

A nighttime photograph of a city skyline, likely Tokyo, with numerous illuminated buildings and the Tokyo Tower visible in the distance. Red dots are overlaid on the image, particularly concentrated around the text and in the foreground. The text is in large, bold, yellow characters with a white outline.

大都市圏地殻構造 探査の成果： 房総および相模測線

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(4)京都大学防災研究所

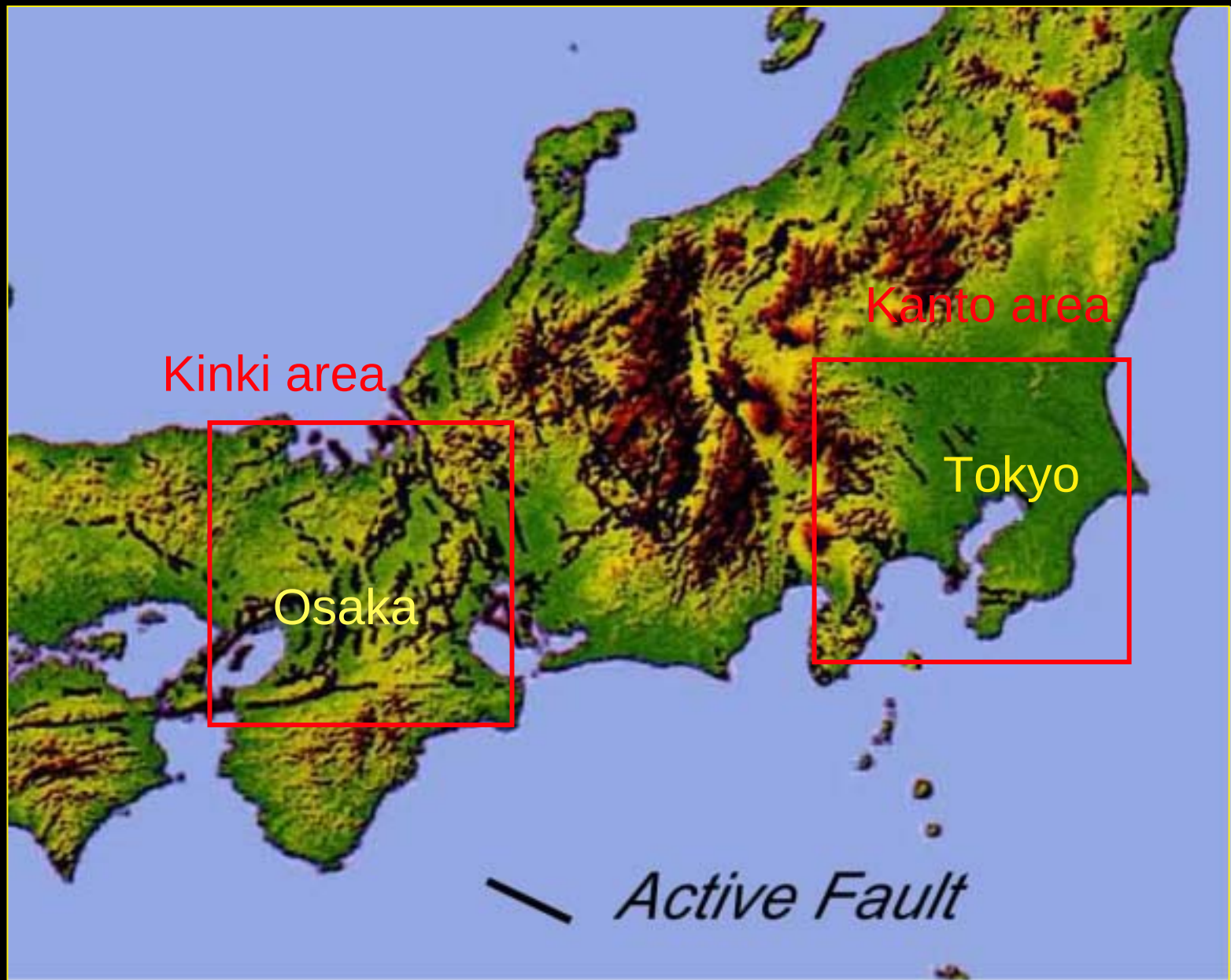
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Los Angeles, USA**

(6)(株)地球科学総合研究所

内容

- 背景: 「大都市圏地殻構造調査研究」プロジェクトにおける地殻構造探査の意義
- 房総2002の概要と成果
- 相模2003の概要と成果

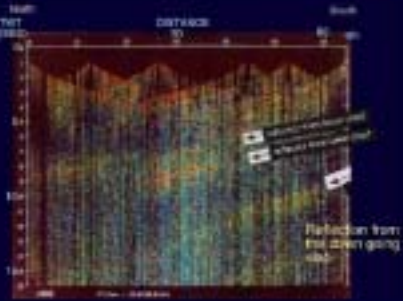




REGIONAL CHARACTERIZATION OF THE CRUST IN METROPOLITAN AREAS FOR PREDICTION OF STRONG GROUND MOTION

Modeling

Seismic Profiling

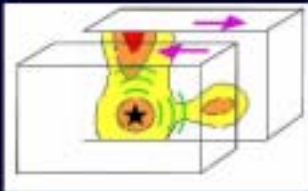
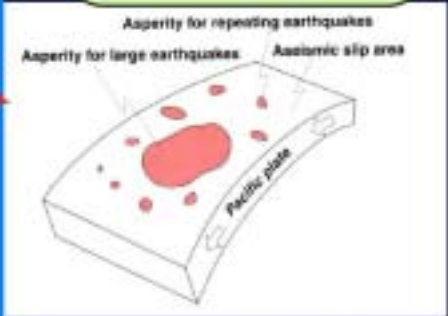


