

# Cruise Information FM3506

## Nankai Trough SW Japan

### Processing Summary for Expanding Spread and Split Spread Profiles:

The ESPs and SSPs were acquired with a 96 channel streamer and consisted of 200 to 1000 shots. To increase the signal to noise ratio, to reduce each data set to a more manageable size, and to generate equal offset spacing, the data in each profile were binned into 16.67 m bins. Achieving the level of accuracy required for this precise placement was quite difficult for this two ship experiment conducted in strong cross-currents. Factors such as the distance from navigation antennas to sources and receivers, and discrepancy between heading and course were all incorporated in the determination of absolute, and relative position of each source and each receiver. The traces within each bin were statically shifted to remove the slight arrival time differences between opposite ends of the bin, and then stacked. Most profiles were two-sided, resulting in positive and negative offsets. For the ESPs the two sides are (theoretically) perfectly symmetric about  $x=0$ , equivalent of CMP gathers. The SSPs are the equivalent of very long offset shot gathers, and only exhibit perfect symmetry for perfectly 1-D sedimentary sections. The tau-p sections were generated using a cylindrical slant stack (Fourier-Hankel transform) after any empty bins were filled with traces interpolated from neighboring bins.

SSP-1 (Edited to exclude shots 138-175 inclusive)

Tansei Maru course: 230°  
offsets: beginning: 8068m                      crossing: 179m    ending: 14523m

First Shot = 1                      Time = 1987:199:22:02:55:219  
Last Shot = 334                      Time = 1987:199:23:48:22:500  
reference latitude = 32.2004°                      reference longitude = -134.9804°

For the imaginary line segment which is the least squares fit of the positions of channel 48 for each shot:

slope = 1.171310  
y intercept = -25801.9m  
begins at latitude = 32.37182°                      longitude = -134.6398°  
x = -2872.2m                      y = -29166.17m  
ends at latitude = 32.29063°                      longitude = 35.0757°  
x = 11830.0m                      y = 11945.3m

For the imaginary line segment which is the least squares fit of the positions of the midpoints between channel 48 and the source for each shot.

slope = 1.163425  
y intercept = -25556.4m  
begins at latitude = 32.16902°                      longitude = -134.9506°  
x = 56.8m                      y = -25490.3m  
ends at latitude = 32.24542°                      longitude = 135.0283°  
x = 7369.9 m                      y = -16982.0 m

Water Gun location	
Average Latitude = 32.20038°	std deviation = .002°
Average Longitude = -134.9804°	std deviation = .0008°
Average X = 2879 m	std deviation = 165 m
Average Y = -21998 m	std deviation = 85 m
Average Distance = 132 m	std deviation = 131 m

SSP-2 (Edited to exclude shots 1-28 and 603-777 inclusive)

Tansei Maru course: 41°  
offsets: beginning: 23586 m                      crossing: 422 m   ending: 15932m

First Shot = 1                                      Time = 1987:199:14:13:04:938  
Last Shot = 1184                                  Time = 1987:199:20:30:01:188  
reference latitude = 32.22°                      reference longitude = 135.02°

For the imaginary line segment which is the least squares fit of the positions of channel 48 for each shot:

slope = .738870  
y intercept z 9406.7 m  
begins at latitude = 32.38649°                      longitude = 135.15132°  
x = 12356.5 m                                      y = 18534.4 m  
ends at latitude = 32.18481°                      longitude = -134.82872°  
x = -18017.6 m                                      y = -3902.9 m

For the imaginary line segment which is the least squares fit of the positions of the midpoints between channel 48 and the source for each shot.

slope = .694292  
y intercept = 9474.8 m  
begins at latitude = 32.32251°                      longitude = 135.04959°  
x = 2785.0 m                                      y = 11408.4 m  
ends at latitude = 32.22809°                      longitude = -134.88893°  
x = -12343.2 m                                      y = 905.0 m

