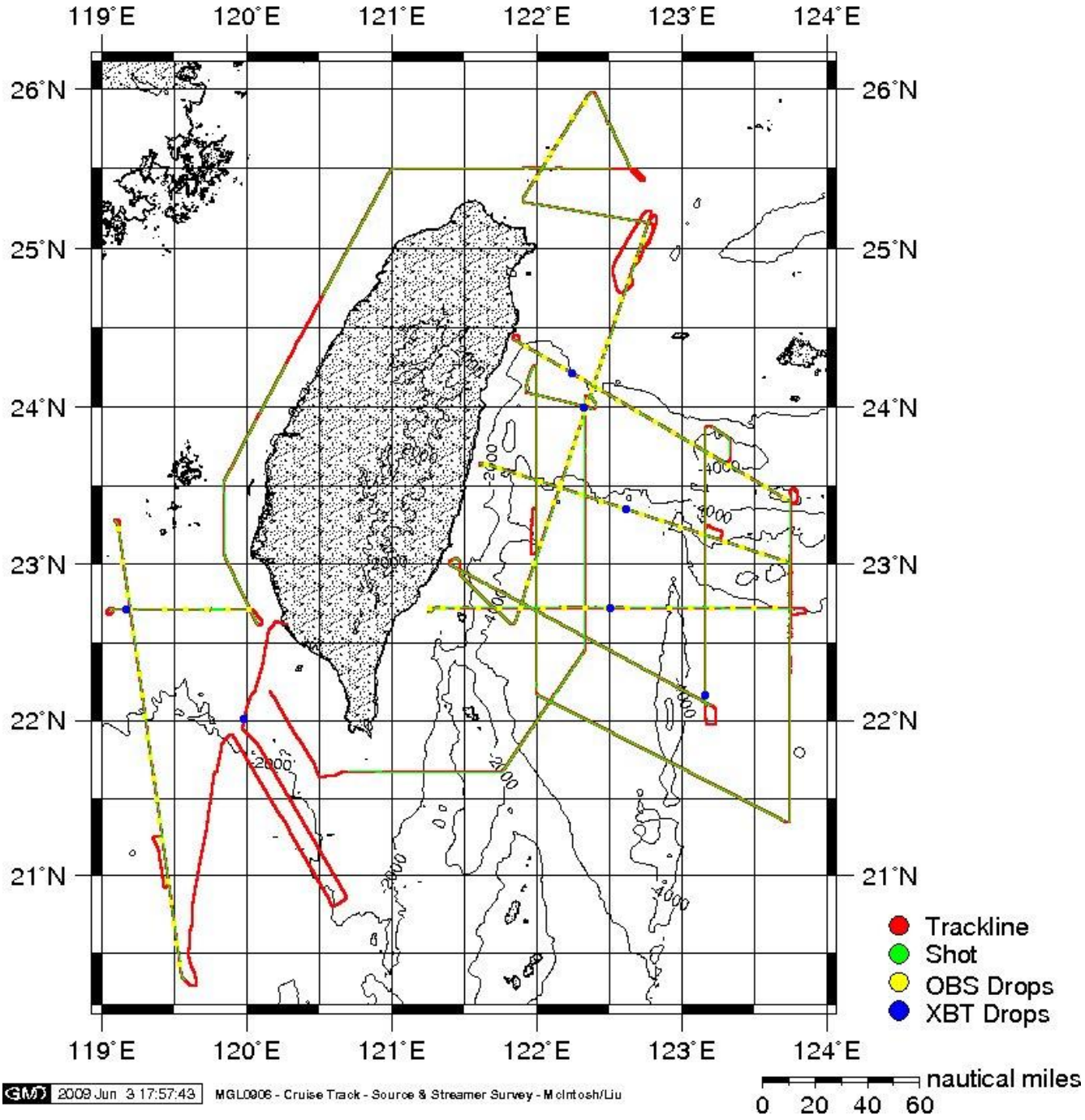
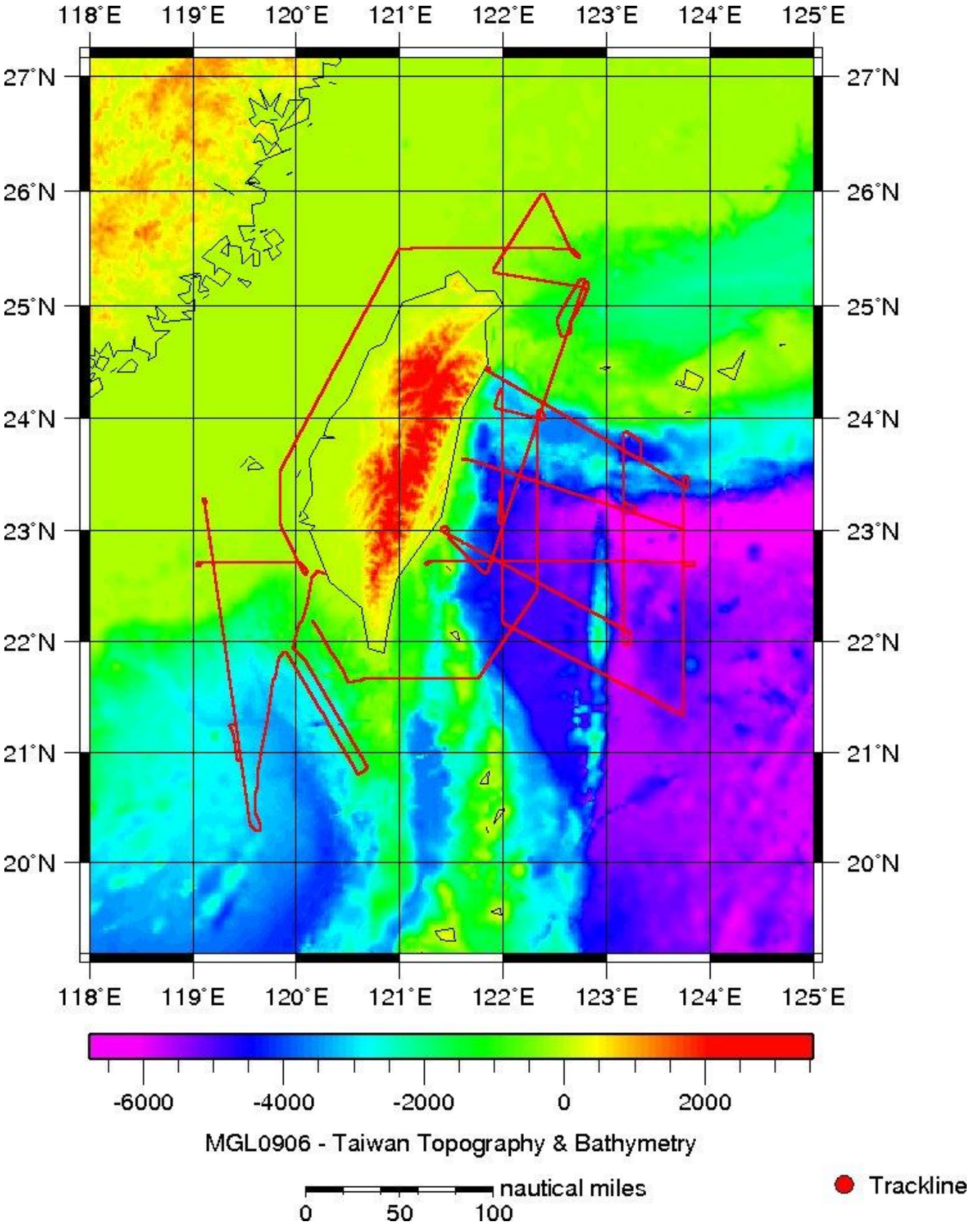


