

# RV Langseth Data Reduction Summary

## MGL0905

Kaohsiung, Taiwan – Kaohsiung, Taiwan

PRELIMINARY

v0.1, 2009-04-29

Lamont-Doherty Earth Observatory, Columbia University

**Wednesday, April 29 08:00:00 2009**

Date	Julian Date	Time	Port
2009-04-01	2009-091	0000 UTC, 0800L	Kaohsiung, Taiwan
2009-04-29	2009-119	0000 UTC, 0800L	Kaohsiung, Taiwan

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MGL0905

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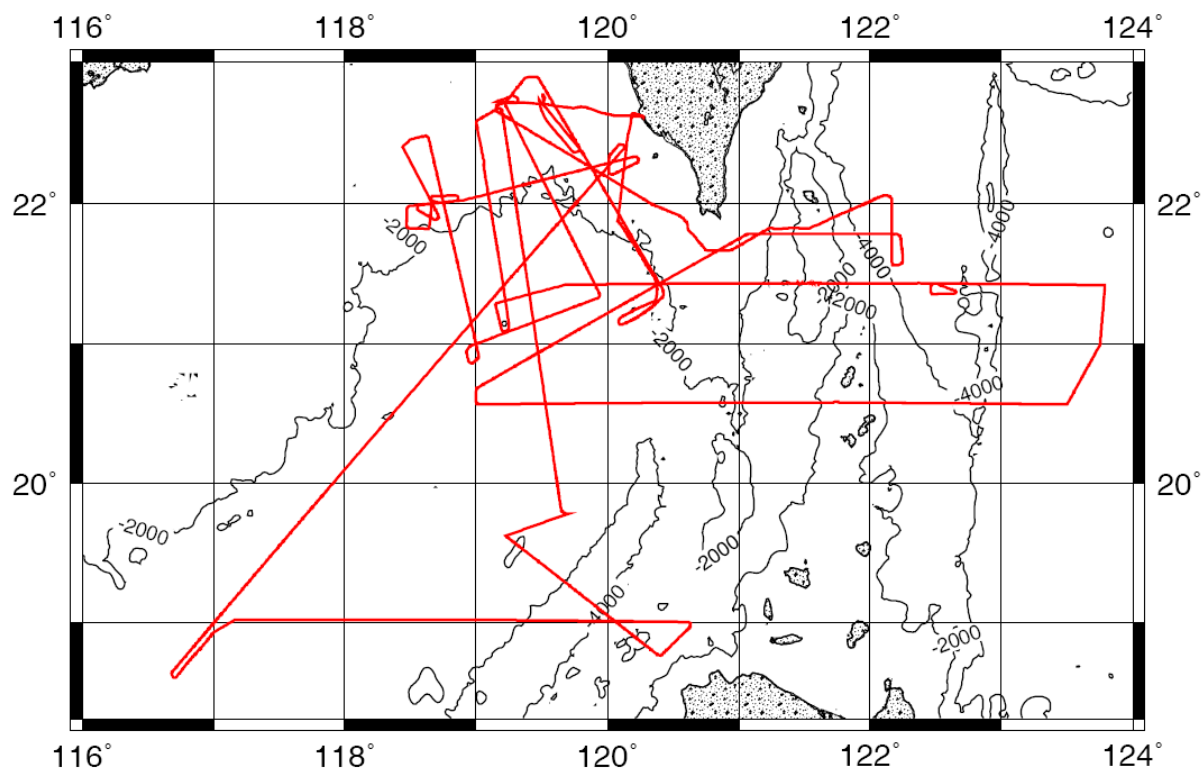
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Please refer to the Langseth Data Report Supplement for information regarding data formats.