Water Gun location  
Average Latitude = 32.26448°                      std deviation = .001°  
Average Longitude = -134.9481°                      std deviation = .005°  
Average X = -6781.0 m                              std deviation = 104 m  
Average Y = 4961.6 m                              std deviation = 523 m  
Average Distance = 523.1 m                              std deviation = 106 m

SSP-3 (Edited to exclude shots 162-191 inclusive)

Tansei Maru course: 223°  
offsets: beginning: 11198 m                      crossing: 260 m   ending: 15280 m

First Shot = 1                                      Time = 1987:199:10:19:35:125  
Last Shot = 434                                  Time = 1987:199:12:36:42:375  
reference latitude = 32.32°                      reference longitude = -134.96°

For the imaginary line segment which is the least squares fit of the positions of channel 48 for each shot:

slope = 1.147083  
y intercept = 361.0181 m  
begins at latitude = 32.25012°                      longitude = -134.88462°  
x = -7093.5 m                                      y = -7775.8 m  
ends at latitude = 32.42619°                      longitude = 135.06627°  
x = 9991.5 m                                      y = 11822.1 m

For the imaginary line segment which is the least squares fit of the positions of the midpoints between channel 48 and the source for each shot.

slope = 1.137758

y intercept = 688.8798 m

begins at latitude = 32.29150°

x = -3393.0 m

ends at latitude = 32.37886°

x = 5153.7m

longitude = 134.92394°

y = -3171.5 m

longitude = 135.01480°

y = 6552.5 m

Water Gun location

Average Latitude = 32.33158°

Average Longitude = -134.9631°

Average X = 270.5 m

Average Y = 1291.0m

Average Distance = 62.9 m

std deviation = .0006°

std deviation = .0005°

std deviation = 49 m

std deviation = 54m

std deviation = 37 m

SSP-4 (Edited to exclude shots 524-618 inclusive)

Tansei Maru course: 42°

offsets: beginning: 19676 m

crossing: 106 m ending: 10767 m

First Shot = 1

Last Shot = 817

reference latitude = 32.35°

Time = 1987:199:03:28:47:531

Time = 1987:199:07:47:49:875

reference longitude = -134.93°

For the imaginary line segment which is the least squares fit of positions of channel 48 for each shot:

slope = 1.066341

y intercept = 1242.250 m

begins at latitude = 32.50275°

x = 14785.2 m

ends at latitude = 32.30319°

x = -6049.3 m

longitude = 135.08735°

y = 17008.3 m

longitude = -134.86569°

y = -5208.4 m

For the imaginary line segment which is the least squares fit of the positions of the midpoints between channel 48 and the source for each shot.

slope = 1.06590

y intercept = 1475.783 m

begins at latitude = 32.43602°

x = 7599.7 m

ends at latitude = 32.33607°

x = -2839.5 m

longitude = 135.01085°

y = 9576.3 m

longitude = -134.89981°

y = -1550.8 m

Water Gun location

Average Latitude = 32.36910°

Average Longitude = -134.9349°

Average X = 399.1 m

Average Y = 2110.8 m

Average Distance = 72.2 m

std deviation = .0007°

std deviation = .0008°

std deviation = 44 m

std deviation = 79 m

std deviation = 54 m

ESP-07 (Edited to exclude shots 1-32 inclusive)

Tansei Maru course: 51°  
offsets: beginning: 11533 m

crossing: 127 m ending: 21206 m

First Shot = 1  
Last Shot = 310  
reference latitude = 31.66°

Time = 1987:201:05:03:00:344  
Time = 1987:201:06:40:51:469  
reference longitude = -133.97°

For the imaginary line segment which is the least squares fit of the positions of channel 48 and gun position for each shot:

slope = .806412  
y intercept = -529.2 m  
begins at latitude = 31.60607°  
x = -7000m  
ends at latitude = 31.70311°  
x = -6800 m

longitude = -133.8982°  
y = 4800m  
longitude = -134.04389°  
y = 6000 m

Midpoint of gun position and channel 48:

