Schlumberger

Company: **International Ocean Discovery Program**

Well: **Expedition 369, Site U1513E**
Field: **Australia Cretaceous Climate & Tectonics**
Rig: **JOIDES Resolution** Ocean: **Indian**

Rig: JOIDES Resolution
Field: Australia Cretaceous Climate & T
Location: Latitude: S 33.79365*'
Well: Expedition 369, Site U1513E
Company: International Ocean Discovery Pr

Versatile Seismic Imager (VSI)
Gamma Ray (EDTC)

LOCATION

Latitude: S 33.79365*'
Longitude: E 112.48534*

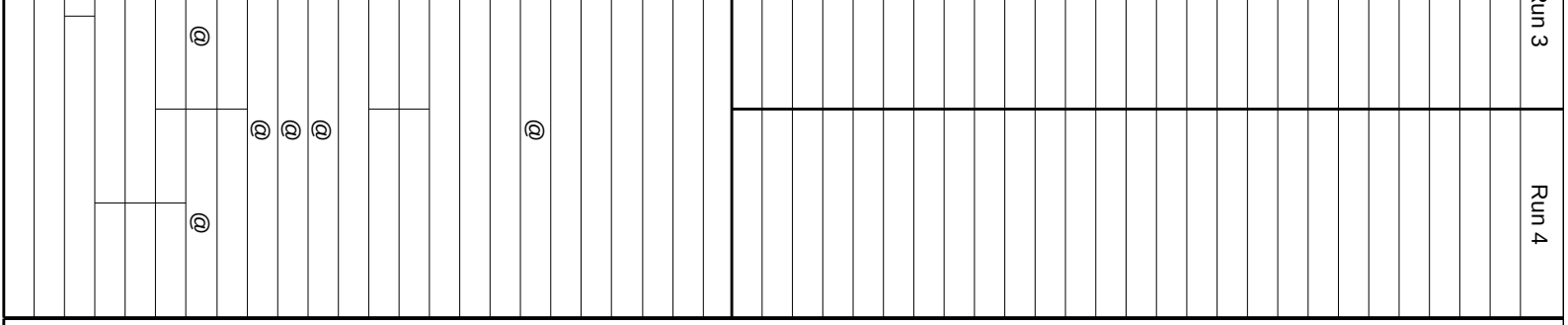
Elev.: K.B. 0.00 m
G.L. −2800.00 m
D.F. 0.00 m

Permanent Datum: Sea Floor — Elev.: −2800.00 m
Log Measured From: Rig Floor — 2800.00 m above Perm. Datum
Drilling Measured From: Rig Floor

API Serial No.	Max. Hole Devi. 1.67 deg	Longitude E 112.48534	Latitude S 33.79365

	Run 1	Run 2	Run 3
Logging Date	23−Nov−2017		
Run Number	1		
Depth Driller	3574 m		
Schlumberger Depth	3440 m		
Bottom Log Interval	3440 m		
Top Log Interval	2801 m		
Casing Driller Size @ Depth	5.500 in @ 3226.5 m	@	@
Casing Schlumberger	3224 m		
Bit Size	9.875 in		
Type Fluid In Hole	Sepiolite		
MUD Density / Viscosity	1.258 g/cm3		
MUD Fluid Loss / PH	/ 8.07		
MUD Source Of Sample	Mudpit		
RM @ Measured Temperature	@ 23 degC	@	@
RMF @ Measured Temperature	@	@	@
RMC @ Measured Temperature	@	@	@
Source RMF / RMC	N/A / N/A		
RM @ MRT / RMF @ MRT	@ 19 / @ 19	@ / @	@ / @
Maximum Recorded Temperatures	19 degC		
Circulation Stopped Time	22−Nov−2017 20:00		
Logger On Bottom Time	23−Nov−2017 11:50		
Unit Number / Location	627314 Larose, LA		
Recorded By	K. Swain		
Witnessed By	M. Jones, Z. Mateo, L. White		

	Run 1	Run 2	Run 3
Logging Date			
Run Number			
Depth Driller			
Schlumberger Depth			
Bottom Log Interval			
Top Log Interval			
Casing Driller Size @ Depth	@		
Casing Schlumberger			
Bit Size			
Type Fluid In Hole			
MUD Density / Viscosity	/		
MUD Fluid Loss / PH	/		
MUD Source Of Sample			
RM @ Measured Temperature	@		
RMF @ Measured Temperature	@		
RMC @ Measured Temperature	@		
Source RMF / RMC	/		
RM @ MRT / RMF @ MRT	@ / @		
Maximum Recorded Temperatures			
Circulation Stopped Time			
Logger On Bottom Time			
Unit Number / Location	/		
Recorded By			
Witnessed By			



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OTHER SERVICES1	OTHER SERVICES2
OS1:	OS1:
OS2: FMS	OS2:
OS3: DSI/HRLA/HLDS/APS	OS3:
OS4: HNGS	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Hole drilled with RCB bottom hole assembly (BHA) at 9−7/8" BS	
Bit dropped using Mechanical Bit Release (MBR) prior to logging.	
Drilled TD was 3574mbrf.	
Drill pipe set at 3226.5mbrf and also later at 2919.3mbrf.	
Tcombo run with upper part eccentralized, lower centralized with MCD tools. See toolsketch.	
Fluid type was Sepeolite mud weighted with Barite to a density of ppg (g/cc)	
Depth recorded from drill floor; logs presented as−logged without depth corrections or shifts, as per client instructions.	
All logs presented in wireline measured depth below rig floor (MDBRF).	
Caliper opened during upward passes; closed inside pipe.	
Hole size corrections made using caliper measurements for upward passes.	
APS porosity shut off in drill pipe and on downlog to avoid activation.	
AHC used from TD then switched off to facilitate pipe entry.	
10.5 lb/gal mud pumped in hole prior to logging.	
Run 2 VSI/EDTC with 2 air guns at 7m and hydraphone at 9m, see geometry.	
Multiple attempts made with 5 logging runs including VSI and FMS.	
Run 1 utilized a hole finder on bottom of HNGC.	
Run 4 utilized FMS with APS.	

RUN 1

SERVICE ORDER #:
PROGRAM VERSION: 19C0−187
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

RUN 2

SERVICE ORDER #:
PROGRAM VERSION:
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1

SURFACE EQUIPMENT

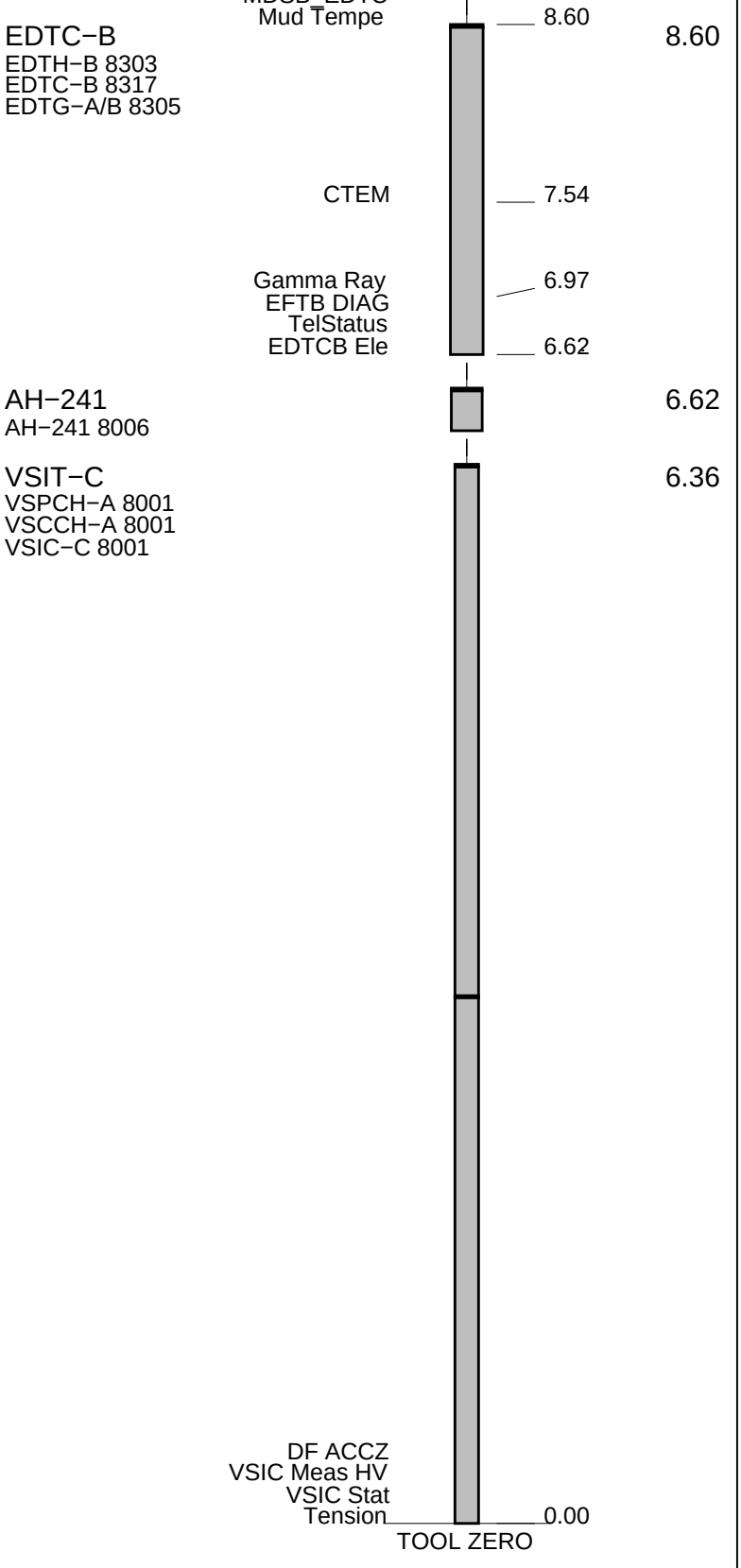
WSAM 808
WITM (EDTS)−A 1

DOWNHOLE EQUIPMENT

LEH−QT 9.49
LEH−QT 301

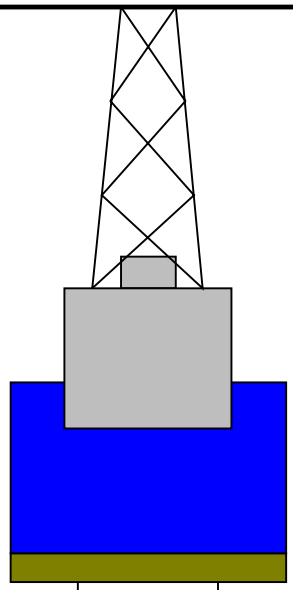
MDSB, EDTC

RUN 2



MAXIMUM STRING DIAMETER 3.63 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Production String	(in) OD	(in) ID	(M) MD	Well Schematic	(M) MD	(in) OD	(in) ID	Casing String