**Figure 1B – Taiwan Topography & Bathymetry**



# II. Personnel

**Science Party**

| | | | |
|---|---|---|---|
| 1 | Kirk McIntosh | Co-Chief Scientist | Univ. Texas at Austin |
| 2 | Char-Shine Liu | Co-Chief Scientist | National Taiwan Univ. |
| 3 | Wu-Cheng Chi | Assistant Researcher | Academia Sinica |
| 4 | Takeshi Matsumoto | Professor | Univ. of Ryukyus |
| 5 | Chih-Chin Tsai | PostDoc Associate | National Taiwan Univ. |
| 6 | William R Lester | Ph. D. Student | Univ. Texas at Austin |
| 7 | Ho-Han Hsu | Ph. D. Student | National Taiwan Univ. |
| 8 | Jih-Hsin Chang | Ph. D. Student | National Taiwan Univ. |
| 9 | Shu-Lin Tu | M.S. Student | National Taiwan Univ. |
| 10 | Chia-Chun Ko | M.S. Student | National Taiwan Univ. |
| 11 | Hau-Ting Hung | M.S. Student | National Taiwan Univ. |
| 12 | Jia-Wei Yan | Military Observer | National Defense Univ. |
| 13 | Shye-Dong Chiou | Chief Tech | National Taiwan Univ. |
| 14 | Mei-Yu Chen | Research Assistant | National Taiwan Univ. |
| 15 | Wan-Jou Chen | Research Assistant | Academia Sinica |

**Shipboard Technical Staff**

| | | |
|---|---|---|
| 1 | Anthony Johnson | Technician-in-charge, Chief Navigator/IT |
| 2 | Ted Koczynski | Watch Leader, Acq Shift Leader |
| 3 | David Ng | Nav/IT |
| 4 | Bern McKiernan | Watch Leader, Acq Shift Leader |
| 5 | Mike Martello | NCS Nav |
| 6 | Della Grallert | Nav |
| 7 | Thomas Spoto | Chief Sound Source/Handing |
| 8 | Allen Ruttan | Sound Source Mechanic |
| 9 | Brian Goodick | Sound Source Mechanic |
| 10 | Richard Harpour | Sound Source Mechanic |
| 11 | Donald Cucchiara | Sound Source Mechanic |