Drilling

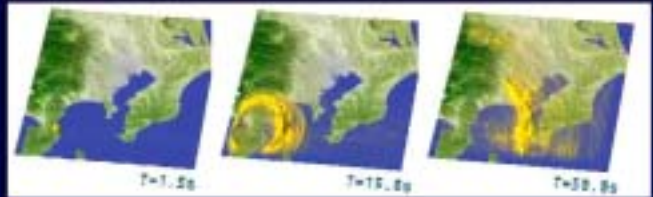


Modeling

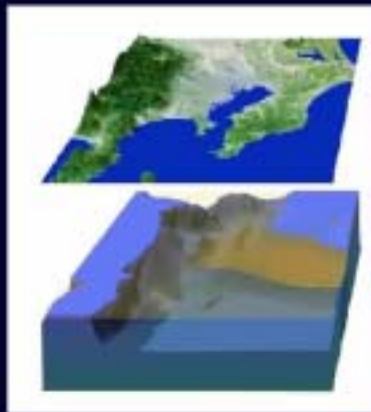
Source fault



Estimation of Strong ground motion



3D velocity and Q model



地殻構造探査の目的

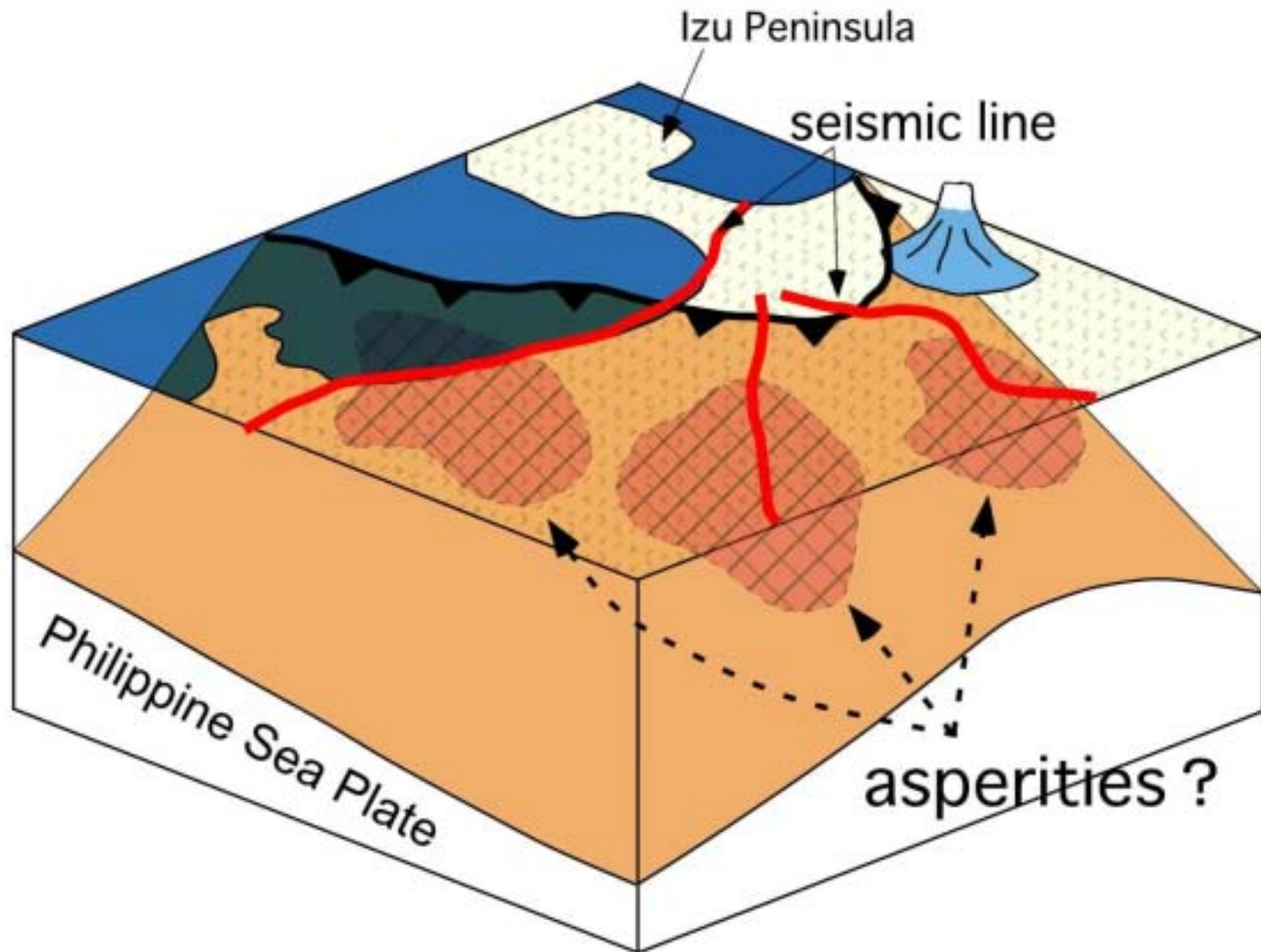
- 震源断層のイメージング
(形状と震源断層の特性)
- 地殻の速度構造 (強震動
の伝搬経路)

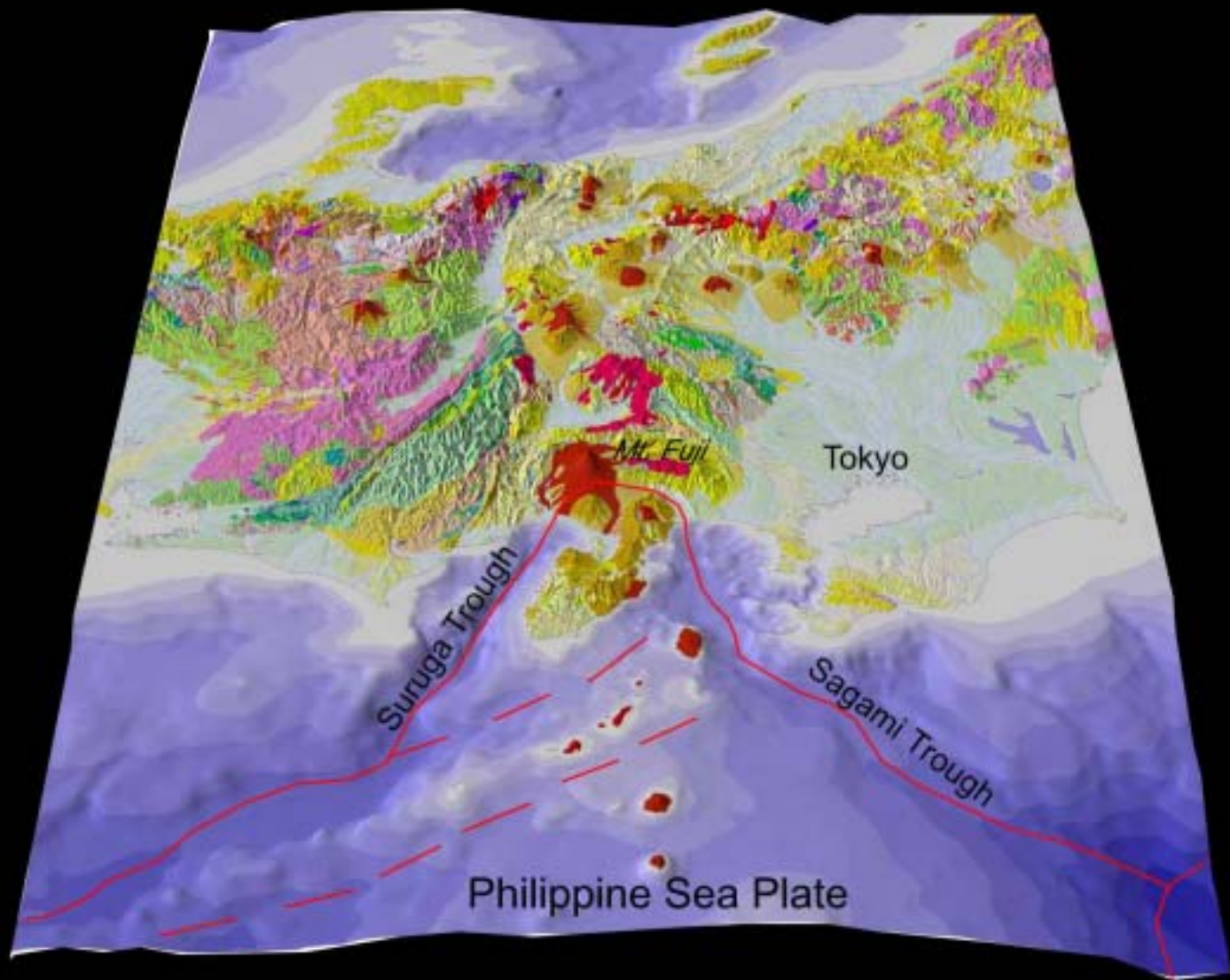
Geometry of down-going slab

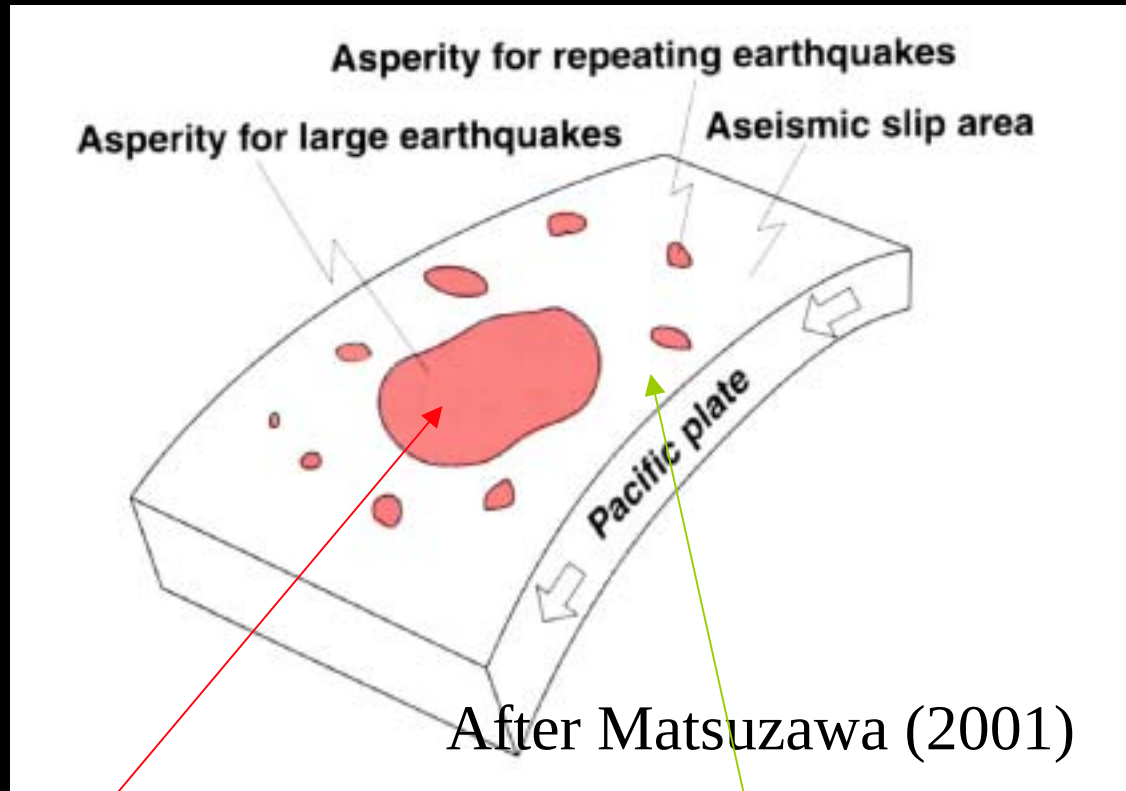


After Okada (2002)