## 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.

## II. Personnel

### Science Party

1	Liu, Char-Shine	Chief Scientist	National Taiwan University
2	Wu, Francis Taming	Chief Scientist	SUNY Binghamton
3	Scnhurle, Phillippe	Post Doctor	National Taiwan University
4	Yeh, Yi-Ching	Post Doctor	National Central University
5	Hsu, Ho-Han	Ph.D.	National Taiwan University
6	Hao, Kuo-Chen	Ph.D.	SUNY Binghamton
7	Chung, San-Hsiung	Geologist	Central Geological Survey, Taiwan
8	Hsieh, Chi-Hsun	Petroleum Engineer	China Petroleum Company, Taiwan
9	Saustруп, Steffen	Scientist	UTIG
10	Tsai, Po An	Military Observer	Taiwan Naval Meteorologic & Oceanographic Office
11	Chen, Mei-Yu	Research Assistant	National Taiwan University
12	Chen, Cheng-Yi	Graduate Student	National Taiwan University
13	Hung, Hau-Ting	Graduate Student	National Taiwan University
14	Liao, Shih-Wei	Graduate Student	National Taiwan University

### Shipboard Technical Staff

1	Robert Steinhaus	Technician-in-charge
2	David Martinson	Chief Navigation
3	Michael Zhang	Chief IT
4	Mike Tatро	Chief Acquisition
5	Mike Martello	IT/Nav Watch Stander
6	Ryan Eaton	Acquisition Leader
7	Robbie Gunn	Chief Sound Source Handling
8	Carlos Gutierrez	Sound Source Handling/Watch Leader
9	Brian Goodick	Sound Source Handling/Watch Leader
10	Don Cucchiara	Sound Source Mechanic
11	Richard Harpour	Sound Source Mechanic
12	Giovanni Caltavuturo,	Marine Mammal Observer
13	Bruce MacTavish	Marine Mammal Observer
14	Bradley Dawe	Marine Mammal Observer
15	Brendan Hurley	Marine Mammal Observer
16	Ming-Chang Liu	Marine Mammal Observer

### Ship's Crew

1	Mark Landow	Captain
2	Matthew Bakis	Chief Mate
3	David Woford	2 <sup>nd</sup> Mate
4	Nick Gasper	3 <sup>rd</sup> Mate

5	Jason Woronowicz	Bosun
6	Inocencio Rimando	AB
7	Ricky Redito	AB
8	Petronio Paragas	AB
9	Salvador Oboza,	AB
10	Jeromial Webster	OS
11	Stephen Pica	Chief Engineer
12	Matthew Tucke	1 <sup>st</sup> Asst. Engineer
13	Randall Jaunzemis	2 <sup>nd</sup> Asst. Engineer
14	David Lawson	3 <sup>rd</sup> Asst. Engineer
15	Jack Schwartz	Electrician
16	Rudolfo Florendo	Oiler
17	John Singletary	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	Kongsberg 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.

#### Taiwan 24nm restrict zone and Philippine restrict zone

Maggie(mag01), BGM(vc01), TSG(tsgraw), Knudsen and multibeam are not logged in Taiwan 24nm restrict zone. Multibeam, Knudsen and TSG(tsgraw) are not logged in Philippine restrict zone.

Time	Event	Comment
2009:091:00:00:00.6560 --- 2009:091:05:27:33.8519	Taiwan 24nm restrict zone	
2009:092:13:32:32.9090 --- 2009:093:19:00:47.9594	Taiwan 24nm restrict zone	
2009:098:04:18:01.1486 --- 2009:098:13:41:33.1675	Taiwan 24nm restrict zone	
2009:102:05:35:29.5208 --- 2009:105:04:28:59.1602	Philippine restrict zone	
2009:108:11:23:50.6069 --- 2009:108:19:01:26.6217	Taiwan 24nm restrict zone	
2009:108:22:18:48.6716 --- 2009:112:21:14:38.1845	Philippine restrict zone	
2009:114:15:06:57.9598 --- 2009:115:06:49:37.8816	Taiwan 24nm restrict zone	
2009:115:10:09:47.8645 --- 2009:115:15:31:07.8372	Philippine restrict zone	
2009:115:22:32:02.9381 --- 2009:117:12:35:02.0053	Taiwan 24nm restrict zone	
2009:118:00:57:47.0301 --- 2009:119:00:00:00.0000	Taiwan 24nm restrict zone	

## 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
2009:091:02:21:24.4188		Logging officially started
2009:119:00:39:54.4614		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 except the Taiwan 24nm restriction zone and Philippine restrict zone. 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 MGL0905/multibeam. Center beam depth is recorded separately to serial log. MicroSV sound velocity was used up through April 29. TSG sound velocity was used beginning 19:01 on April 3<sup>rd</sup> (Julian day: 093).