Average Latitude = 31.66900°  
Average Longitude = -133.9903°  
Average X = 1902.4 m  
Average Y = 1004 m  
Average Distance = 31.0 m

std deviation = .0002°  
std deviation = .0004°  
std deviation = 26 m  
std deviation = 24 m  
std deviation = 16 m

ESP-09 (Edited to exclude shots 1-69 inclusive)

Tansei Maru course: 228°  
offsets: beginning: 773 m

crossing: 38 m ending: 21762 m

First Shot = 1  
Last Shot = 227  
reference latitude = 31.75°

Time = 1987:201:10:34:14:875  
Time = 1987:201 :11:45:49:031  
reference longitude = -133.9°

For the imaginary line segment which is the least squares fit of the positions of channel 48 and gun position for each shot:

slope = .752326  
y intercept = 1700.4 m  
begins at latitude = 31.81646°  
x = -10000 m  
ends at latitude = 31.69785°  
x = 8000 m

longitude = -133.9845°  
y = -5800m  
longitude = -133.79438°  
y = 7400m

Midpoint of gun position and channel 48:

Average Latitude = 31.76238°  
Average Longitude = -133.8955°  
Average X = -425.1 m  
Average Y = 1380.6 m  
Average Distance = 27.9 m

std deviation = .0002°  
std deviation = .0003°  
std deviation = 27 m  
std deviation = 17 m  
std deviation = 15 m

#### ESP-13 (Edited to exclude shots 1-13 inclusive)

Tansei Maru course: 50°  
offsets: beginning: 13862 m

crossing: 91 m ending: 21975 m

First Shot = 1  
Last Shot = 361  
reference latitude = 31.8°

Time= 1987:201:12:48:45:063  
Time = 1987:201:14:42:45:250  
reference longitude = -133.86°

For the imaginary line segment which is the least squares fit of the positions of channel 48 and gun position for each shot:

slope = .666492  
y intercept = 689.9 m  
begins at latitude = 31.75800°  
x = -8045.7 m  
ends at latitude 31.86196°  
x = 9316.7 m

longitude = -133.77498°  
y = -4672.5 m  
longitude = -133.95851°  
y = 6899.4 m

Midpoint of gun position and channel 48:

Average Latitude = 31.81030°  
Average Longitude = -133.8672°  
Average X = 680.5 m  
Average Y = 1143.4m  
Average Distance = 35.7 m

std deviation = .0002°  
std deviation = .0003°  
std deviation = 30 m  
std deviation = 27m  
std deviation = 19 m

#### ESP-14

Tansei Maru course: 50°  
offsets: beginning: 8927 m

crossing: 125 m ending: 21995 m

First Shot = 1  
Last Shot = 348  
reference latitude = 31.81°

Time = 1987:202:00:33:25:188  
Time = 1987:202:02:23:56:437  
reference longitude = -133.85°

For the imaginary line segment which is the least squares fit of the positions of channel 48 and gun position for each shot:

slope = .772736  
y intercept = 887.3 m  
begins at latitude = 31.76590°  
x = -7497.8 m  
ends at latitude = 31.88043°  
x = 9000.5 m

longitude = -133.77076°  
y = -4906.5 m  
longitude = -133.94518°  
y = 7842.3 m

Midpoint of gun position and channel 48:

Average Latitude = 31.82327°  
Average Longitude = -133.8584°  
Average X = 762.7 m  
Average Y = 1476.6 m  
Average Distance = 40.6 m

std deviation = .0002°  
std deviation = .0006°  
std deviation = 41 m  
std deviation = 25 m  
std deviation = 26 m

ESP-15 (Edited to exclude shots 1 -40 and 138-170 inclusive)

Tansei Maru course: 230°	
offsets: beginning: 14310 m	crossing: 97 m ending: 3417 m
First Shot = 1	Time = 1987:202:03:24:25:500
Last Shot = 170	Time = 1987:202:04:17:56:562
reference latitude = 31.82°	reference longitude = -133.85°