Imaging of upper surface of the Philippine Sea Plate by controlled source







Asperity

Low seismicity

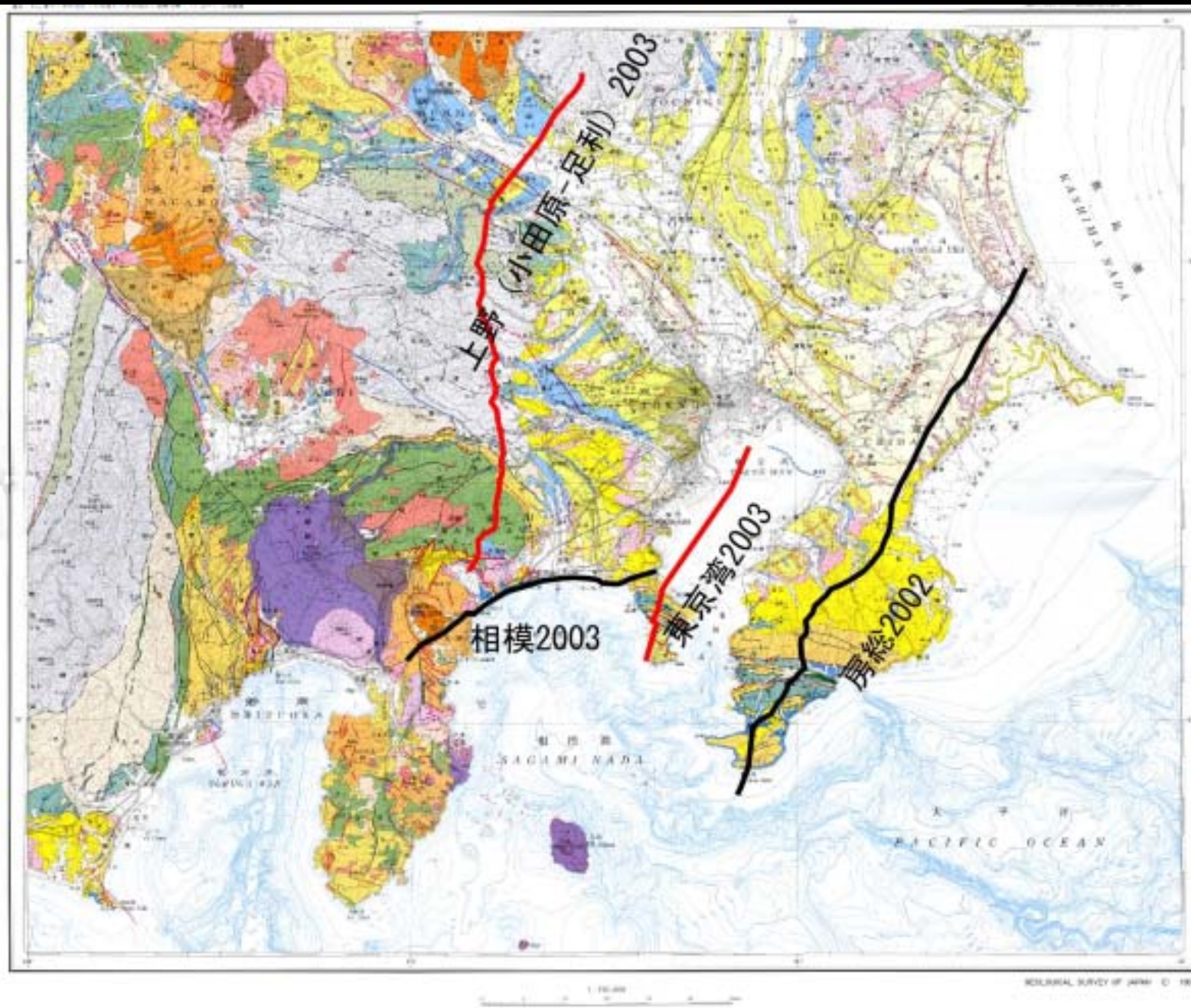
Low reflection coefficient?