**Marine Mammal Observers**

| | | |
|---|---|---|
| 1 | Claudio Fossati | Lead Marine Mammal Observer |
| 2 | Meike Holst | Marine Mammal Observer |
| 3 | Bradley Dawe | Marine Mammal Observer |
| 4 | Brendan Hurley | Marine Mammal Observer |
| 5 | Hsin-Yi Yu | Marine Mammal Observer |

**Ship's Crew**

| | | |
|---|---|---|
| 1 | Mark Landow | Captain |
| 2 | Matthew Bakis | Chief Mate |
| 3 | Chris Zimmerman | 2$^{nd}$ Mate |

| | | |
|---|---|---|
| 4 | Breckenridge Crum | 3rd Mate |
| 5 | Sal Oboza | AB |
| 6 | Inocencio Rimando | AB |
| 7 | Ping Paragas | AB |
| 8 | Bernard Clark | AB |
| 9 | Ben Nadler | OS |
| 10 | Jeromial Webster | OS |
| 11 | Stephen Pica | Chief Engineer |
| 12 | Matthew Tucke | 1st Asst. Engineer |
| 13 | Randall Juanzemis | 2nd Asst. Engineer |
| 14 | David Lawson | 3rd Asst. Engineer |
| 15 | Phil Neis | Electrician |
| 16 | Fernando Uribe | Oiler |
| 17 | Stephen Collier | Oiler |
| 18 | Jack Billings | Oiler |
| 19 | Hervin Fuller | Steward |
| 20 | Michael Duffy | Cook |

## III. Instrumentation Summary

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.

**Instrument Data Files**

| Instrument | Description | Data Set | Data Outputs | Files | Interval |
|---|---|---|---|---|---|
| FE700 | Furuno FE700 Echosounder | Partial | serial logs | MGL-bath01.* | 1s |
| EM120 | Kongsberg EM120 Multibeam Sonar | Full | raw output to file | See below | variable |
| | | | centerbeam serial logs | MGL-bath02.* | variable |
| DS50 | Furuno DS50 Doppler Speedlog | Full | serial logs | MGL-slog01.* | 1s |
| XBT | Sippican MK21 XBT Launcher | | raw output to file | See below | n/a |
| | | | converted output to file | See below | |
| WX1 | RM Young 5103 Weather Bird and Translator | Full | serial logs | MGL-wx01.* | 1s |
| | | | mwv conversion | MGL-mwv01.* | |
| TSG | SeaBird SBE23 Thermosalinograph | Full | raw serial logs | MGL-tsg.* | 1s |
| | | | converted data | MGL-tsgconv.* | |
| CNAV | C&C Tech. CNAV DGPS Receiver | Full | serial logs | MGL-cnav.* | 1s |
| MAG01 | GeoMetrics 882 Magnetometer | Partial | serial logs | MGL-mag01.* | 1s |
| BGM | Bell Aerospace BGM-3 Gravimeter | Full | serial logs | MGL-vc01.* | 1s |
| GYRO | Simrad GC80 Gyrocompass/AD100 | Full | serial logs | MGL-gy01.* | 1s |
| POSMV | Applanix POSMV Integrated Nav System | Full | serial logs | MGL-posmv.* | 1s |
| SEAPATH | Konsberg SeaPath Integrated Nav System | Full | serial logs | MGL-seapath.* | 1s |
| STU | Sercel Streamer Tension | None | serial logs | MGL-stu1.* | 10s |
| TAGGER | Spectrum Instruments intelligent reference TM-4 | Full | serial logs | MGL-tagger01.* | shot |
| | | | filtered logs | MGL-shot01.* | shot |

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

## Science Navigation Instrumentation

### FE700

**Logging interval**: 1 second

**File id**: bath01

The FE700 only operated to 800m depth. The echosounder is normally switched off before the unit goes out of depth. The unit was not logged during this cruise.

*Interruptions greater than twenty seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:120:00:00:00.3443 | | Logging officially started |
| 2009:151:18:51:41.3319 – 2009:151:19:09:54.1110 | Missing data | Power failure |
| 2009:151:19:10:25.2902 – 2009:151:19:54:30.2854 | Missing data | Restoring power to equipment |
| 2009:154:17:18:56.5545 | | Logging officially ended |

bath01 data sample:

```
bath01      2008:220:13:45:42.0681  $SDDBT,,,,,,
bath01      2008:220:13:45:42.0690  $SDDBS,,,,,,
bath01      2008:220:13:45:42.0691  $SDDPT,,0006.6*49
bath01      2008:220:13:45:42.1482  $PFEC,Alarm,0,0*6F
bath01      2008:220:13:45:42.1483  $PFEC,xdr,FORE,050*79
```

**EM-122 Mutibeam**

The EM122 multibeam sonar was operated throughout the cruise. The system is designed for deeper water, and does not track ground well in less than 50m of water.

EM122 swath data is saved to the cruise archive under MGL0903/multibeam. Center beam depth is recorded separately to serial log. MicroSV sound velocity was used up through Feb 28. TSG sound velocity was used beginning 0900 on Feb 28.