	OD	ID	MD		MD	OD	ID	
Kelly Bushing Elevation			0					
Derrick Floor Elevation			0					
Mean Sea Level			11					
						4.1		
					2800	4.1		Sea Floor
					2919.3		9.875	Open Hole
					3226.5			
					3574			Total Depth

General Information

Survey Type	Zero Offset VSP
Surface Recording Length	500.0 ms
Suface Sampling Rate	1.0 ms
Downhole Recording Length	5000.0 ms
Downhole Sampling Rate	1.0 ms
Top of Survey	3051.1 m
Bottom of Survey	3440.2 m
Number of Shots	34
Number of Downhole Traces	34
Number of Downhole Traces used for Processing	3

Stack Summary Listing (1/1) from VSI_002_A-IODP-DualGun_geo_wavefield_z.ldf

Stack Number	Measured Depth [m]	True Vertical Depth [m]	Measured Time [s]	One-way Vertical Time [s]	Two-way Vertical Time [s]	Interval Velocity [m/s]	Average Velocity [m/s]	RMS Velocity [m/s]
	0	0	0	0	0			
9	3326.1	3315.1	2.1582					
6	3374.1	3363.1	2.1827					
1	3440.2	3429.2	2.2261					

Shot Summary Listing (1/1)

Measured Depth [m]	Tool Number	Stack Number	Relative Bearing [deg]	Caliper [in]	Anchoring force [kg]	Shot number
3326.1	1	9	0.7	13.5	713.4	17
3374.1	1	6	-4.2	10.8	773.5	12
3440.2	1	1	-4.9	9.1	653.5	2

Observer's Note (1/1)

Well depth [m]	Time	Shot Type	Shot#	Stack#	Source	Remarks
3440.2	15:24:37	SHOT	1	1	A-IODP-DualGun	
3440.2	15:26:56	SHOT	2	1	A-IODP-DualGun	
3440.2	15:29:29	SHOT	3	2	A-IODP-DualGun	
3440.2	15:29:47	SHOT	4	2	A-IODP-DualGun	
3440.2	15:30:41	SHOT	5	2	A-IODP-DualGun	
3426.1	15:36:06	SHOT	6	3	A-IODP-DualGun	
3426.1	15:36:28	SHOT	7	3	A-IODP-DualGun	
3426.1	15:37:13	SHOT	8	3	A-IODP-DualGun	
3426.1	15:38:25	SHOT	9	3	A-IODP-DualGun	
3401.1	15:44:04	SHOT	10	4	A-IODP-DualGun	
3401.1	15:44:36	SHOT	11	4	A-IODP-DualGun	
3374.1	15:55:21	SHOT	12	6	A-IODP-DualGun	
3374.1	16:01:48	SHOT	13	7	A-IODP-DualGun	
3351.1	16:07:50	SHOT	14	8	A-IODP-DualGun	
3351.1	16:08:34	SHOT	15	8	A-IODP-DualGun	
3326.1	16:13:44	SHOT	16	9	A-IODP-DualGun	
3326.1	16:15:07	SHOT	17	9	A-IODP-DualGun	
3326.1	16:16:00	SHOT	18	9	A-IODP-DualGun	
3301.0	16:20:25	SHOT	19	10	A-IODP-DualGun	
3276.1	16:28:54	SHOT	20	12	A-IODP-DualGun	
3261.1	16:35:23	SHOT	21	13	A-IODP-DualGun	

3261.1	16:36:33	SHOT	22	13	A-IODP-DualGun	
3256.0	16:40:02	SHOT	23	14	A-IODP-DualGun	
3246.0	16:46:25	SHOT	24	15	A-IODP-DualGun	
3246.0	16:47:32	SHOT	25	15	A-IODP-DualGun	
3246.0	16:48:11	SHOT	26	15	A-IODP-DualGun	
3151.1	17:07:19	SHOT	27	16	A-IODP-DualGun	
3151.1	17:08:25	SHOT	28	16	A-IODP-DualGun	
3151.1	17:08:43	SHOT	29	16	A-IODP-DualGun	
3151.1	17:10:59	SHOT	30	16	A-IODP-DualGun	
3051.1	17:19:39	SHOT	31	17	A-IODP-DualGun	
3051.1	17:20:01	SHOT	32	17	A-IODP-DualGun	
3051.1	17:20:21	SHOT	33	17	A-IODP-DualGun	
3051.1	17:20:42	SHOT	34	17	A-IODP-DualGun	

Source Configuration (Air Gun)

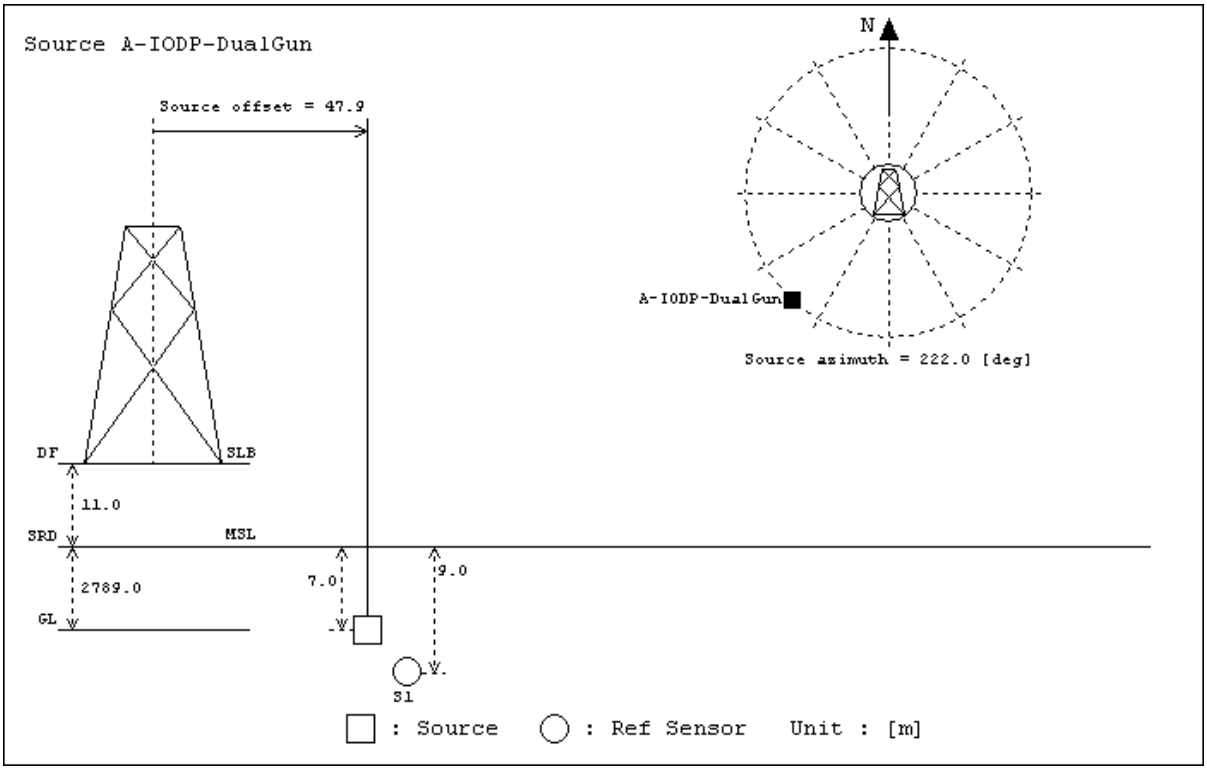
Source Location (Rig, Boat, Pit, Borehole)	
Source Group ID (A, B, C, …)	
Source Offset (for fixed offset)	
Source Azimuth (for fixed offset)	
Source Depth from Surface	
Source Depth from Logging Zero	

Gun Controller Type	
Gun Controller Model Name	
Gun Controller Serial Number	
Gun Type	
Gun Serial Number(s)	
Gun Configuration (3 Gun Cluster, Gun Array, etc.)	
Gun Chamber Volumes	
Gun Pit/Borehole Information	
Compressor Type	
Compressor Flow Rate	
Air Regulator Pressure	