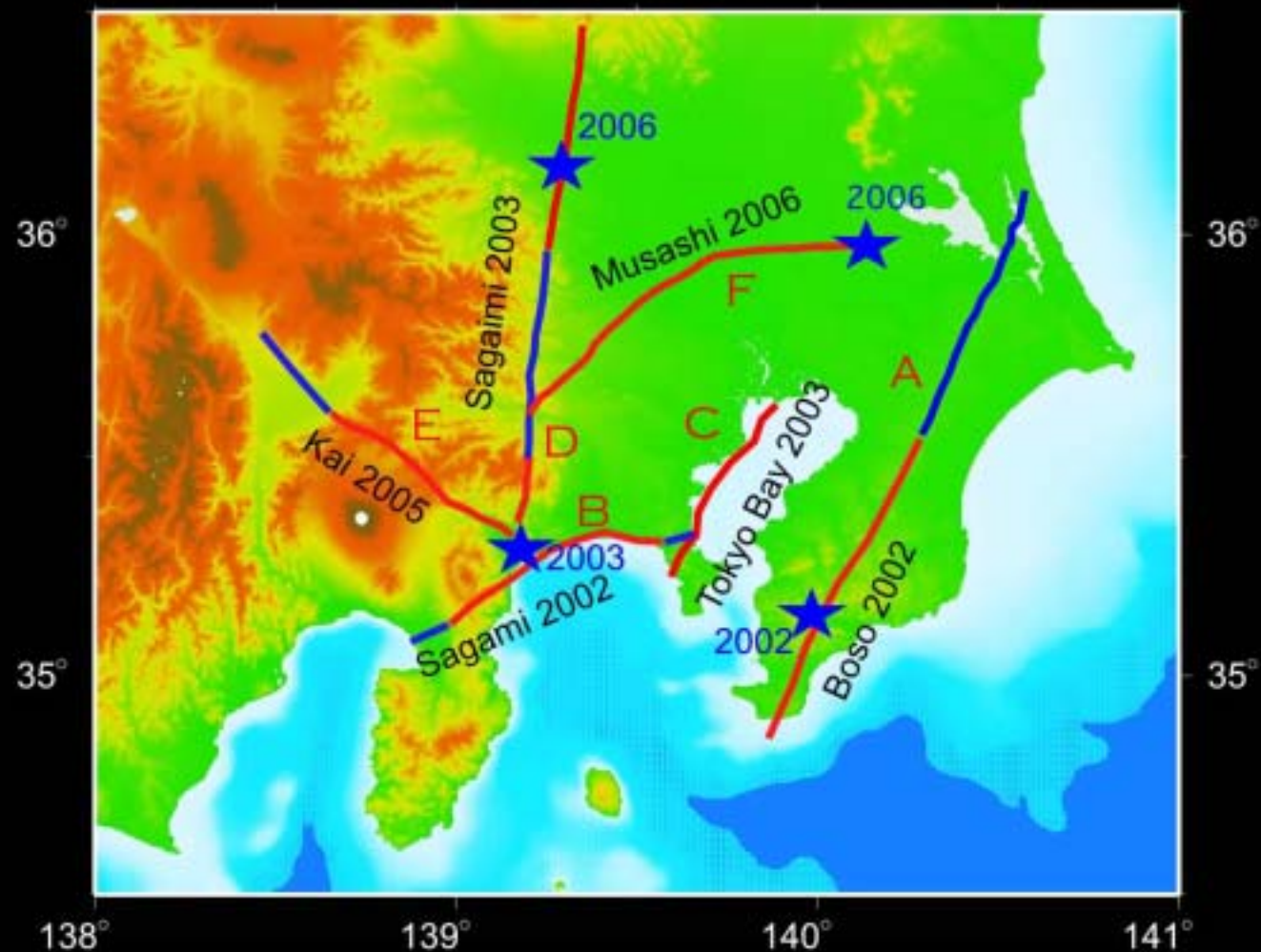
High seismicity

Slow earthquake

A seismic slip

Repeated earthquakes





Proposed Seismic Lines

— CMP-Reflection

— Wide-angle Reflection / Refraction



Drilling Site

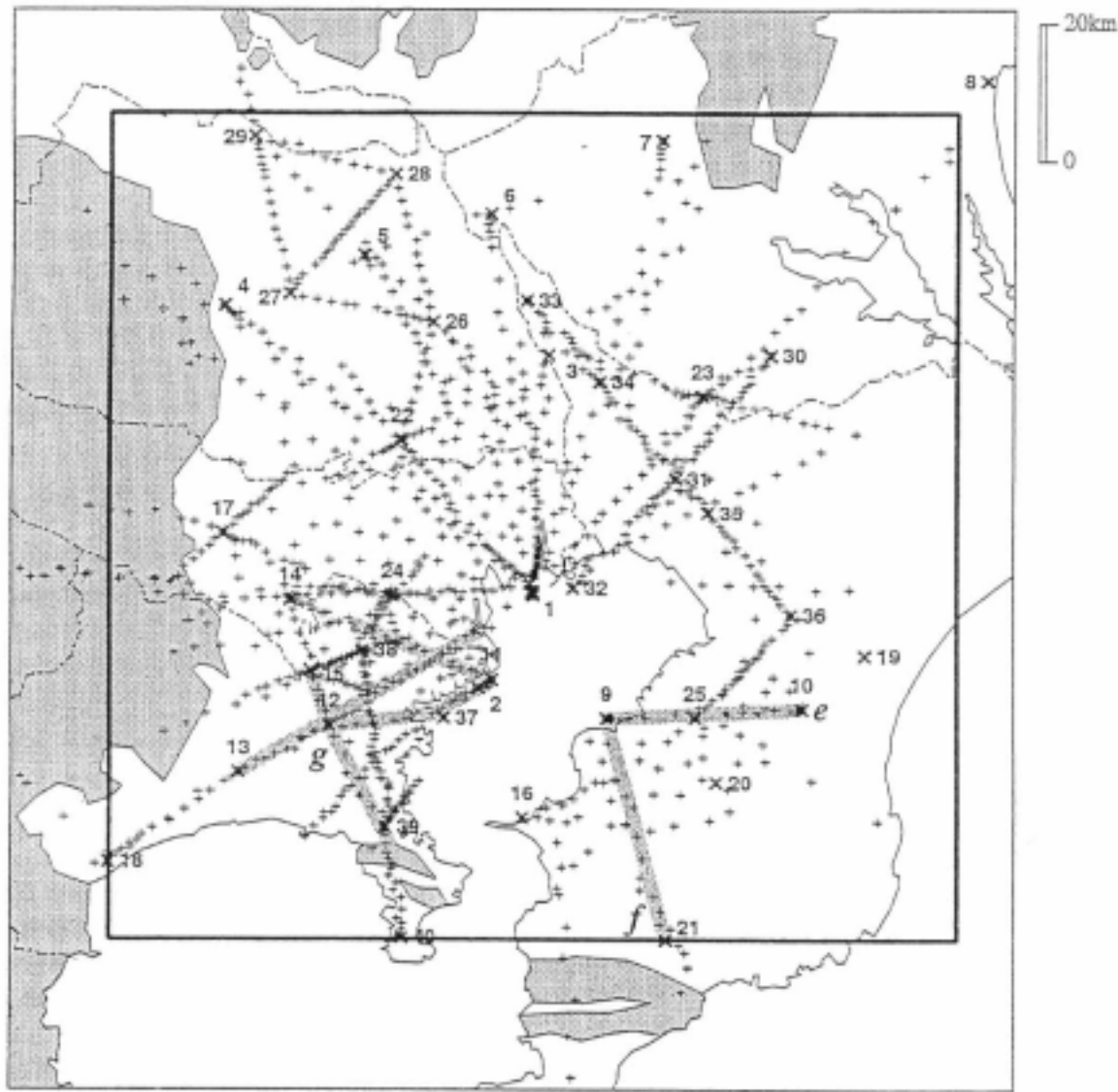
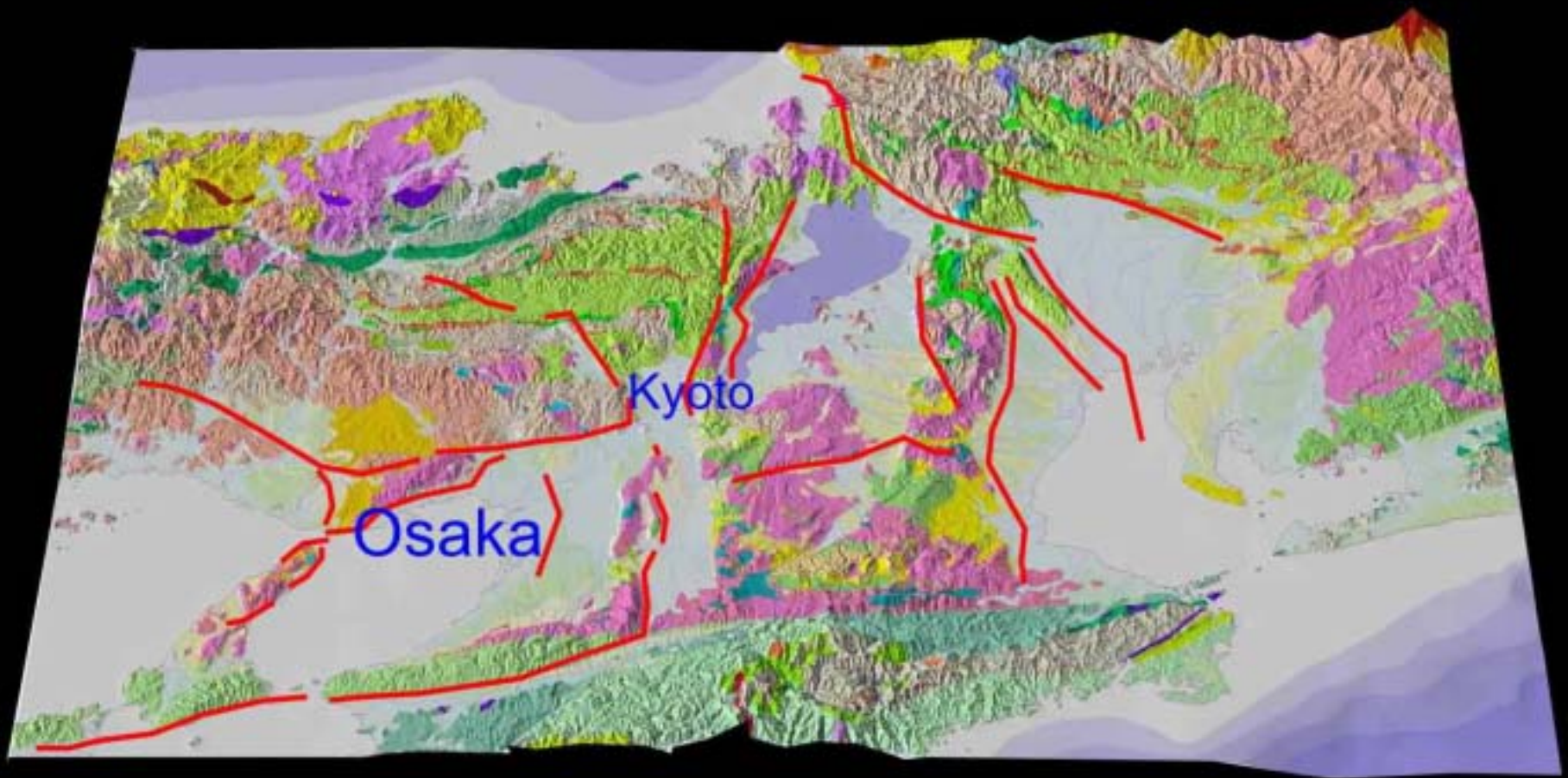
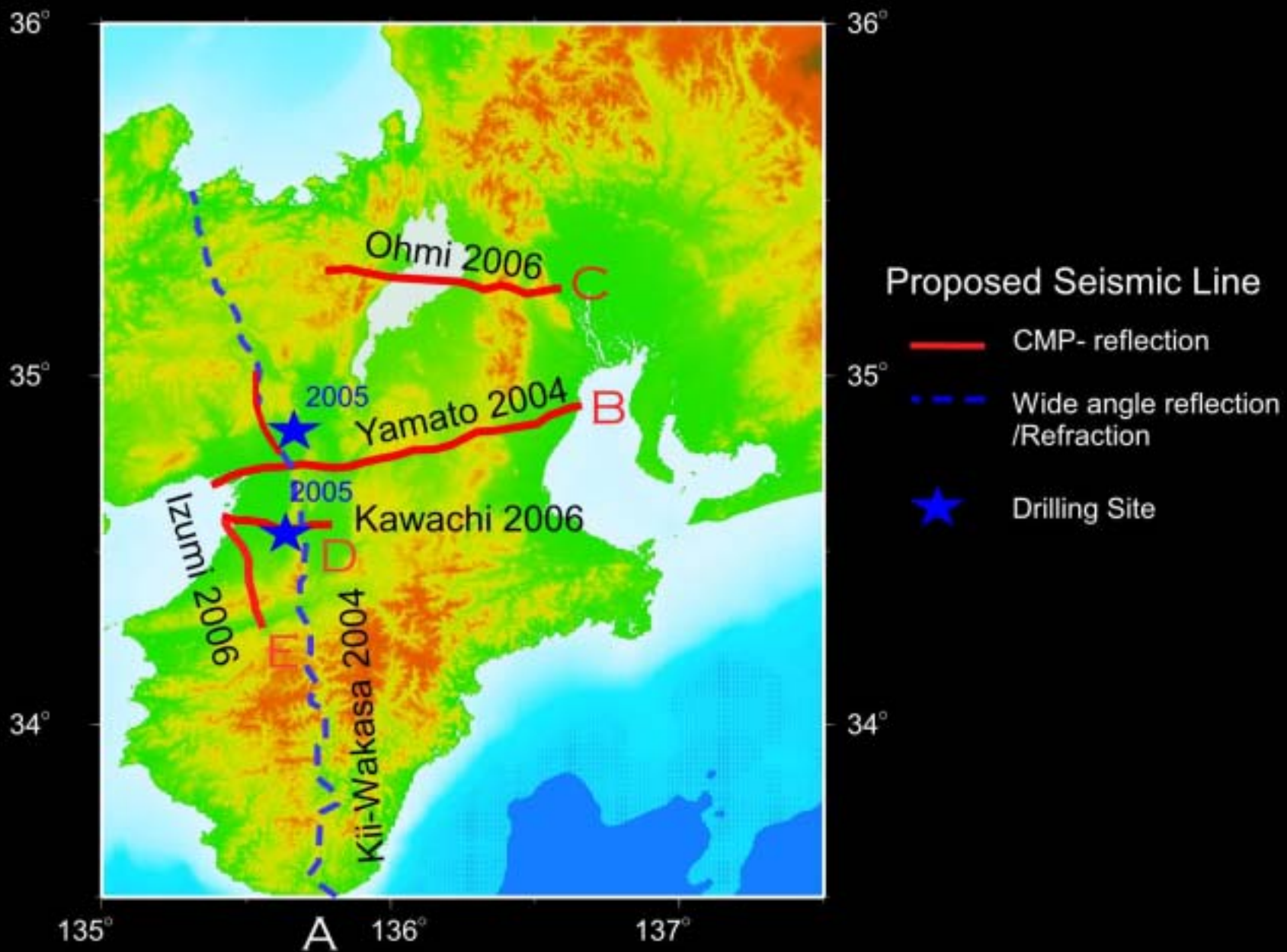