**Logging interval**: variable with water depth

**File id**: bath02

*Interruptions greater than sixty seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:124:05:36:39.1162 | | Logging officially started |
| 2009:124:05:52:59.9366 – 2009:124:05:56:11.7458 | Missing data | Instrument turned off |
| 2009:124:05:57:12.7121 – 2009:124:06:03:38.6729 | Missing data | Instrument turned off |
| 2009:124:06:03:38.6729 – 2009:124:06:13:33.0506 | Missing data | Instrument turned off |
| 2009:124:06:31:57.6361 – 2009:124:06:38:02.6112 | Missing data | Instrument turned off |
| 2009:124:15:42:00.2500 – 2009:124:15:44:12.5599 | Missing data | Restarted SIS |
| 2009:138:19:13:03.5835 – 2009:138:19:16:38.7335 | Missing data | Seabed image not functioning properly; |

| | | |
|---|---|---|
| | | restarted SIS |
| 2009:138:19:25:30.1001 – 2009:138:19:36:15.8203 | Missing data | Seabed image corrupted; restarted SIS |
| 2009:141:12:10:58.6571 – 2009:141:12:19:31.9737 | Missing data | Restarted SIS for BIST test |
| 2009:146:02:09:20.5136 – 2009:146:02:13:04.9775 | Missing data | Ramping up source |
| 2009:151:18:51:39.1436 – 2009:151:19:50:16.4757 | Missing data | Power failure |
| 2009:154:17:18:51.3975 | | Logging officially ended |

Bath02 data format

```
bath02      2008:192:00:00:12.6663  $KGDPT,2938.25,0.0,12000.0*4a
bath02      2008:192:00:00:30.3301  $KGDPT,2954.08,0.0,12000.0*4f
bath02      2008:192:00:00:46.5831  $KGDPT,2958.32,0.0,12000.0*4a
bath02      2008:192:00:01:03.0606  $KGDPT,2954.18,0.0,12000.0*4e
```

**DS50 Speedlog**

**File id**: slog01
**Logging interval**: 1 second

The Furuno DS-50 is a Doppler speed log. It was in operation for the length of the cruise.

*Interruptions greater than ten seconds are displayed in the following table.*

| **Log Date** | **Event** | **Comment** |
|---|---|---|
| 2009:120:00:00:00.6528 | | Logging officially started |
| 2009:151:18:51:40.1376 – 2009:151:19:10:18.6614 | Missing data | Power failure |
| 2009:151:19:10:24.7392 – 2009:151:19:31:21.4926 | Missing data | Restoring power to equipment |
| 2009:154:17:19:12.4166 | | Logging officially ended |

Slog01 data format:

```
slog01      2008:231:00:00:00.0744  $VDVHW,,T,,M,09.68,N,17.93,K*4C
slog01      2008:231:00:00:00.1906  $VDVBW,009.68,000.09,A,009.68,000.09,V*46
slog01      2008:231:00:00:00.1908  $VDVLW,0005960.30,N,0005960.30,N*5F
```

**RMYoung Integrated Weather**

**File id**: wx01
**Logging interval**: 1 second

The weather station is used to log wind speed, direction, air temperature, and barometric pressure. The unit was functioning during the cruise. See also mwv01 below.

| Log Date | Event | Comment |
|---|---|---|
| 2009:120:00:00:00.7341 | | Logging officially started |
| 2009:151:18:51:40.5833 – 2009:151:19:09:55.3272 | Missing data | Power failure |
| 2009:151:19:10:25.8702 – 2009:151:19:49:55.0362 | Missing data | Restoring power to equipment |
| 2009:154:17:19:25.5078 | | Logging officially ended |

**File id**: mwv01
**Logging interval**: 1 second

The weather station is used to log wind speed, direction, air temperature, and barometric pressure. The wx01 strings are converted in real-time to produce mwv strings for the DP. The mwv output is strictly a derivative of the w01 output. See also the wx01 description above.

*Interruptions greater than ten seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:120:00:00:00.7341 | | Logging officially started |
| 2009:151:18:51:40.5833 – 2009:151:19:09:55.3272 | Missing data | Power failure |
| 2009:151:19:10:25.8702 – 2009:151:20:28:49.0930 | Missing data | Restoring power to equipment |
| 2009:154:17:19:02.5619 | | Logging officially ended |

Mwv01 data sample:

```
mwv01 2008:231:00:00:00.5173  6.1   6.6   6.6   8.8 354 321   5   0.0   0.0   0.0
0.0 355 355   0 ***** ***** ***** *****  8  8  8 1009.7
mwv01 2008:231:00:00:01.5172  5.9   6.6   6.6   8.8 353 321   5   0.0   0.0   0.0
0.0 355 355   0 ***** ***** ***** *****  8  8  8 1009.6
mwv01 2008:231:00:00:02.5190  6.3   6.6   6.6   8.8 354 321   5   0.0   0.0   0.0
0.0 355 355   0 ***** ***** ***** *****  8  8  8 1009.8
```

**CNAV**
**Logging interval**: 1 second

**File id**: cnav

The C-NAV is a global satellite-based differential receiver. This is the best individual receiver currently on the ship. This system was operational during the cruise.