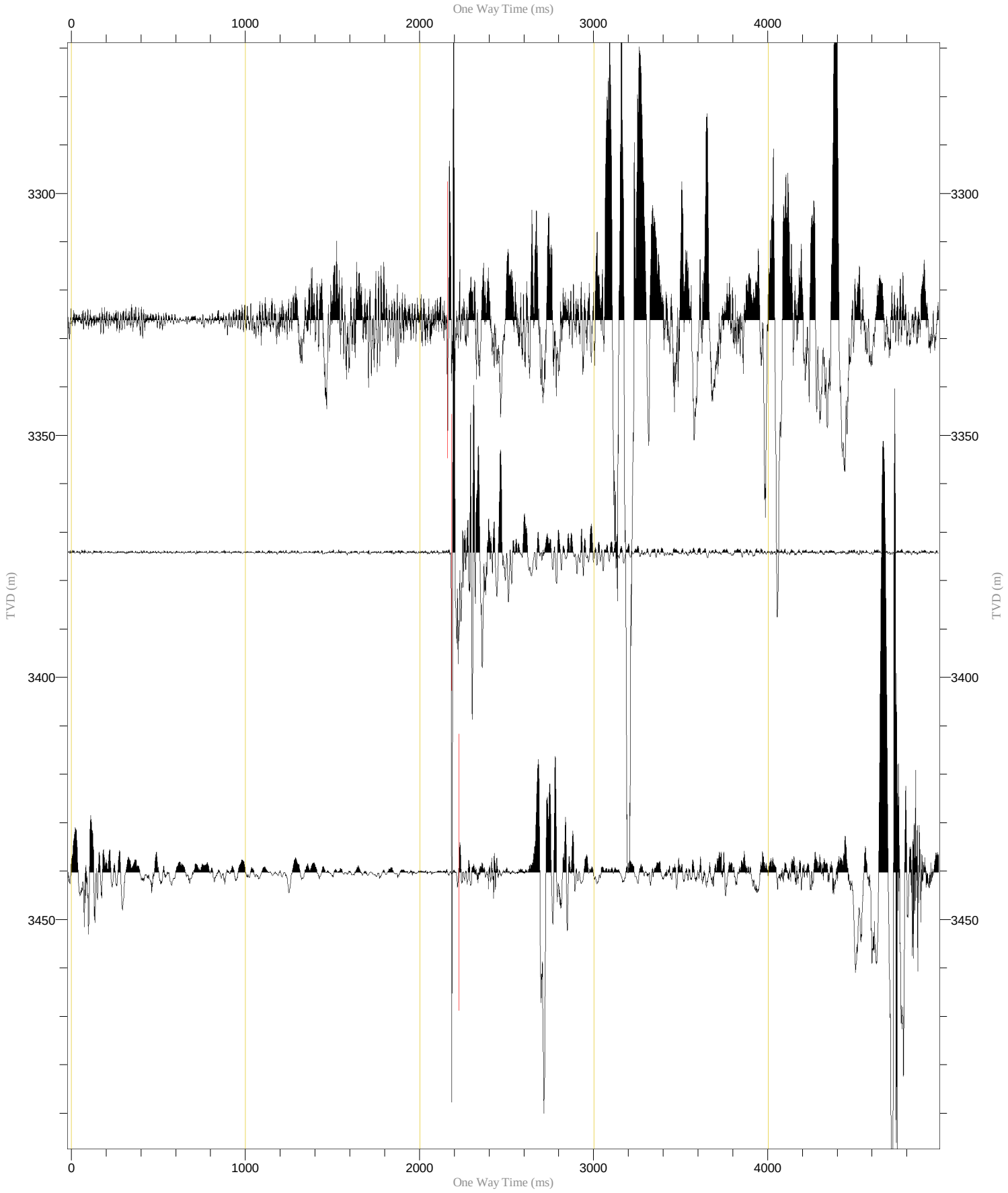
Surface Sensor Configuration

Number of Surface Reference Sensors	
Surface Recording Length	
Surface Sampling Rate	
Sensor Type (S1)	
Sensor Type (S2)	
Sensor Type (S3)	
Sensor Depth from Surface (S1)	
Sensor Depth from Surface (S2)	
Sensor Depth from Surface (S3)	
Sensor Depth from Logging Zero (S1)	
Sensor Depth from Logging Zero (S2)	
Sensor Depth from Logging Zero (S2)	
Sensor Offset from Source (S1)	
Sensor Offset from Source (S2)	
Sensor Offset from Source (S3)	

Source Geometry Sketch



Raw Stack (Z)	Normalization Trace by Trace (250%) Polarity Normal One Way Time (ms) Scaling 3.4 cm/sec, 1/1050	



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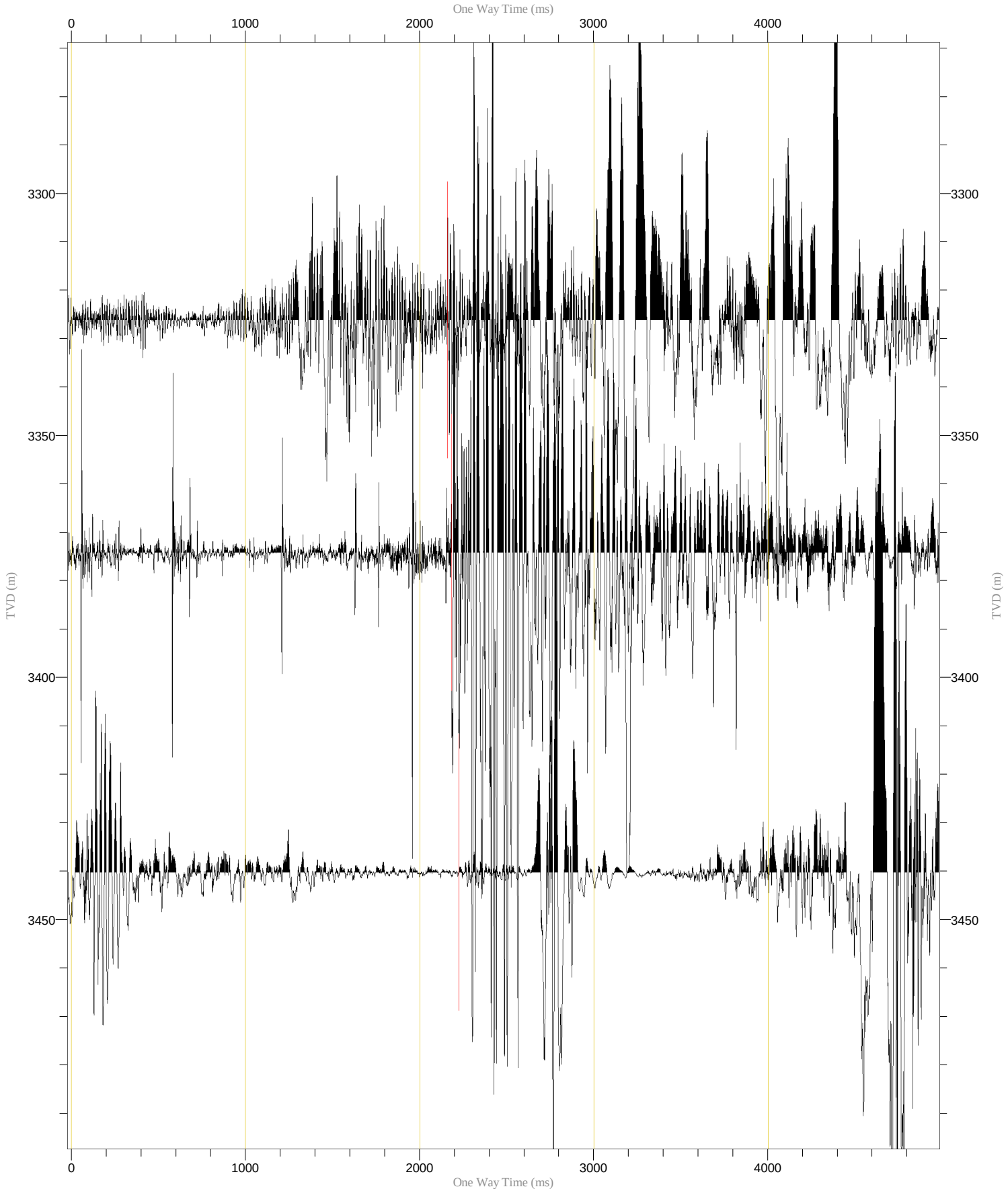
Raw Stack (X)	Normalization Trace by Trace (250%) Polarity Normal One Way Time (ms) Scaling 3.4 cm/sec, 1/1050	



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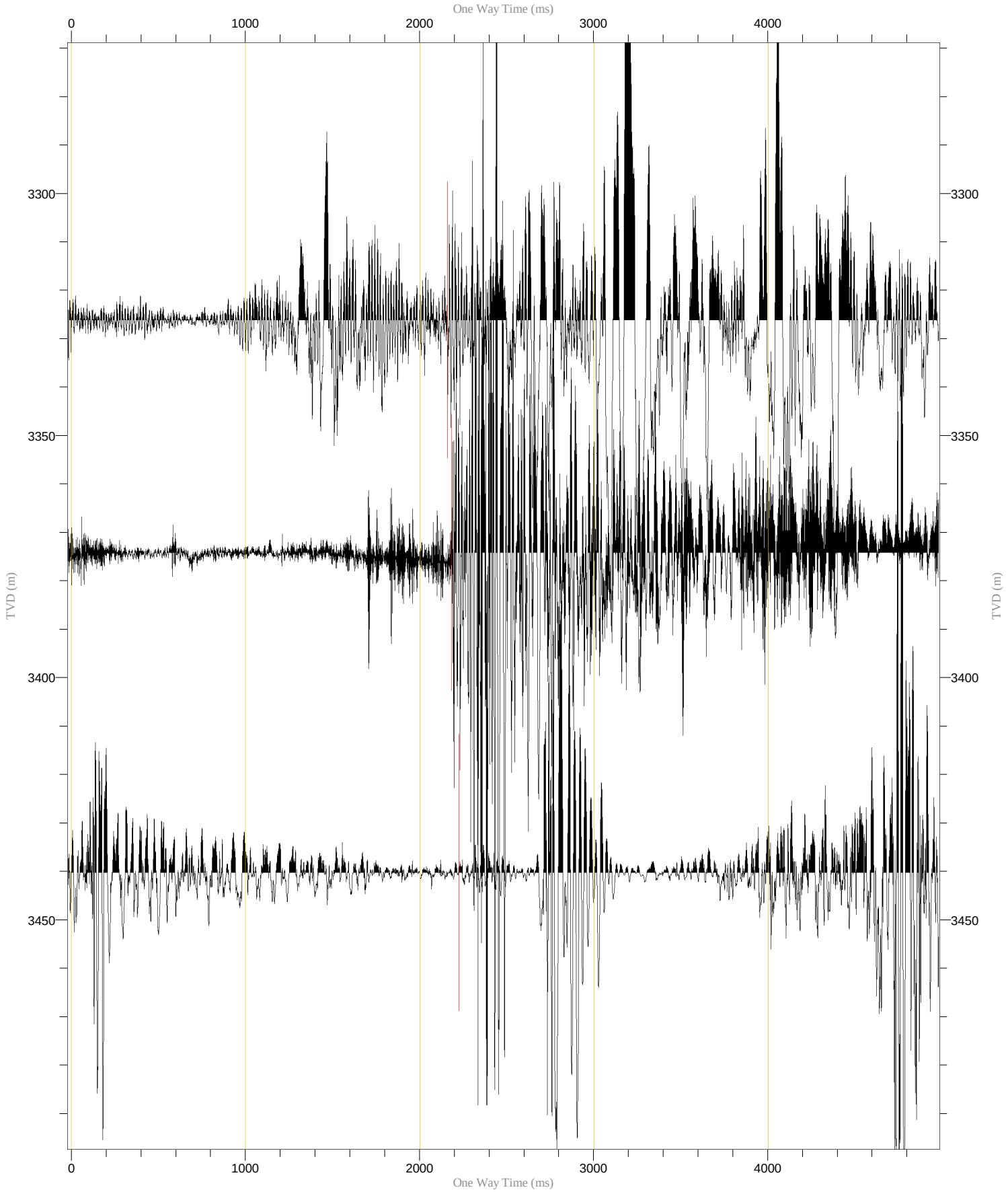
Raw Stack (Y)	Normalization Trace by Trace (250%) Polarity Normal One Way Time (ms) Scaling 3.4 cm/sec, 1/1050	