For the imaginary line segment which is the least squares fit of the positions of channel 48 and gun position for each shot:

slope = .775065	
y intercept = 565.6 m	
begins at latitude = 31.79232°	longitude = -133.8003°
x = -4704 m	y = -3080 m
ends at latitude = 31.85353°	longitude = -133.8932°
x = 4086 m	y = 3733 m

Midpoint of gun position and channel 48:

Average Latitude = 31.82284°	std deviation = .0002°
Average Longitude = -133.8466°	std deviation = .0002°
Average X = -320.7 m	std deviation = 15 m
Average Y = 316.5 m	std deviation = 24 m
Average Distance = 25.1 m	std deviation = 14 m

ESP-17

Tansei Maru course: 230°	
offsets: beginning: 11673 m	crossing: 116 m ending: 22229 m
First Shot = 1	Time = 1987:201 :15:51 :09:406
Last Shot = 359	Time = 1987:201 :17:44:31 :563
reference latitude = 31.83°	preference longitude = -133.84°

For the imaginary line segment which is the least squares fit of the positions of channel 48 and gun position for each shot:

slope = .65733	
y intercept = 1240.2 m	
begins at latitude = 31.88964°	longitude = -133.92690°
x = 8215.3 m	y = 6640.318 m
ends at latitude = 31.78544°	longitude = -133.74036°
x = -9426.0 m	y = -4955.8 m

Midpoint of gun position and channel 48:

Average Latitude = 31.83746°	std deviation = .0002°
Average Longitude = -133.8332°	std deviation = .0004°
Average X = -626.0 m	std deviation = 36 m
Average Y = 828.6 m	std deviation = 26 m
Average Distance = 390 m	std deviation = 22 m

ESP-23 (Edited to exclude shots 1-20 inclusive)

Tansei Maru course: 47°  
offsets: beginning: 22011 m

crossing: m ending: 1592 m

First Shot = 1  
Last Shot = 211  
reference latitude = 31.91°

Time = 1987:202:08:00:34:000  
Time = 1987:202:09:07:04:063

For the imaginary line segment which is the least squares fit of the positions of channel 48 and gun position for each shot:

slope = .804645  
y intercept = 1173.8 m  
begins at latitude = 31.98508°  
x = 8929.9 m  
ends at latitude = 31.86347°  
x = -7892.0 m

longitude = -133.86454°  
y = 8359.2 m  
longitude = -133.68650°  
y = -5176.5 m

Midpoint of gun position and channel 48:

Average Latitude = 31.92461°  
Average Longitude = -133.7758°  
Average X = 562.2 m  
Average Y = 1626.2 m  
Average Distance = 40.4 m

std deviation = .0003°  
std deviation = .0004°  
std deviation = 31 m  
std deviation = 34 m  
std deviation = 21 m

ESP-25

Tansei Maru course: 233°  
offsets: beginning: 5293 m

crossing: 105 m ending: 19786 m

First Shot = 1  
Last Shot = 257  
reference latitude = 31.97°

Time = 1987:202:13:20:46:438  
Time = 1987:202:14:42:09:625  
reference longitude = -133.73°

For the imaginary line segment which is the least squares fit of the positions of channel 48 and gun position for each shot:

slope = .815016  
y intercept = 52.6 m  
begins at latitude = 32.02863°  
x = 7945.6 m  
ends at latitude = 31.92295°  
x = -6487.2 m

longitude = -133.81416°  
y = 6528.4 m  
longitude = -133.66132°  
y = -5234.6 m

Midpoint of gun position and channel 48:

Average Latitude = 31.97496°  
Average Longitude = -133.7365°  
Average X = 611.6 m  
Average Y = 551.2 m  
Average Distance = 59.3 m

std deviation = .0004°  
std deviation = .0006°  
std deviation = 54 m  
std deviation = 40 m  
std deviation = 31 m