*Interruptions greater than ten seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:120:00:00:00.6380 | | Logging officially started |
| 2009:138:09:26:42.8729 – 2009:138:09:27:06.4831 | Missing data | Restarting CNAV |
| 2009:151:19:06:15.8894 – 2009:151:19:43:14.6550 | Missing data | Power failure |
| 2009:154:17:18:57.0023 | | Logging officially ended |

**Cnav data format:**

```
cnav  2008:231:00:00:00.6936
$GPGGA,000000.00,1434.94372,N,10444.85748,W,2,8,1.1,15.52,M,-20.60,M,9,0108*65
cnav  2008:231:00:00:00.7137  $GPVTG,006.5,T,,M,9.64,N,17.85,K*53
```

**GC80 Gyrocompass**

The GC80 gyrocompass is installed on the bridge and used for ship and seismic navigation.

**File id**: gy01
**Logging interval**: 1 second

The GC80 gyrocompass operated normally.

*Interruptions greater than ten seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:120:00:00:00.2830 | | Logging officially started |
| 2009:151:19:10:18.1607 – 2009:151:19:49:43.6427 | Missing data | Power failure |
| 2009:154:17:19:01.3869 | | Logging officially ended |

Gy01 data format:

```
gy01  2008:231:00:00:00.4110  $PTKM,HEALM,0000,0,G1*09
gy01  2008:231:00:00:00.6395  $HEHDT,005.8,T*22
gy01  2008:231:00:00:00.6396  $HEROT,-005.25,A*34
gy01  2008:231:00:00:01.6394  $HEHDT,005.7,T*2D
gy01  2008:231:00:00:01.6395  $HEROT,-004.53,A*34
```

**POSMV Integrated Nav**

The POS/MV is a receiver that uses CNAV input in addition to its own antennae, an inertial sensor and optional RTG, WTC, or WAAS corrections and a Kalman filter to produce a smooth navigation output and very accurate heading.

The PosMV operated normally during the cruise.

**File id**: posmv
**Logging interval**: 1 second

*Interruptions greater than ten seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:120:00:00:00.2018 | | Logging officially started |
| 2009:151:19:10:26.0575 – 2009:151:19:52:31.9847 | Missing data | Power failure |
| 2009:154:17:19:04.5327 | | Logging officially ended |

Posmv data format:

```
posmv 2008:231:00:00:00.0885
      $INGGA,235959.842,1434.95002,N,10444.85734,W,2,,1.1,12.71,M,,,9.0,0108*2E
posmv 2008:231:00:00:00.0889  $INHDT,15.0,T*11
posmv 2008:231:00:00:00.2047  $INVTG,7.0,T,,M,9.7,N,17.9,K*46
posmv 2008:231:00:00:00.3208  $INGST,235959.842,,0.9,0.9,0.0,0.9,0.9,2.5*51
posmv 2008:231:00:00:00.4411  $PASHR,235959.842,15.05,T,-
0.58,0.48,0.15,0.069,0.069,0.045,2,0*05
posmv 2008:231:00:00:00.4412  $INZDA,235959.0000,17,08,2008,,*73
```

**SeaPath Integrated Nav**

The Kongsberg Seapath is an integrated navigation system. It was in operation for the length of the cruise.

**Logging interval**: 1 second

**File id**: seapath

*Interruptions greater than ten seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:120:00:00:00.2309 | | Logging officially started |
| 2009:147:12:23:02.3819 – 2009:147:12:23:51.1934 | Missing data | Equipment problem; Restarted Seapath |
| 2009:151:19:10:25.8022 – 2009:151:19:31:53.7789 | Missing data | Power failure |
| 2009:154:00:05:28.0690 | | Logging officially ended |

**Seapath data format:**

```
seapath     2008:231:00:00:00.0504  $INZDA,235959.99,17,08,2008,,*73
seapath     2008:231:00:00:00.1686
      $INGGA,235959.99,1434.953109,N,10444.859147,W,2,08,1.1,-
16.30,M,,M,1.0,0291*70
seapath     2008:231:00:00:00.1687  $INVTG,5.97,T,,M,9.7,N,,K,D*03
```

```
seapath     2008:231:00:00:00.1688  $INHDT,5.82,T*1A
```

**Spectrum Instruments TDM-4 Event Logger**

The Event logger time stamps time-break triggers from DigiShot in all fire modes.

**File id**: tagger1

**Logging interval**: 1 second

*Interruptions greater than ten seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:120:00:00:00.0305 | | Logging officially started |
| 2009:151:18:51:38.8620 – 2009:151:19:32:17.6083 | Missing data | Power failure |
| 2009:154:10:54:07.4804 | | Logging officially ended |

Tagger1 data format:

```
tagger1     2008:231:00:00:00.0383  #51,08182008,000001
tagger1     2008:231:00:00:00.2027  #79,00000000
tagger1     2008:231:00:00:00.2948  #68,2
tagger1     2008:231:00:00:00.3689  #70,0
tagger1     2008:231:00:00:00.4010  #56,-00000
tagger1     2008:231:00:00:00.4210  #72,FF
```

**Geometrics 882 Magnetometer**

The Geometrics 882 magnetometer is towed behind the ship. Raw serial output is logged using LDS. Deployment is dependent upon seismic operations. See the deployment notes below. Except where noted, the source was not deployed when the magnetometer was at 300m, and the source was deployed when the magnetometer was at 100m.