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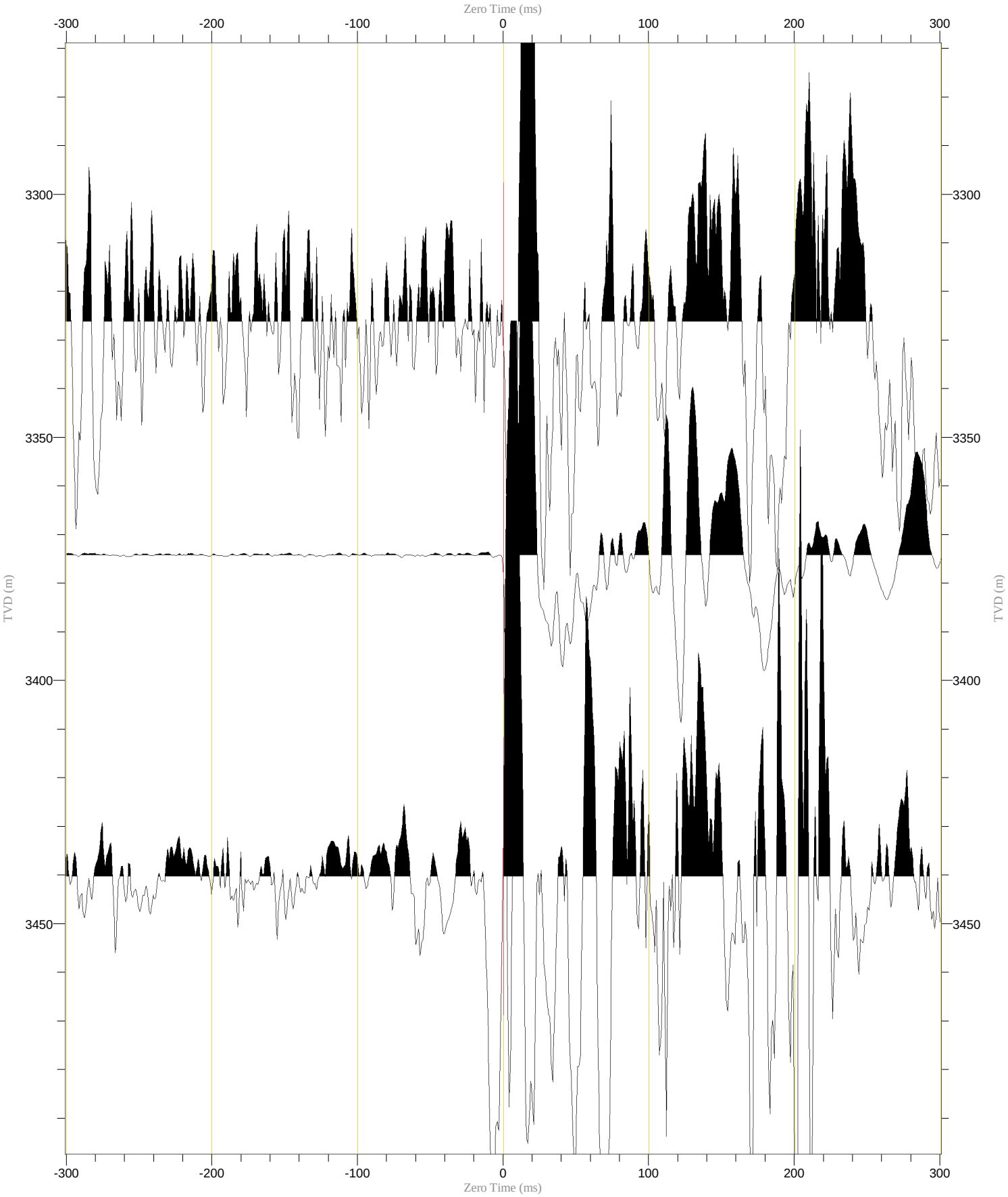
Raw Stack (Z) (Magnified)	Normalization Trace by Trace (250%) Polarity Normal Zero Time (ms) Scaling 28.5 cm/sec, 1/1050	



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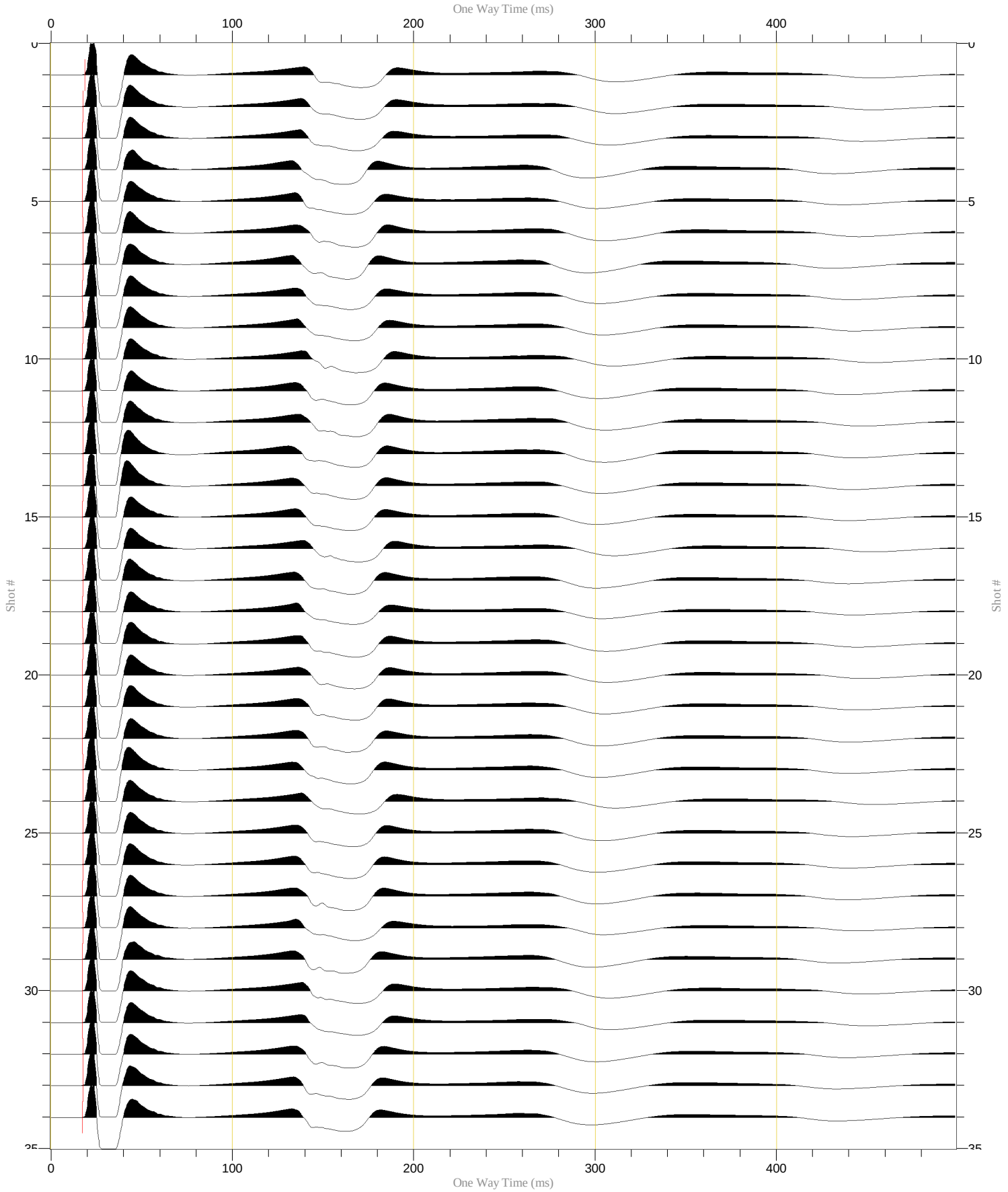
Source Sensor Signature	Normalization Trace by Trace (100%) Polarity Normal One Way Time (ms) Scaling 35.67 cm/sec, 1.61/cm	