**Logging interval:** variable with water depth

**File id:** bath02

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

Log Date	Event	Comment
2009:091:01:55:56.2290		Logging officially started
2009:091:06:45:27.4856---2009:091:06:49:02.1988	Missing data	Reason unrecorded
2009:092:00:36:46.8417---2009:092:00:39:13.1215	Missing data	Reason unrecorded
2009:092:01:34:48.5640---2009:092:01:37:06.3107	Missing data	Reason unrecorded
2009:092:01:42:28.1322---2009:092:01:45:39.0963	Missing data	Reason unrecorded
2009:092:01:56:46.8621---2009:092:01:59:24.1559	Missing data	Reason unrecorded
2009:092:13:32:35.2104---2009:092:14:13:32.1106	Missing data	Reason unrecorded
2009:115:19:07:38.1625---2009:115:19:10:07.8776	Missing data	Reason unrecorded
2009:115:19:32:32.0837---2009:115:19:34:38.6587	Missing data	Reason unrecorded
2009:115:19:38:25.1238---2009:115:19:40:41.6519	Missing data	Reason unrecorded
2009:115:19:41:50.5877---2009:115:19:44:11.7727	Missing data	Reason unrecorded
2009:115:19:45:54.6911---2009:115:19:49:03.8284	Missing data	Reason unrecorded
2009:115:19:51:17.6059---2009:115:19:56:02.4751	Missing data	Reason unrecorded
2009:115:20:01:46.1858---2009:115:20:05:00.4176	Missing data	Reason unrecorded
2009:115:20:07:07.0705---2009:115:20:09:07.3496	Missing data	Reason unrecorded
2009:115:20:09:15.0833---2009:115:20:12:51.6423	Missing data	Reason unrecorded
2009:115:20:32:25.6328---2009:115:20:35:08.5817	Missing data	Reason unrecorded
2009:117:19:11:37.4103---2009:117:19:14:36.5787	Missing data	Reason unrecorded
2009:117:19:14:36.5787---2009:117:19:21:35.7566	Missing data	Reason unrecorded
2009:117:19:25:33.9542---2009:117:19:27:41.4046	Missing data	Reason unrecorded
2009:119:00:37:26.2457		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
2009:091:00:02:00.1208		Logging officially started
2009:119:00:39:55.7833		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
2009:091:00:00:00.7183		Logging officially started
2009:119:00:39:56.0184		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
2009:091:00:00:00.7183		Logging officially started
2009:119:00:39:55.0174		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
2009:091:00:00:00.6560		Logging officially started
2009:119:00:39:55.1216		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
2009:091:00:00:00.3724		Logging officially started
2009:119:00:39:54.5325		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
2009:091:00:00:00.3222		Logging officially started
2009:119:00:39:37.0607		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
2009:091:00:00:00.7061		Logging officially started
2009:114:02:57:50.2896---2009:114:02:58:29.7483	Missing Data	Reason unrecorded
2009:119:00:39:55.2758		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
2009:092:02:04:04.3416		Logging officially started
2009:106:07:09:55.6886---2009:106:07:10:16.7129	Missing data	Reason unrecorded
2009:119:00:39:55.8621		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.

**Logging interval:** 1 second

**File id:** mag01

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

Log Date	Event	Comment
2009:094:01:29:11.9274		Logging officially started
2009:098:04:18:03.7316---2009:098:13:41:35.2845	Missing data	Maggie powered down, 24nm restrict zone
2009:098:13:41:46.2847---2009:098:21:06:45.1877	Missing data	Reason unrecorded
2009:114:15:07:06.0253---2009:115:06:49:30.6279	Missing data	Maggie powered down,

		24nm restrict zone
2009:118:00:11:54.5246 2009:118:00:12:34.5229	Missing data	Reason unrecorded
2009:118:00:12:48.5231		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.*