*Magnetometer Deployment Notes*

| Time | Event |
|---|---|
| 2009:124:09:21:03.9619 | Maggie deployed at 100 m |
| 2009:125:01:55:50.4179 | Recovered due to loss of vessel steerage |
| 2009:125:17:31:52.3944 | Deployed at 100 m |
| 2009:128:04:43:58.2583 | Stopped logging data inside 24 nmi zone |
| 2009:128:05:38:36.1541 | Started logging data outside 24 nmi zone |
| 2009:128:14:03:00.0000 | Maggie recovered; sensor misoriented |
| 2009:131:09:35:00.0000 | Deployed at 100 m |
| 2009:132:10:33:00.0000 | Recovered |
| 2009:132:20:10:00.0000 | Deployed at 100 m |
| 2009:133:01:32:00.0000 | Recovered |

| | |
|---|---|
| 2009:134:13:55:00.0000 | Deployed at 100 m |
| 2009:136:19:06:00.0000 | Recovered |
| 2009:137:14:23:00.0000 | Deployed at 100 m |
| 2009:150:00:12:33.9565 | Recovered |
| 2009:150:12:47:03.0107 | Deployed at 100 m |
| 2009:151:19:10:25.3715 | Power failure; recovered |
| 2009:151:19:50:50.2773 | Power back up |
| 2009:151:22:53:00.0000 | Deployed at 100 m |
| 2009:153:21:19:00.0000 | Recovered |

**Logging interval**: 1 second

**File id**: mag01

*Interruptions greater than ten seconds are displayed in the following table.*

| Log Date | Event | Comment |
|---|---|---|
| 2009:124:09:21:03.9619 | | Logging officially started |
| 2009:125:01:55:50.4179 – 2009:125:17:31:52.3944 | Missing data | Instrument recovered due to loss of vessel steerage |
| 2009:128:04:43:58.2583 – 2009:128:05:38:36.1541 | Missing data | Instrument turned off inside 24 nmi zone |
| 2009:150:00:12:33.9565 – 2009:150:12:47:03.0107 | Missing data | Instrument recovered |
| 2009:151:19:10:25.3715 – 2009:151:19:50:50.2773 | Missing data | Power failure |
| 2009:153:04:43:35.2753 | | Logging officially ended |

Mag01 data sample:

```
mag01 2008:185:09:45:58.1820  $107714.673,0042,0024,0110,3533,1143
mag01 2008:185:09:46:01.0333  $ 63703.933,0042,0024,0110,3533,1143
mag01 2008:185:09:46:04.0330  $ 44031.029,0042,0027,0110,3533,1143
```

**SBE-23 Thermosalinograph**

The Seabird TSG output is logged by LDS to the “tsg” set. Output is also converted in real-time and recorded to the “tsgconv” data set.

**File id**: tsg

**Logging interval:** 1 second

*Interruptions greater than ten seconds are displayed in the following table.*

| | | |
|---|---|---|
| 2009:023:19:52:43.0749 | | Logging officially started |
| 2009:127:00:23:20.3430 – 2009:127:00:31:13.1588 | Missing data | Data overflow on wet lab laptop |
| 2009:127:00:31:13.3852 – 2009:127:00:31:45.4945 | Missing data | Data overflow on wet lab laptop |
| 2009:127:00:31:45.6891 – 2009:127:00:33:02.4977 | Missing data | Data overflow on wet lab laptop |
| 2009:127:00:33:02.7160 – 2009:127:00:53:04.8689 | Missing data | Data overflow on wet lab laptop |
| 2009:127:00:53:14.5787 – 2009:127:01:11:45.4241 | Missing data | Data overflow on wet lab laptop |
| 2009:127:01:11:45.6514 – 2009:127:04:21:33.6613 | Missing data | Data overflow on wet lab laptop |
| 2009:127:04:21:38.1610 – 2009:127:04:22:18.6208 | Missing data | Data overflow on wet lab laptop |
| 2009:127:04:22:36.6087 – 2009:127:04:27:18.9170 | Missing data | Data overflow on wet lab laptop |
| 2009:127:07:54:03.7149 – 2009:127:07:55:10.7401 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:47:38.0226 – 2009:127:09:48:59.6862 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:51:58.6322 – 2009:127:09:54:23.6463 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:55:16.6883 – 2009:127:09:56:46.1845 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:56:49.3746 – 2009:127:09:57:37.1483 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:59:03.1150 – 2009:127:09:59:43.6938 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:03:05.7708 – 2009:127:10:08:16.6780 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:08:18.9515 – 2009:127:10:08:49.5908 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:08:49.8596 – 2009:127:10:09:20.5008 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:09:20.8846 – 2009:127:10:09:51.4098 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:10:56.9891 – 2009:127:10:11:27.5265 | Missing data | Data overflow on wet lab laptop |