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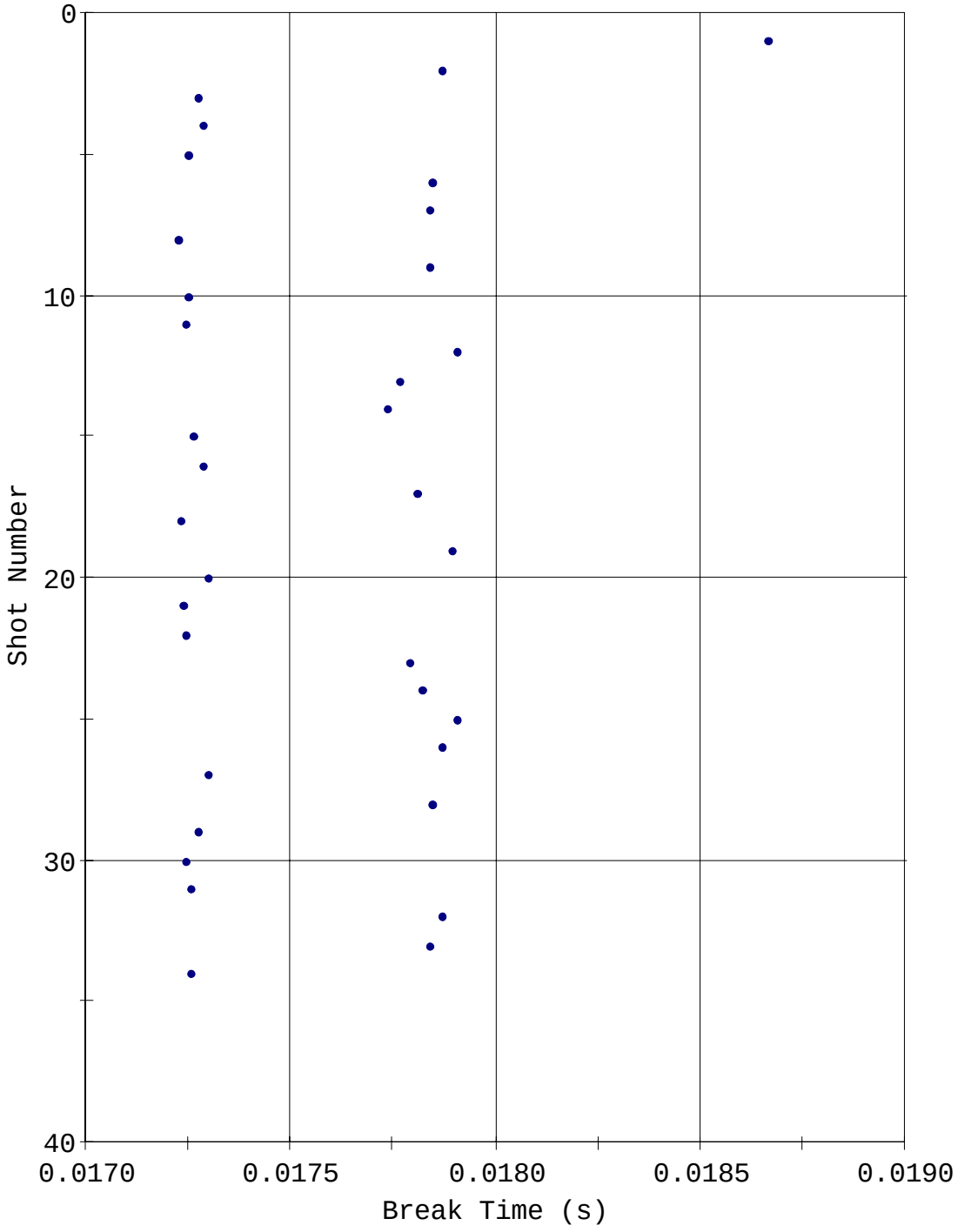
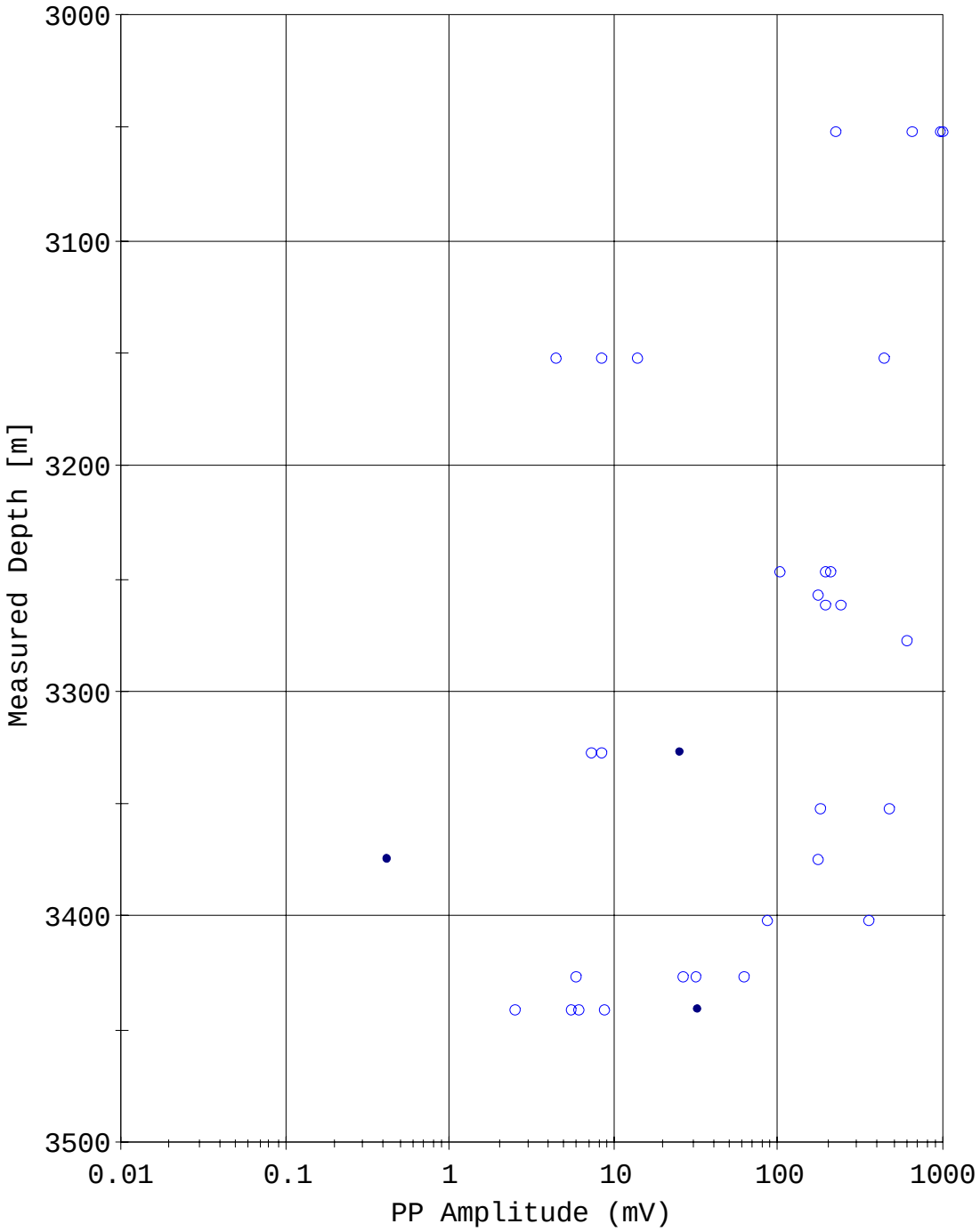
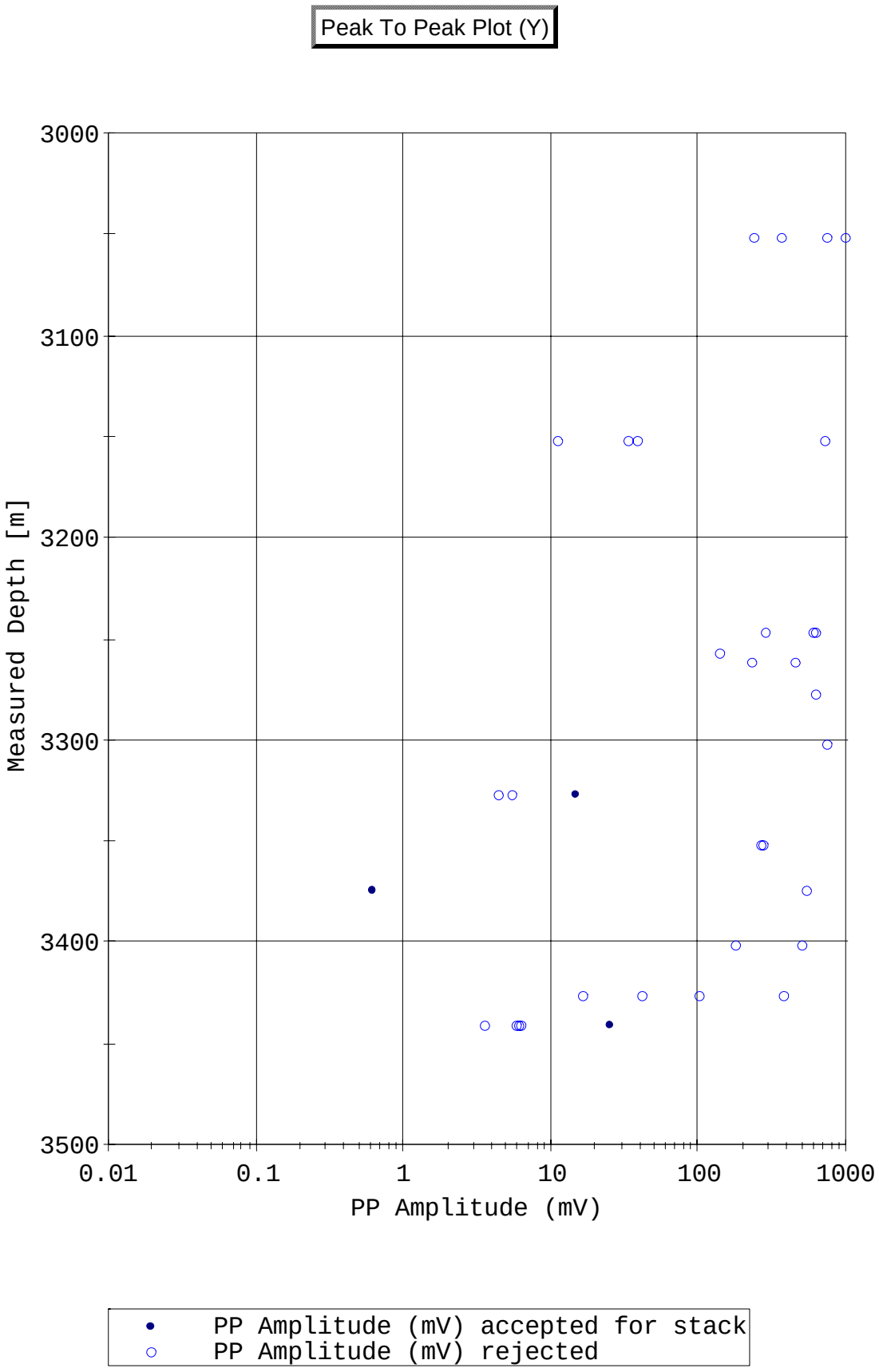
Surface Sensor QC Plot Page