図2 測線図 (I3) による).

Existing Seismic Line
For Sedimentary
Basin structure
(Refraction)





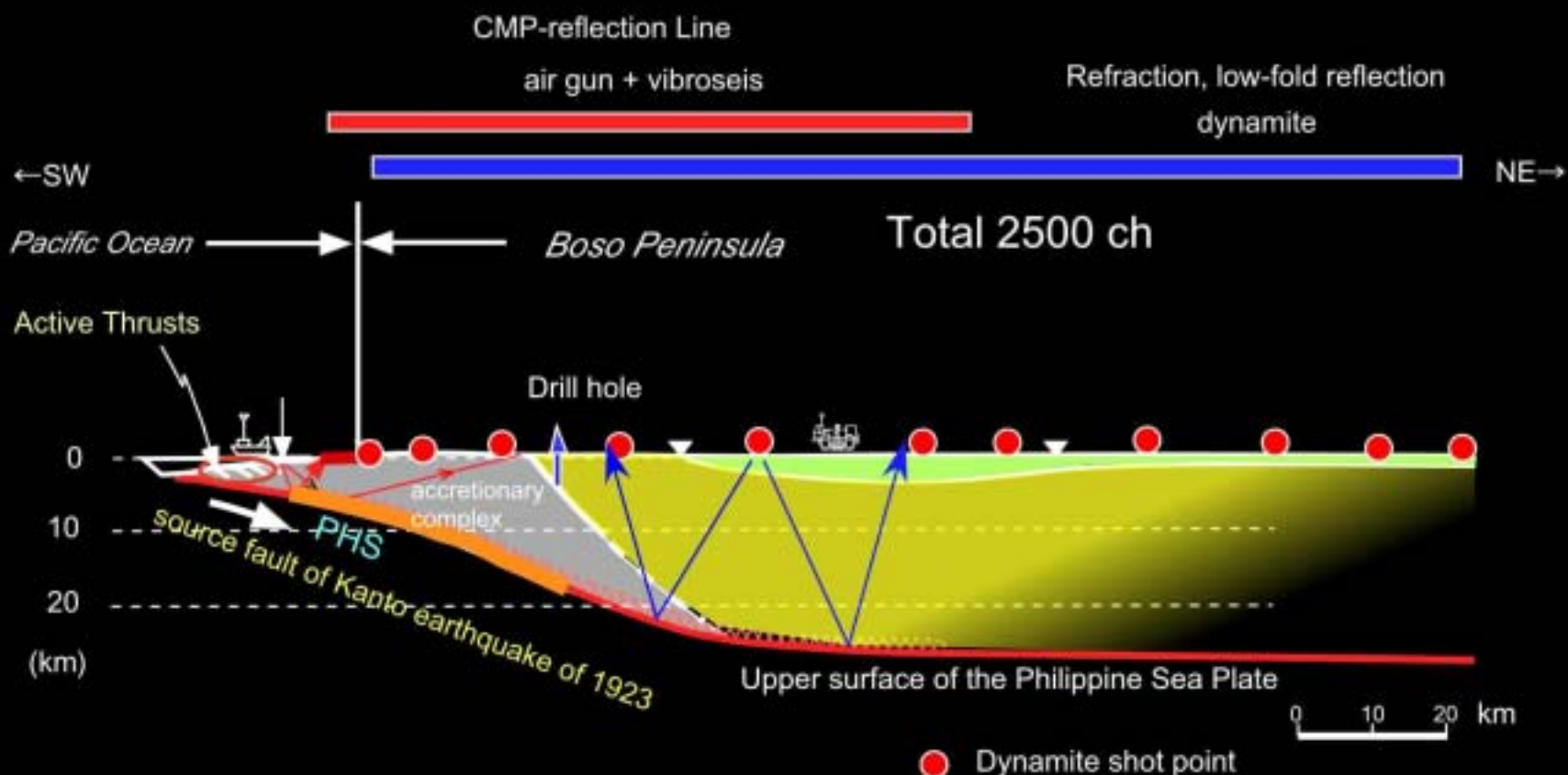
大都市圏地殻構造探查

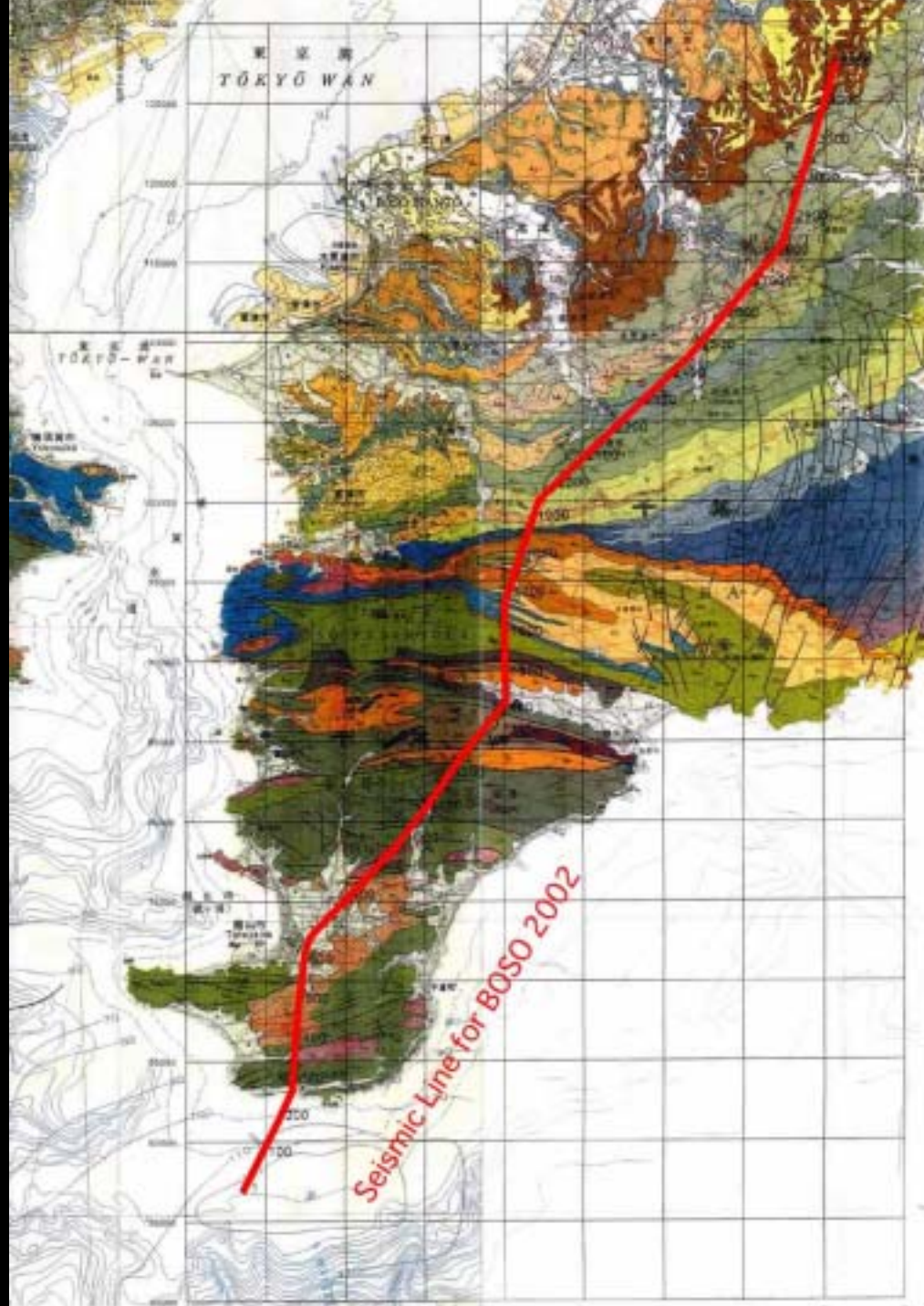
房総 2002

実験期間-2002年9月下旬~12月初旬



Seismic Line for Boso 2002



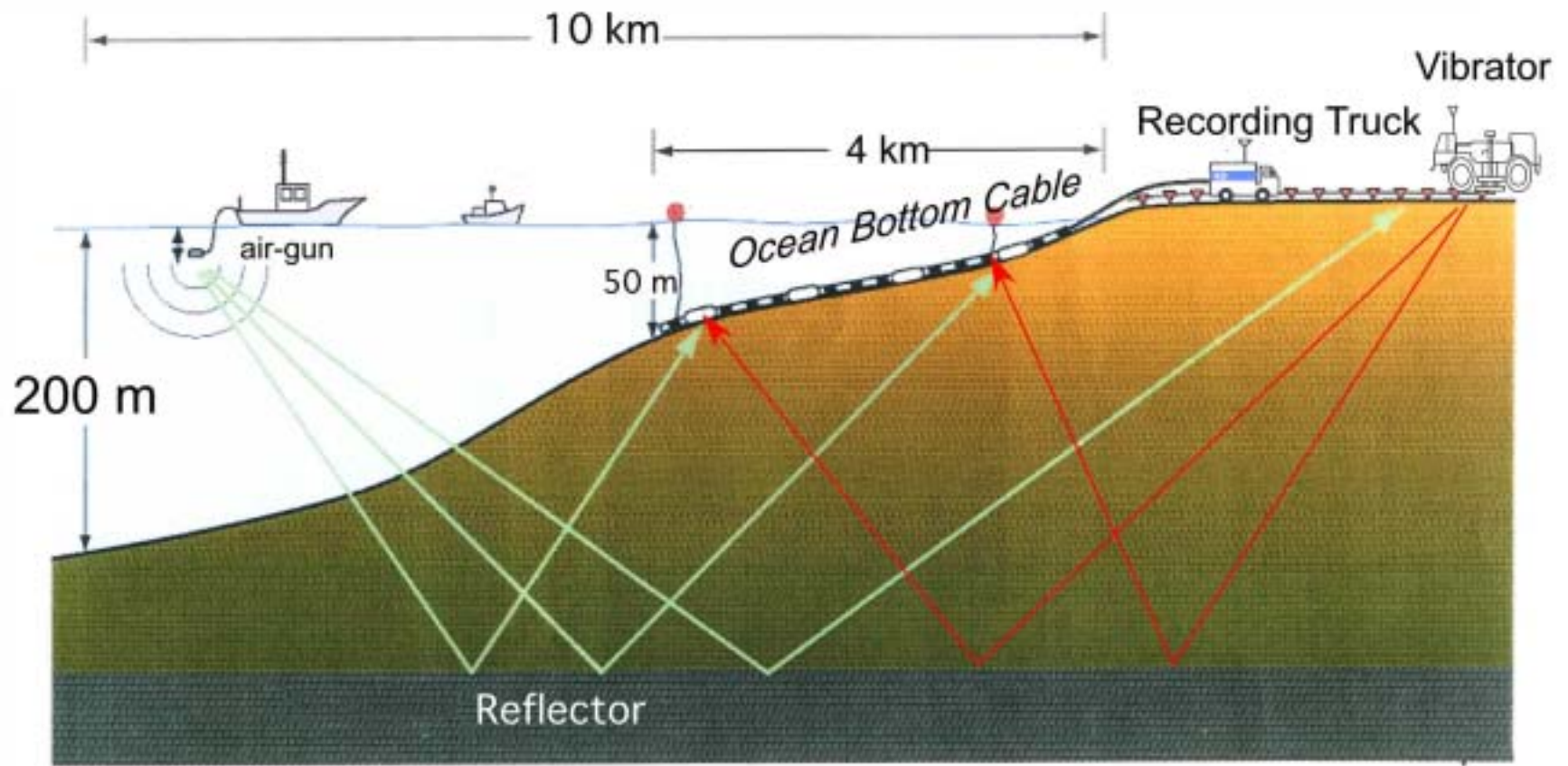


地震探査測線
房総2002

海底ケーブルの設置



ケーブル



海陸の統合的な地殻構造探査概念図

Data acquisition parameters for the southern part of Boso 2002