| | | |
|---|---|---|
| 2009:127:10:14:09.5515 – 2009:127:10:15:57.8727 | Missing data | Data overflow on wet lab laptop |
| 2009:146:02:12:27.5496 – 2009:146:06:40:47.5256 | Missing data | Inside 24 nmi zone; stopped logging hydrographical data |
| 2009:151:19:05:16.8683 – 2009:151:19:54:14.8720 | Missing data | Power failure |
| 2009:155:00:00:00.0000 | | Logging officially ended |

tsg data sample:

```
tsg   2008:231:00:00:01.9179  B479CB5528A6D6ABFB2D
tsg   2008:231:00:00:11.9187  B474CB5428A799ABBB2D
tsg   2008:231:00:00:21.9176  B46FCB5328A70CAB8B2D
```

**File id**: tsgconv

**Logging interval**: 1 second

| | | |
|---|---|---|
| 2009:023:19:52:43.0749 | | Logging officially started |
| 2009:127:00:23:20.3430 – 2009:127:00:31:13.1588 | Missing data | Data overflow on wet lab laptop |
| 2009:127:00:31:13.3852 – 2009:127:00:31:45.4945 | Missing data | Data overflow on wet lab laptop |
| 2009:127:00:31:45.6891 – 2009:127:00:33:02.4977 | Missing data | Data overflow on wet lab laptop |
| 2009:127:00:33:02.7160 – 2009:127:00:53:04.8689 | Missing data | Data overflow on wet lab laptop |
| 2009:127:00:53:14.5787 – 2009:127:01:11:45.4241 | Missing data | Data overflow on wet lab laptop |
| 2009:127:01:11:45.6514 – 2009:127:04:21:33.6613 | Missing data | Data overflow on wet lab laptop |
| 2009:127:04:21:38.1610 – 2009:127:04:22:18.6208 | Missing data | Data overflow on wet lab laptop |
| 2009:127:04:22:36.6087 – 2009:127:04:27:18.9170 | Missing data | Data overflow on wet lab laptop |
| 2009:127:07:54:03.7149 – 2009:127:07:55:10.7401 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:47:38.0226 – 2009:127:09:48:59.6862 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:51:58.6322 – 2009:127:09:54:23.6463 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:55:16.6883 – 2009:127:09:56:46.1845 | Missing data | Data overflow on wet lab |

| | | |
|---|---|---|
| | | laptop |
| 2009:127:09:56:49.3746 – 2009:127:09:57:37.1483 | Missing data | Data overflow on wet lab laptop |
| 2009:127:09:59:03.1150 – 2009:127:09:59:43.6938 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:03:05.7708 – 2009:127:10:08:16.6780 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:08:18.9515 – 2009:127:10:08:49.5908 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:08:49.8596 – 2009:127:10:09:20.5008 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:09:20.8846 – 2009:127:10:09:51.4098 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:10:56.9891 – 2009:127:10:11:27.5265 | Missing data | Data overflow on wet lab laptop |
| 2009:127:10:14:09.5515 – 2009:127:10:15:57.8727 | Missing data | Data overflow on wet lab laptop |
| 2009:146:02:12:27.5496 – 2009:146:06:40:47.5256 | Missing data | Inside 24 nmi zone; stopped logging hydrographical data |
| 2009:151:19:05:16.8683 – 2009:151:19:54:14.8720 | Missing data | Power failure |
| 2009:155:00:00:00.0000 | | Logging officially ended |

tsgconv data sample:

```
tsgconv     2008:231:00:00:01.9179  B479CB5528A6D6ABFB2D 1531.59 28.85 24.35 5.53
33.74
tsgconv     2008:231:00:00:11.9187  B474CB5428A799ABBB2D 1531.61 28.85 24.36 5.53
33.74
tsgconv     2008:231:00:00:21.9176  B46FCB5328A70CAB8B2D 1531.60 28.85 24.35 5.53
33.74
```

**BGM-3 Gravimeter**

**File id**: vc01
**Logging interval**: 1 second

*Interruptions greater than ten seconds are displayed in the following table.*

| | | |
|---|---|---|
| 2009:123:04:41:08.2610 | | Logging officially started |
| 2009:124:02:53:00.3011 – 2009:124:06:17:44.3078 | Missing data | Inside 24 nmi zone; instrument turned off |

| | | |
|---|---|---|
| 2009:151:19:10:25.4716 – 2009:151:19:32:03.4759 | Missing data | Power failure |
| 2009:153:04:43:32.5293 | | Logging officially ended |

**Mk21 XBT System**

**Files: *.RDF,*.EDF**

Many XBT drops were made during this cruise. Refer to the Expendable_Drops spreadsheet in the operations directory of the cruise archive.