2009:091:07:12:27.2568		Logging officially started
2009:092:13:32:30.7087---2009:093:19:00:50.5673	Missing data	Taiwan 24nm restriction zone
2009:098:04:18:00.0324---2009:098:13:41:39.9884	Missing data	Taiwan 24nm restriction zone
2009:098:13:41:39.9884---2009:098:21:06:49.9528	Missing data	Reason unrecorded
2009:102:05:35:29.5208---2009:105:04:28:59.1602	Missing data	Philippine restrict zone
2009:108:22:18:48.6716---2009:109:11:24:48.6066	Missing data	Taiwan 24nm restriction zone
2009:109:11:25:18.6075---2009:112:21:14:28.2197	Missing data	Philippine restrict zone
2009:114:15:06:57.9598---2009:115:06:49:37.8816	Missing data	Taiwan 24nm restriction zone
2009:115:10:09:47.8645---2009:115:15:31:07.8372	Missing data	Philippine restrict zone
2009:118:00:11:47.5459---2009:118:00:12:37.5461	Missing data	Reason unrecorded
2009:119:00:00:47.5440		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



2009:091:07:12:27.2568		Logging officially started
2009:092:13:32:30.7087---2009:093:19:00:50.5673	Missing data	Taiwan 24nm restriction zone
2009:098:04:18:00.0324---2009:098:13:41:39.9884	Missing data	Taiwan 24nm restriction zone
2009:098:13:41:39.9884---2009:098:21:06:49.9528	Missing data	Reason unrecorded
2009:102:05:35:29.5208---2009:105:04:28:59.1602	Missing data	Philippine restrict zone
2009:108:22:18:48.6716---2009:109:11:24:48.6066	Missing data	Taiwan 24nm restriction zone
2009:109:11:25:18.6075---2009:112:21:14:28.2197	Missing data	Philippine restrict zone
2009:114:15:06:57.9598---2009:115:06:49:37.8816	Missing data	Taiwan 24nm restriction zone
2009:115:10:09:47.8645---2009:115:15:31:07.8372	Missing data	Philippine restrict zone
2009:118:00:11:47.5459---2009:118:00:12:37.5461	Missing data	Reason unrecorded
2009:119:00:00:47.5440		Logging officially ended

tsgconv data sample:

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

### BGM-3 Gravimeter

**File id:** vc01

**Logging interval:** 1 second

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

2009:091:05:27:33.8519		Logging officially started
2009:091:10:17:12.8597---2009:091:10:17:31.8586	Missing data	Reason unrecorded
2009:092:13:32:32.9090---2009:093:19:00:47.9594	Missing data	Taiwan 24nm restriction zone
2009:098:04:18:01.1486---2009:098:13:41:33.1675	Missing data	Taiwan 24nm restriction zone
2009:098:13:41:43.1678---2009:098:21:06:43.1839	Missing data	Reason unrecorded
2009:108:11:23:50.6069---2009:108:19:01:26:6217	Missing data	Taiwan 24nm restriction zone
2009:114:15:07:03.8793---2009:115:06:49:27.9060	Missing data	Taiwan 24nm restriction zone
2009:118:00:11:53.0277 2009:118:00:12:32.0264	Missing data	Reason unrecorded
2009:118:00:00:47.0301		Logging officially ended

## **PCO2**

**File id:** pco2

**Logging interval:** 160 second

PCO2 is not used in this cruise

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

## **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	MGL0905_ACQ01
FieldActivityID	MGL0905
ReceiverType	Hydrophone Streamer
SourceType	Airgun
Acquisition System Name	Syntron Syntrack 960
Acquisition System Type	Digital
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	193.70 m
Antenna_to_Source	198.57 m
Source_to_Near_Channel	179 m
Number_of_channels_recorded	468
Number_of_cables	1
Number_of_channels_each_cable	480
Channel_length	12.5 m
Cable_length	6000 m
Cable_spacing	N/A
Near_Channel_Number	468
Cable_depth	9.0 m
Number_source_arrays	1
Alternate_Shooting	No
Source_array_separation	6 m
Source_volume	6600 cu in
Source_pressure	2000 psi nominal
Source_make,model	Bolt
Source_number	40 (10 guns per string)
Source_depth	8.0 m
Shot_control	Distance
Shot_Interval	50m
Sample_interval	2 ms
Record_length	15 sec, 16 sec.
Compass_birds	Yes
Tail_buoy_Positioning	Yes
Recording_delay	No

### 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 ***MGL0905\_TowConfig.doc***. All antenna, vessel, and in water equipment offsets are also detailed in the aforementioned document.