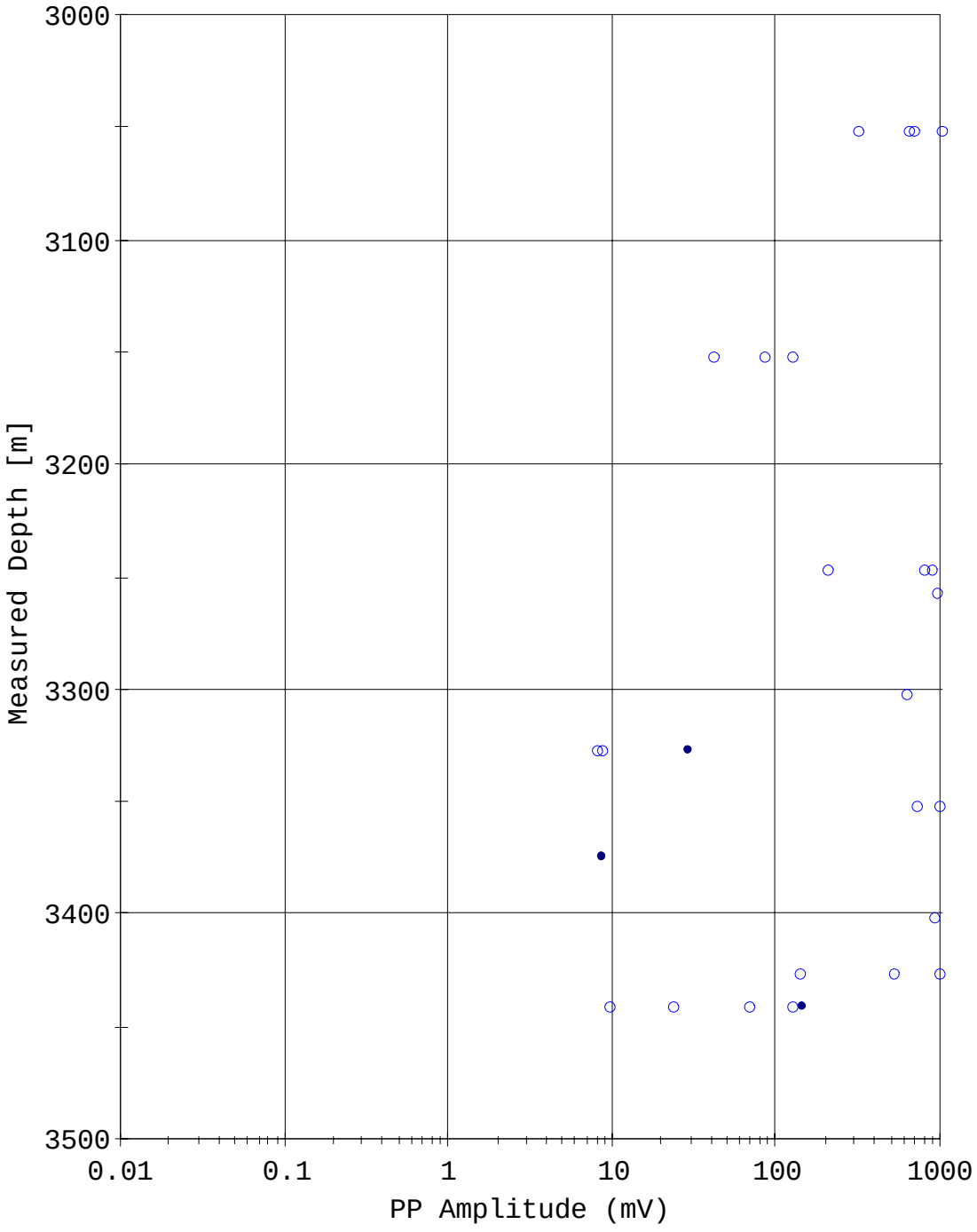


Peak To Peak Plot (X)

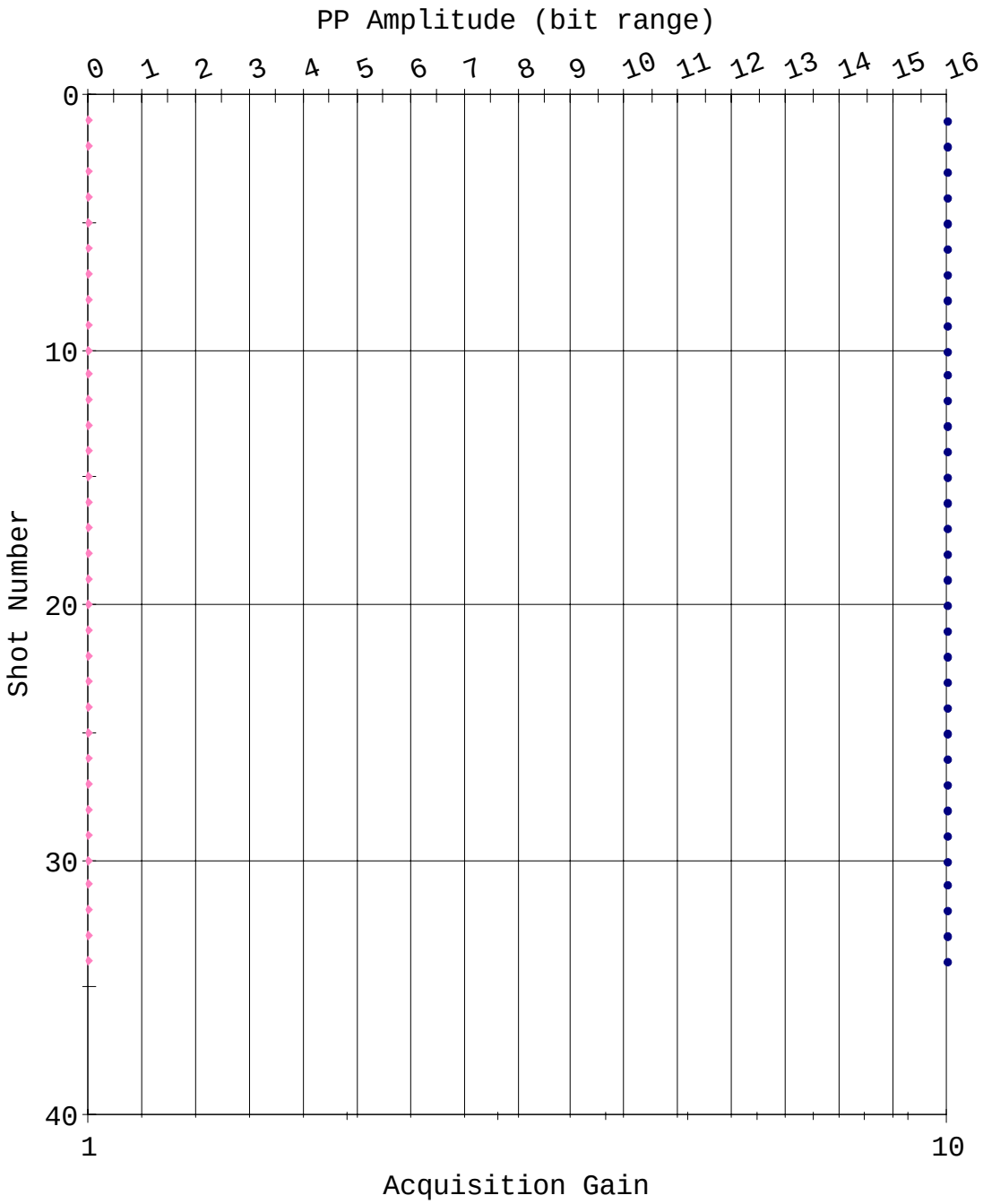



Peak To Peak Plot (Y)
3000
3100
3200
3300
3400
3500
Measured Depth [m]
0.01
0.1
1
10
100
1000
PP Amplitude (mV)
PP Amplitude (mV) accepted for stack
PP Amplitude (mV) rejected