Length of seismic Line 52.5 km

Source

source	4 vibroseis trucks,	Air-guns (2000 cu. inch)
sweep frequency	6-35/40 Hz	
sweep length	16 / 20 sec	
No. of sweeps	40 - 50	1
shot interval	200 m (standard)	50 m (standard)
total No. of shots	496 (on land)	212 (offshore)

Receiver information

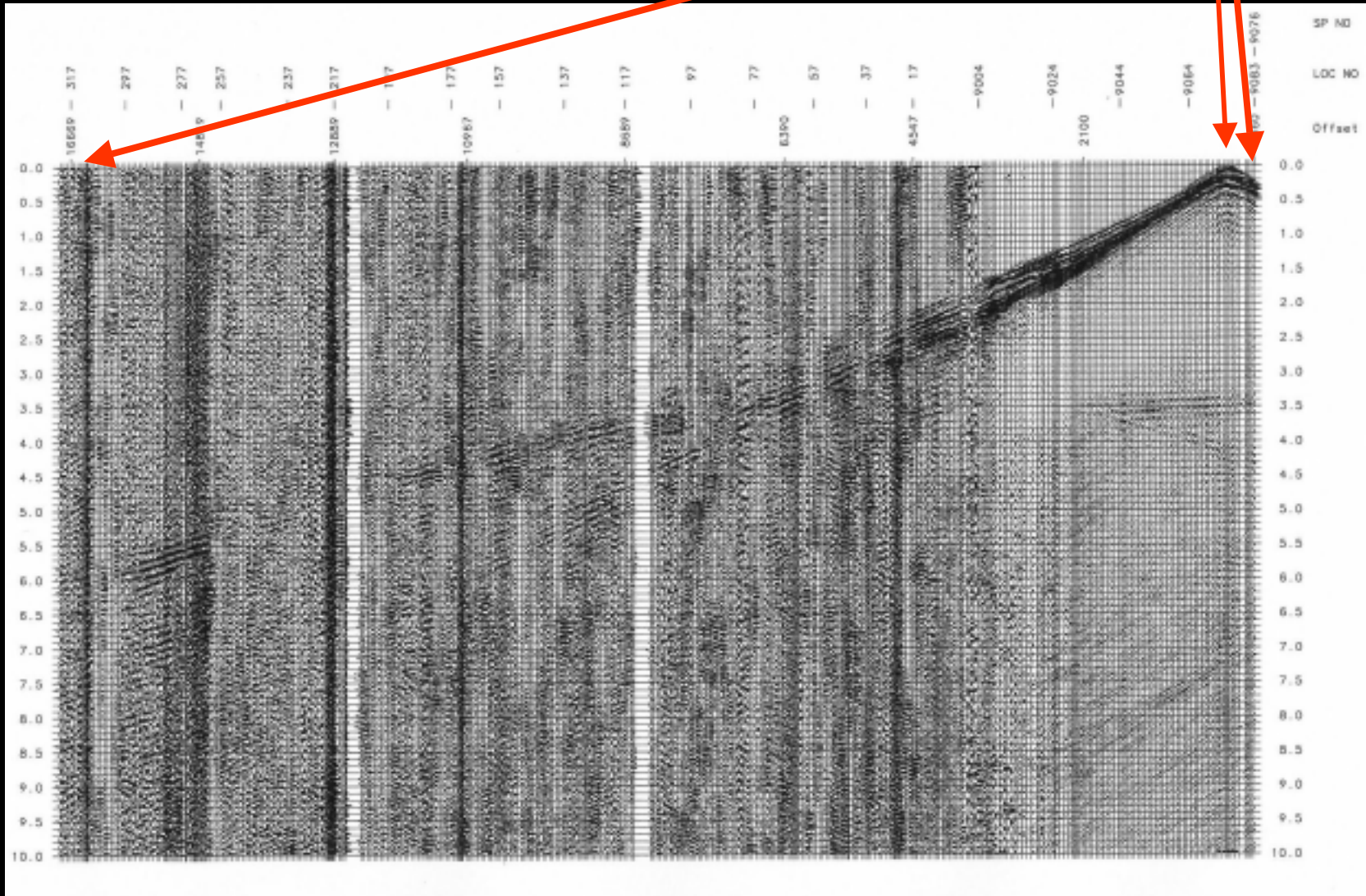
receiver interval	50 m
length of spread	16 / 20 km
receiver	geophone (10 Hz)/ hydrophone