## **Offsets**

All antenna, vessel, and in water equipment offsets are in the file ***MGL0905\_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

CruiseID PRE MGL0905  
Date 31 March, 2009  
Port Kaohsiung, Taiwan  
Operator Mike Tatro / Ryan Eaton

Pier side Reading #1 (outbound)  
Ship's position (Seapath)  
LAT 22d37'10.54"North LONG 120d16'63.85"East

Height of Pier over Main Deck -1.5 meters  
Portable GPS Time TIME 08:01 start,08:15 end  
Portable GPS Position LAT 22d37'07.10"North LONG 120d16'37.4"East

L&R Readings	Reading1	2275.83
	Reading2	2277.40
	Reading3	2278.11
	Ave.	2277.11

## VII. Archive Contents

Key files are bolded.

MGL0905/docs	Cruise documents and logs
MGL0905/docs/elog	Cruise elog
MGL0905/docs/map	Cruise maps, track map
MGL0905/docs/Operations/	Operations documents
MGL0905/docs/Operations/Daily Reports	Cruise Daily Reports from Tech-in-charge
MGL0905/docs/Operations/ Issued Clearances	Clearance Documents
MGL0905/docs/Operations/Nav_Logs	Seismic navigation logs (spectra)
MGL0905/docs/Operations/Observer_Logs	Seismic acquisition logs (gun controller)
<b>MGL0905/docs/Operations/MGL0905_B15_line_log_multi_channel_seismics.xls</b>	<b>Master line log table</b>
MGL0905/docs/Operations/ShipmentDocuments	Shipment logs/invoices
MGL0905/docs/Operations/StreamerSheets	Streamer logs (deploy/recovery, ballast)
MGL0905/docs/Operations/Waypoints	Waypoint files
MGL0905/docs/Personnel	Personnel rosters, org chart, bunk and phone lists
MGL0905/docs/Report	Cruise Report and supplemental docs
<b>MGL0905/docs/Report/MGL0905_NavReport.doc</b>	<b>Seismic navigation report</b>
<b>MGL0905/docs/Report/MGL0905_DataReport.doc</b>	<b>This file</b>
<b>Cruisedata/MGL0905/docs/Report/MGL0905_TowOffset.xls</b>	<b>Seismic tow drawings</b>
<b>MGL0905/docs/Report/Sequence_Report.xls</b>	<b>Sequence report</b>
<b>MGL0905/docs/Report/ Taiger Final Report</b>	<b>Job Book with Nav &amp; Technical Support Final Report</b>
MGL0905/docs/ScreenCaps	Screen captures
MGL0905/docs/tapelogs	Backup tape index / log files
MGL0905/processed	Processed data
MGL0905/processed/7 Decimal OBS Time	Original Spectra shot time files
MGL0905/processed/P190_Post_processed	P190 processed files
MGL0905/processed/shotlogs	Spectra shot log files in CSV format
MGL0905/processed/Spectra_P190	Original Spectra P190 fles

MGL0905/processed/Spectra_P294	Original Spectra P294 files
MGL0905/processed/svp	Sound velocity profiles
MGL0905/raw	Raw data
MGL0905/raw/knudsen	Raw Knudsen sub-bottom profiler data
MGL0905/raw/multibeam	Raw EM120 data
MGL0905/raw/serial	Underway data: gps, tsg, weather, etc.
MGL0905/raw/spectra/P1	Spectra underway p190
MGL0905/raw/spectra/P2	Raw seismic navigation, p294
MGL0905/raw/spectra/survey	Spectra configuration archive
MGL0905/raw/XBT	Raw XBT data