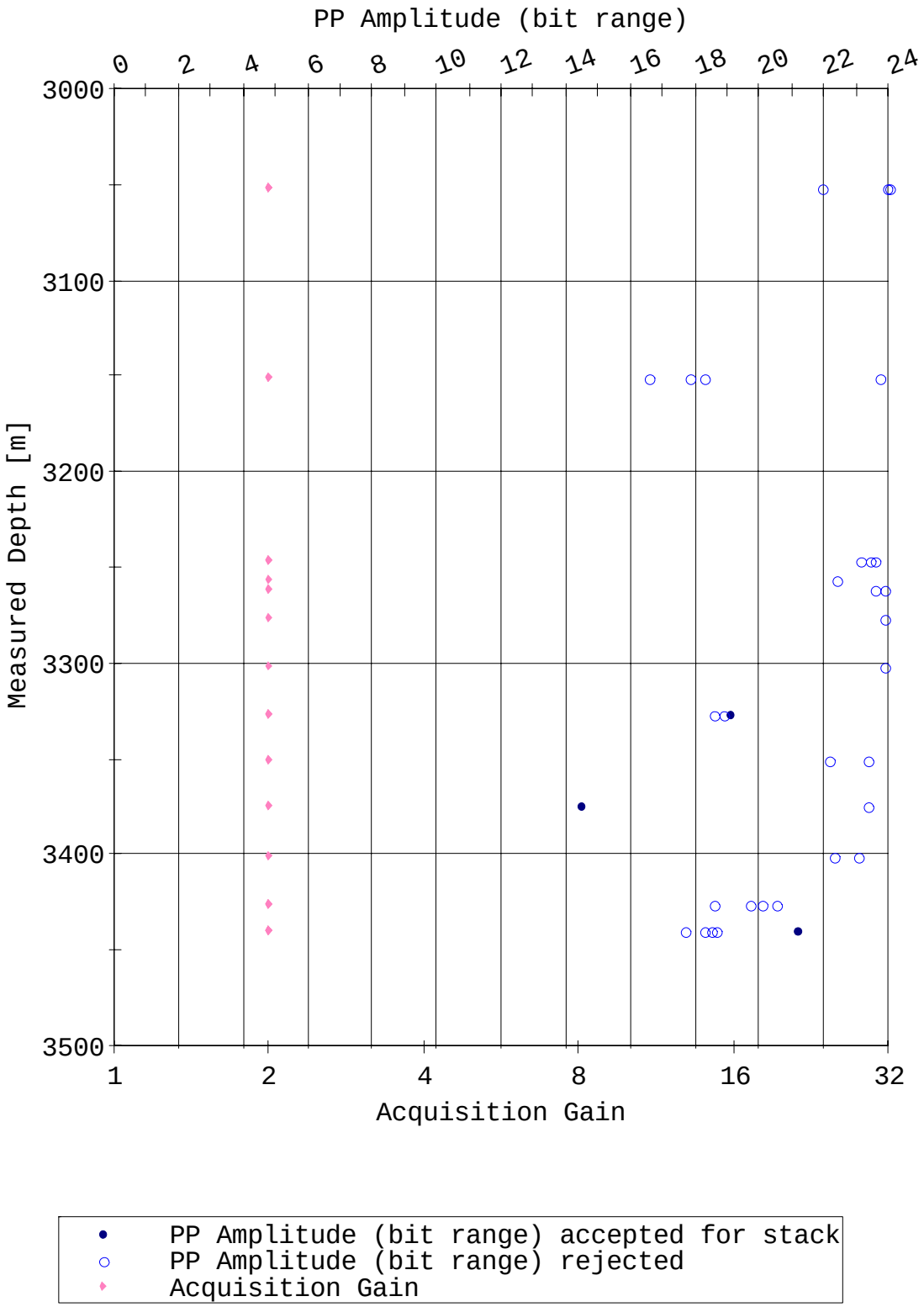
Peak To Peak Plot (Z)



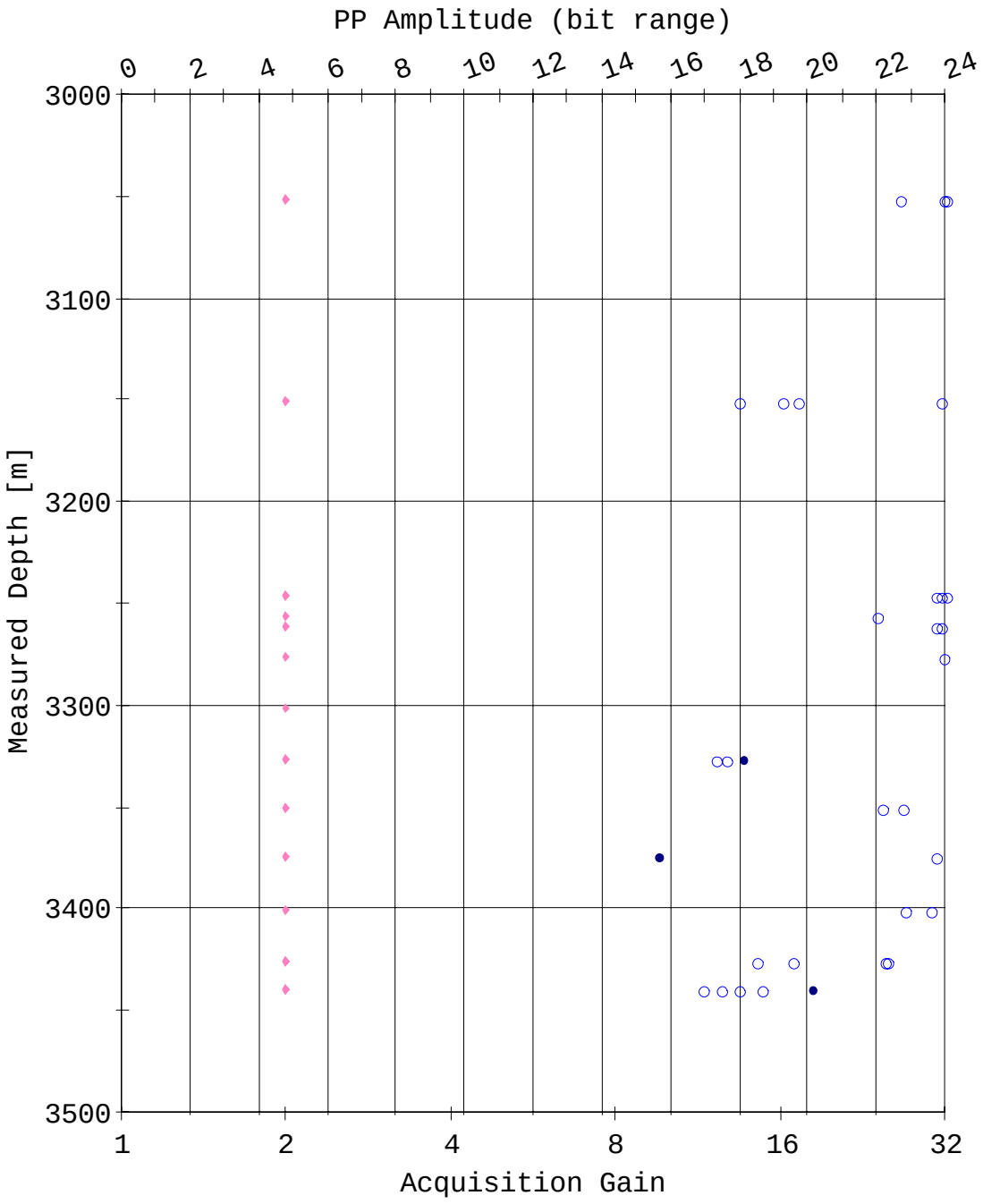
Amplitude QC Plot (Surface)



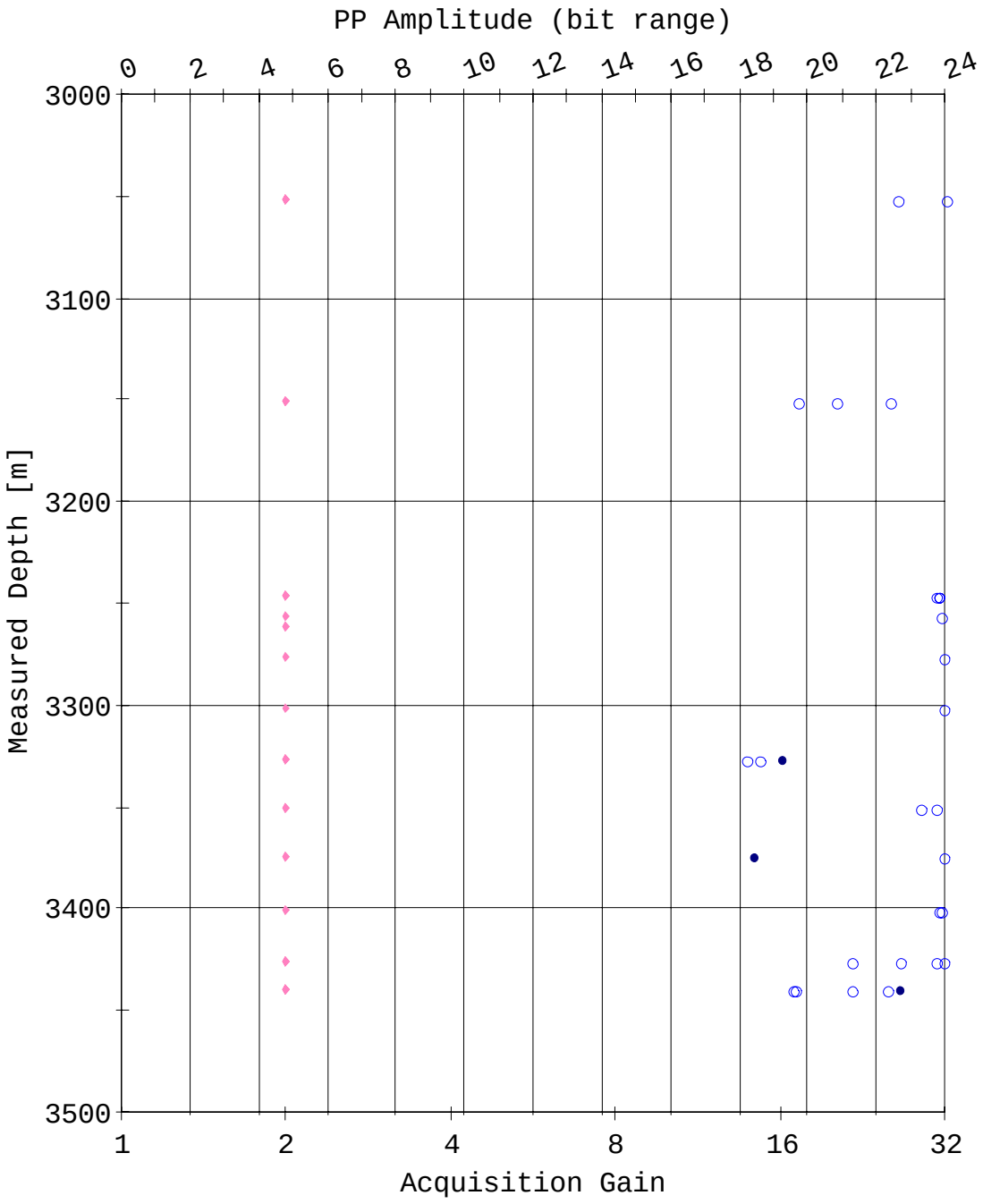
Amplitude QC Plot (X)



Amplitude QC Plot (Y)