Recording information

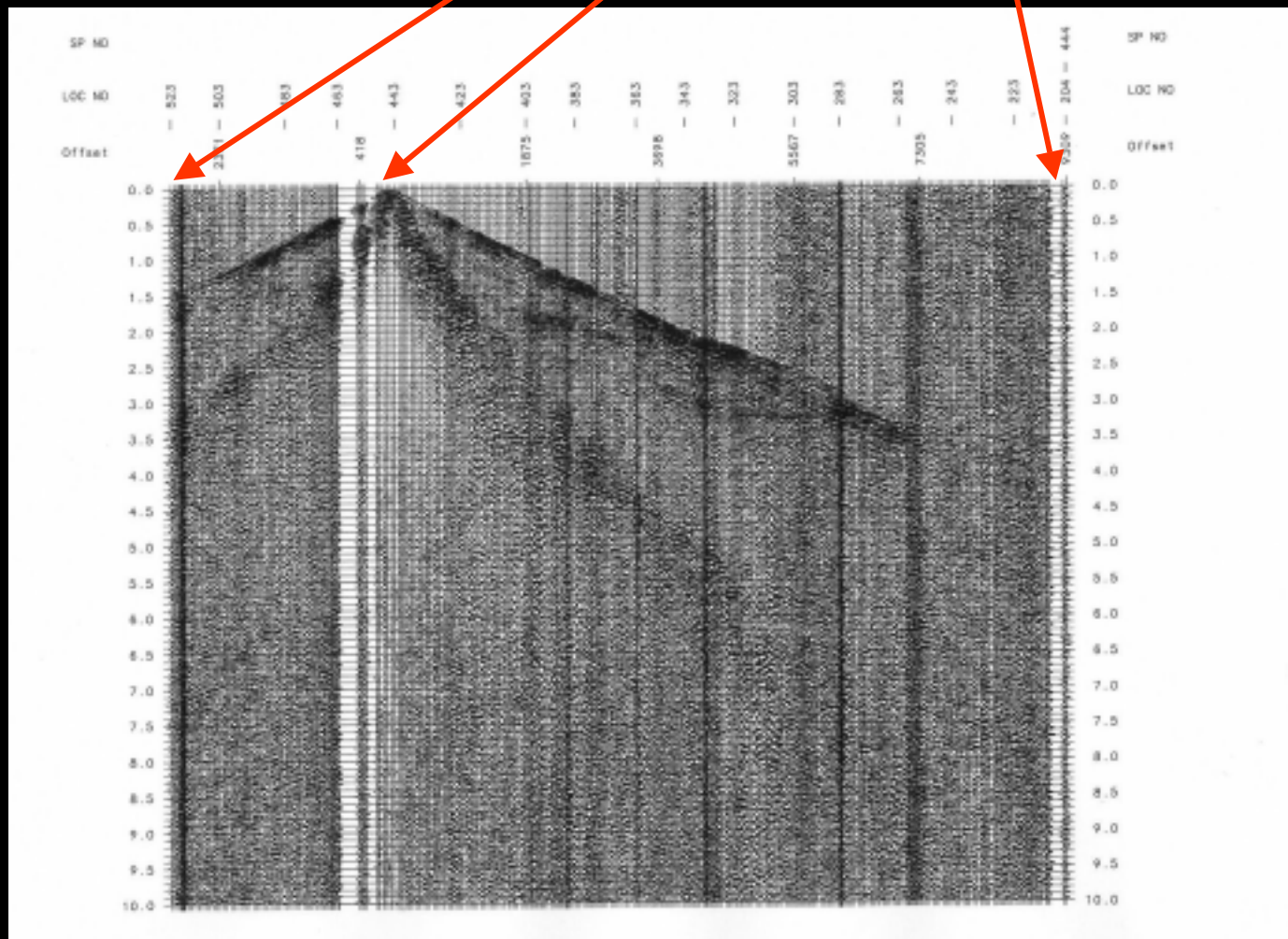
instruments	GDAPS-4
sampling interval	4 ms
recording length	16 sec