# IV. Seismic Summary

## A. Acquisition Parameter Table

| Acquisition Parameter Table | |
|---|---|
| **AcquisitionParameterID** | MGL0906_ACQ01 |
| **FieldActivityID** | MGL0906 |
| **ReceiverType** | Source & Streamer/Ocean-Bottom Seismometer |
| **SourceType** | Airgun |
| **Acquisition System Name** | SIO, WHOI OBS |
| **Acquisition System Type** | OBS |
| **Seismic_Nav_System** | C-Nav primary |
| **Survey_datum** | WGS84 |
| **Navigation Reference Point** | Fore/Aft+4.87 m, Stb/pt +8.055 m, vertical +14.5 m |
| **NRP_to_Antennae** | 4.87 m |
| **NRP to source** | 165 m |
| **Antenna_to_Source** | |
| **Source_to_Near_Channel** | 200 m |
| **Number _of_channels_recorded** | 0 |
| **Number _of_cables** | 1 |
| **Number_of_channels_each_cable** | 468 |
| **Channel_length** | N/A |
| **Cable_length** | 6km |
| **Cable_spacing** | N/A |
| **Near_Channel_Number** | N/A |
| **Cable_depth** | 9m |
| **Number_source_arrays** | 1 |
| **Alternate_Shooting** | No |
| **Source_array_separation** | N/A |
| **Source_volume** | 6600 cu in |
| **Source_pressure** | 2000 psi nominal |
| **Source_make,model** | Bolt |
| **Source_number** | 36 |
| **Source_depth** | 8m |
| **Shot_control** | Distance |
| **Shot_Interval** | 50m, 75m, 100m, 125m, 150m |
| **Sample_interval** | 2ms |
| **Record_length** | 15s, 16s, 20s |
| **Compass_birds** | N/A |
| **Tail_buoy_Positioning** | N/A |
| **Recording_delay** | N/A |

## B. Seismic Overview

The primary objectives of the cruise were survey lines in a 2D survey block using four gun strings set up and one 6 km streamers deployed by Lamont-Doherty Earth Observatory.

## Physical Configuration

The towing configuration for the air guns and streamers is detailed in the document titled ***MGL0906_TowConfig.doc***.

## Offsets

All antenna and in-water offset drawings are in the file ***MGL0906_OffsetConfig.xls***

## Spectra

Spectra was used for all timing and navigation during the cruise. Shotlogs were generated from spectra P190 and P294 files using shotlog processing code contained on the archive in /supplemental/code/shotlog

# V. Client Instrumentation

Multi OBS sites were passing which were deployed by client

## VI. RV Langseth Gravity Tie Information

Insert gravity time info here.

## VII. Archive Contents

Key files are bolded.

| | |
|---|---|
| MGL0906/docs | Cruise documents and logs |
| MGL0906/docs/elog | Cruise elog |
| MGL0906/docs/map | Cruise maps, track map |
| MGL0906/docs/Operations/ | Operations documents |
| MGL0906/docs/Operations/Daily Reports | Cruise Daily Reports from Tech-in-charge |
| MGL0906/docs/Operations/ Issued Clearances | Clearance Documents |
| MGL0906/docs/Operations/Nav_Logs | Seismic navigation logs (spectra) |
| MGL0906/docs/Operations/Observer_Logs | Seismic acquisition logs (gun controller) |
| **MGL0906/docs/Operations/MGL0906_B15_line_log_multi_channel_seismics.xls** | **Master line log table** |
| MGL0906/docs/Operations/ShipmentDocuments | Shipment logs/invoices |
| MGL0906/docs/Operations/StreamerSheets | Streamer logs (deploy/recovery, ballast) |
| MGL0906/docs/Operations/Waypoints | Waypoint files |
| MGL0906/docs/Personnel | Personnel rosters, org chart, bunk and phone lists |
| MGL0906/docs/Report | Cruise Report and supplemental docs |
| **MGL0906/docs/Report/MGL0906_NavReport.doc** | **Seismic navigation report** |
| **MGL0906/docs/Report/MGL0906_DataReport.doc** | **This file** |
| **CruiseData/MGL0906/docs/Report/MGL0906_TowOffset.xls** | **Seismic tow drawings** |
| **MGL0906/docs/Report/ Taiger Final Report** | Job Book with Nav & Technical Support Final Report |
| MGL0906/docs/ScreenCaps | Screen captures |
| MGL0906/docs/tapelogs | Backup tape index / log files |
| MGL0906/processed | Processed data |
| MGL0906/processed/7 Decimal OBS Time | Original Spectra shot time files |
| MGL0906/processed/P190_Post_processed | P190 processed files |
| MGL0906/processed/shotlogs | Spectra shot log files in CSV format |
| MGL0906/processed/Spectra_P190 | Original Spectra P190 fles |
| MGL0906/processed/Spectra_P294 | Original Spectra P294 files |
| MGL0906/processed/svp | Sound velocity profiles |
| MGL0906/raw | Raw data |
| MGL0906/raw/knudsen | Raw Knudsen sub-bottom profiler data |
| MGL0906/raw/multibeam | Raw EM120 data |
| MGL0906/raw/serial | Underway data: gps, tsg, weather, etc. |
| MGL0906/raw/spectra/P1 | Spectra underway p190 |
| MGL0906/raw/spectra/P2 | Raw seismic navigation, p294 |
| MGL0906/raw/spectra/survey | Spectra configuration archive |
| MGL0906/raw/XBT | Raw XBT data |