Amplitude QC Plot (Z)



VSI Seismic Evaluation Report

ELECTRICAL NOISE LOW TEST

2017/11/23 12:20:34

Shot No: 1 | **Station Depth: -1.06 m**

Evaluation Item	Shuttle	Channel	Value	Unit	Lower Limit	Upper Limit	Result
DC Offset	1	X	-25.4741	milli V	-100.0000	100.0000	PASS
RMS Noise Level	1	X	0.1178	micro V	-	0.5000	PASS
Noise Peak	1	X	0.5194	micro V	-	2.0000	PASS
DC Offset	1	Y	-25.2642	milli V	-100.0000	100.0000	PASS
RMS Noise Level	1	Y	0.1196	micro V	-	0.5000	PASS
Noise Peak	1	Y	0.5288	micro V	-	2.0000	PASS
DC Offset	1	Z	-25.3653	milli V	-100.0000	100.0000	PASS
RMS Noise Level	1	Z	0.1197	micro V	-	0.5000	PASS
Noise Peak	1	Z	0.4123	micro V	-	2.0000	PASS

ELECTRICAL NOISE HIGH TEST

2017/11/23 12:20:58

Shot No: 2 | **Station Depth: -1.06 m**

Evaluation Item	Shuttle	Channel	Value	Unit	Lower Limit	Upper Limit	Result
DC Offset	1	X	-25.4669	milli V	-100.0000	100.0000	PASS
RMS Noise Level	1	X	0.1200	micro V	-	0.5000	PASS
Noise Peak	1	X	0.4643	micro V	-	2.0000	PASS
DC Offset	1	Y	-24.8958	milli V	-100.0000	100.0000	PASS
RMS Noise Level	1	Y	0.1255	micro V	-	0.5000	PASS
Noise Peak	1	Y	0.4458	micro V	-	2.0000	PASS
DC Offset	1	Z	-24.7731	milli V	-100.0000	100.0000	PASS
RMS Noise Level	1	Z	0.1206	micro V	-	0.5000	PASS
Noise Peak	1	Z	0.4217	micro V	-	2.0000	PASS

ELECTRICAL DISTORTION TEST

2017/11/23 12:21:06

Shot No: 3 | **Station Depth: -1.06 m**

Evaluation Item	Shuttle	Channel	Value	Unit	Lower Limit	Upper Limit	Result
Total Harmonic Distortion	1	X	-103.5649	dB	-	-90.0000	PASS
Total Harmonic Distortion	1	Y	-110.5189	dB	-	-90.0000	PASS
Total Harmonic Distortion	1	Z	-109.0129	dB	-	-90.0000	PASS

SYSTEM DYNAMIC RANGE TEST

2017/11/23 12:21:21

Shot No: 4 | **Station Depth: -1.06 m**

Evaluation Item	Shuttle	Channel	Value	Unit	Lower Limit	Upper Limit	Result
System Dynamic Range	1	X	106.8878	dB	103.0000	-	PASS
System Dynamic Range	1	Y	107.1446	dB	103.0000	-	PASS
System Dynamic Range	1	Z	106.7448	dB	103.0000	-	PASS

AMPLIFIER GAIN 2 TEST

2017/11/23 12:21:35

Shot No: 5 | **Station Depth: -1.06 m**

Evaluation Item	Shuttle	Channel	Value	Unit	Lower Limit	Upper Limit	Result
Gain Accuracy	1	X	0.1436	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	X	0.0000	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Y	0.1478	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Y	0.0000	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Z	0.1475	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Z	0.0000	dB	-0.5000	0.5000	PASS

AMPLIFIER GAIN 4 TEST

2017/11/23 12:21:45

Shot No: 6 | **Station Depth: -1.06 m**

Evaluation Item	Shuttle	Channel	Value	Unit	Lower Limit	Upper Limit	Result
Gain Accuracy	1	X	0.1402	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	X	0.0034	dB	-0.5000	0.5000	PASS

Gain Accuracy	1	Y	0.1474	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Y	0.0004	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Z	0.1456	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Z	0.0019	dB	-0.5000	0.5000	PASS
AMPLIFIER GAIN 8 TEST							
2017/11/23 12:21:55							
Shot No: 7			**Station Depth: -1.06 m**				
Evaluation Item	**Shuttle**	**Channel**	**Value**	**Unit**	**Lower Limit**	**Upper Limit**	**Result**
Gain Accuracy	1	X	0.1409	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	X	0.0027	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Y	0.1474	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Y	0.0004	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Z	0.1472	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Z	0.0003	dB	-0.5000	0.5000	PASS
AMPLIFIER GAIN 16 TEST							
2017/11/23 12:22:05							
Shot No: 8			**Station Depth: -1.06 m**				
Evaluation Item	**Shuttle**	**Channel**	**Value**	**Unit**	**Lower Limit**	**Upper Limit**	**Result**
Gain Accuracy	1	X	0.1377	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	X	0.0059	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Y	0.1434	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Y	0.0043	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Z	0.1419	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Z	0.0056	dB	-0.5000	0.5000	PASS
AMPLIFIER GAIN 32 TEST							
2017/11/23 12:22:15							
Shot No: 9			**Station Depth: -1.06 m**				
Evaluation Item	**Shuttle**	**Channel**	**Value**	**Unit**	**Lower Limit**	**Upper Limit**	**Result**
Gain Accuracy	1	X	0.1386	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	X	0.0050	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Y	0.1465	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Y	0.0013	dB	-0.5000	0.5000	PASS
Gain Accuracy	1	Z	0.1403	dB	-0.5000	0.5000	PASS
Gain Step Accuracy	1	Z	0.0072	dB	-0.5000	0.5000	PASS
CROSS TALK X TEST							
2017/11/23 12:22:30							
Shot No: 10			**Station Depth: -1.06 m**				
Evaluation Item	**Shuttle**	**Channel**	**Value**	**Unit**	**Lower Limit**	**Upper Limit**	**Result**
Cross Talk X-Y	1	-	-100.3041	dB	-	-90.0000	PASS
Cross Talk X-Z	1	-	-99.1192	dB	-	-90.0000	PASS
CROSS TALK Y TEST							
2017/11/23 12:22:48							
Shot No: 11			**Station Depth: -1.06 m**				
Evaluation Item	**Shuttle**	**Channel**	**Value**	**Unit**	**Lower Limit**	**Upper Limit**	**Result**
Cross Talk Y-Z	1	-	-98.2187	dB	-	-90.0000	PASS
Cross Talk Y-X	1	-	-99.6611	dB	-	-90.0000	PASS
CROSS TALK Z TEST							
2017/11/23 12:23:07							
Shot No: 12			**Station Depth: -1.06 m**				
Evaluation Item	**Shuttle**	**Channel**	**Value**	**Unit**	**Lower Limit**	**Upper Limit**	**Result**
Cross Talk Z-X	1	-	-97.0669	dB	-	-90.0000	PASS
Cross Talk Z-Y	1	-	-97.0921	dB	-	-90.0000	PASS
IMPULSE RESPONSE TEST							
2017/11/23 12:23:25							
Shot No: 13			**Station Depth: -1.06 m**				
Evaluation Item	**Shuttle**	**Channel**	**Value**	**Unit**	**Lower Limit**	**Upper Limit**	**Result**

Amplitude (0.3Hz)	1	X	-1.6462	dB	-5.0000	-	PASS
Amplitude (400Hz)	1	X	-3.5725	dB	-5.0000	-	PASS
Impulse Amplitude	1	X	573.6089	milli V	-	-	-
Phase Diff. at 0.3Hz from X1	1	X	0.0000	degree	-	-	-
Amplitude (0.3Hz)	1	Y	-1.5744	dB	-5.0000	-	PASS
Amplitude (400Hz)	1	Y	-3.5720	dB	-5.0000	-	PASS
Impulse Amplitude	1	Y	574.1895	milli V	-	-	-
Phase Diff. at 0.3Hz from X1	1	Y	-0.4889	degree	-	-	-
Amplitude (0.3Hz)	1	Z	-1.6796	dB	-5.0000	-	PASS
Amplitude (400Hz)	1	Z	-3.5716	dB	-5.0000	-	PASS
Impulse Amplitude	1	Z	574.0626	milli V	-	-	-
Phase Diff. at 0.3Hz from X1	1	Z	0.6143	degree	-	-	-

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Enhanced DTS Cartridge Wellsite Calibration − EDTC Accelerometer Calibration							
Before: 23−Nov−2017 5:46							
EDTC Z−Axis Acceleration	9.810	N/A	9.728	N/A	N/A	N/A	M/S2
Enhanced DTS Cartridge Wellsite Calibration − Detector Calibration							
Before: 20−Nov−2017 8:33							
Gamma Ray (Jig − Bkg)	140.5	N/A	140.5	N/A	N/A	12.77	GAPI
Gamma Ray (Calibrated)	164.0	N/A	164.0	N/A	N/A	15.00	GAPI

Enhanced DTS Cartridge / Equipment Identification

Primary Equipment:		
EDTC Gamma Ray Detector	EDTG − A/B	8305
Enhanced DTS Cartridge	EDTC − B	8317
Auxiliary Equipment:		
EDTC Housing	EDTH − B	8303

Enhanced DTS Cartridge Wellsite Calibration

EDTC Accelerometer Calibration

Phase	EDTC Z−Axis Acceleration M/S2	Value
Before		9.728

9.610 (Minimum) 9.810 (Nominal) 10.01 (Maximum)

Before: 23−Nov−2017 5:46

Enhanced DTS Cartridge Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig − Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		7.572	Before		140.5	Before		164.0

0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)

127.7 (Minimum) 140.5 (Nominal) 153.2 (Maximum)

149.0 (Minimum) 164.0 (Nominal) 179.0 (Maximum)

Before: 20−Nov−2017 8:33

Company:	**International Ocean Discovery Program**
Well:	**Expedition 369, Site U1513E**
Field:	**Australia Cretaceous Climate & Tectonics**
Rig:	**JOIDES Resolution**
Ocean:	**Indian**

Schlumberger

Versatile Seismic Imager (VSI)
Gamma Ray (EDTC)