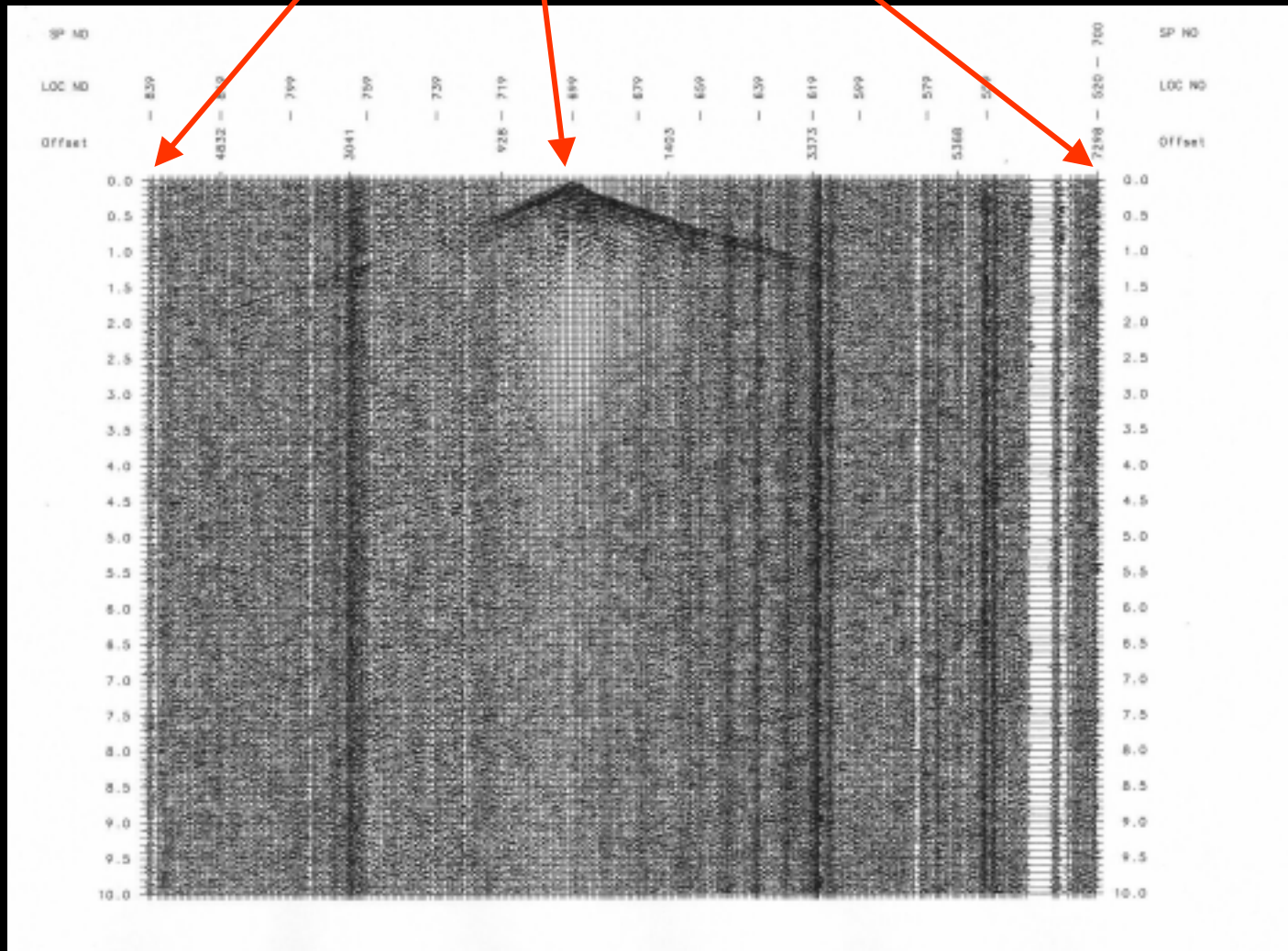
SP9076



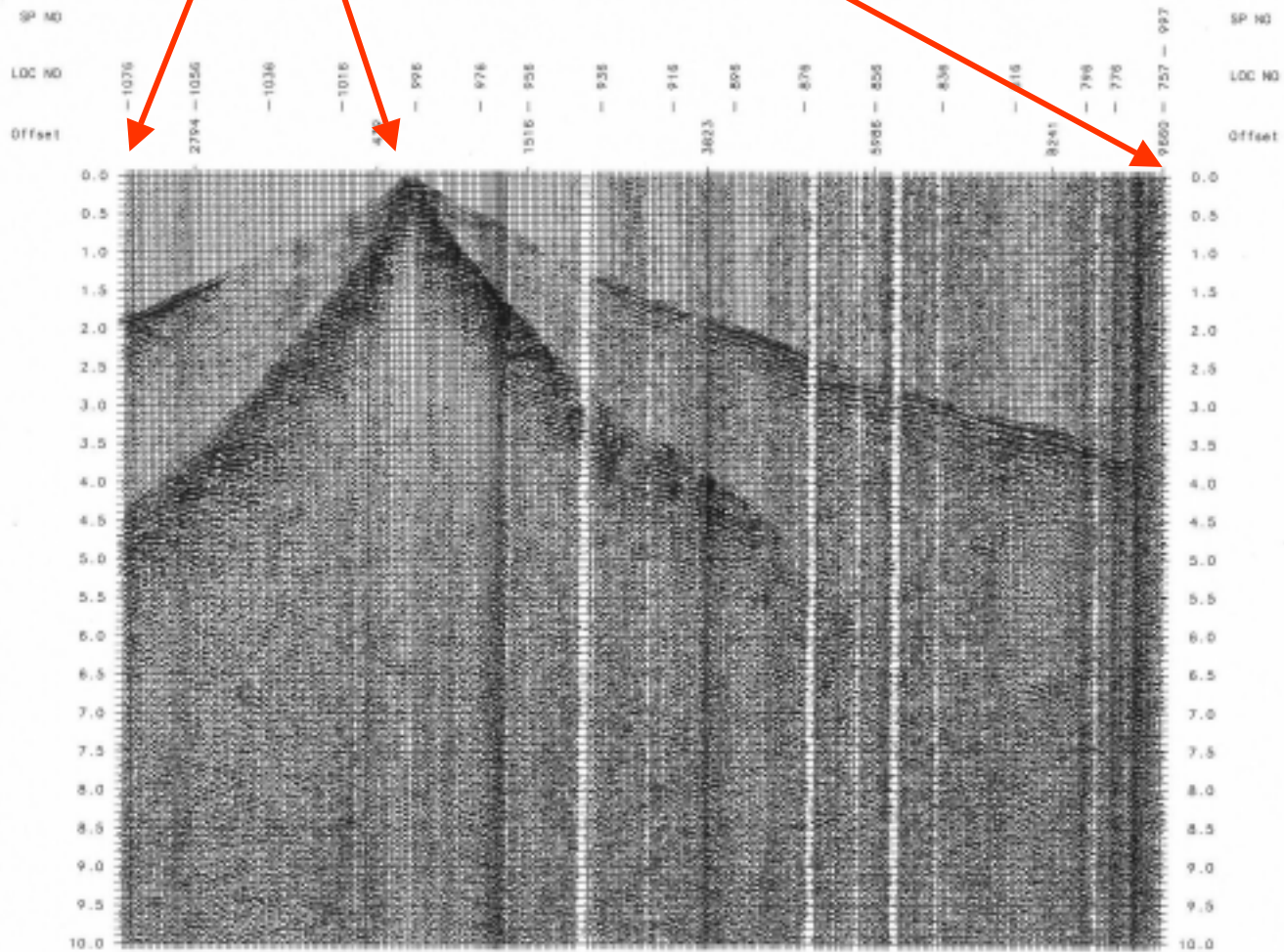
A topographic map of the study area, showing the location of the study site (red dot) and the location of the study site (red line). The map includes contour lines, a scale bar, and a north arrow.



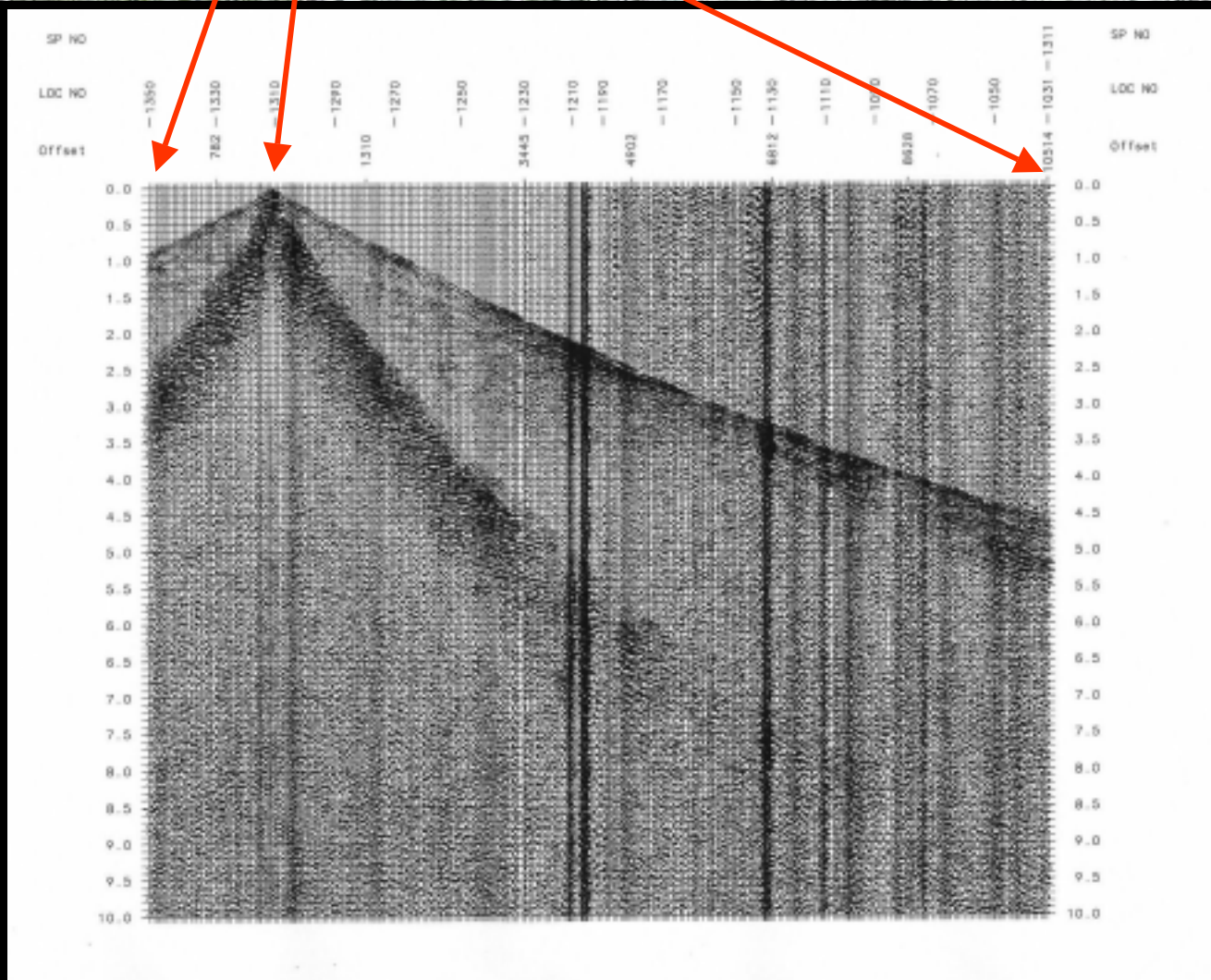
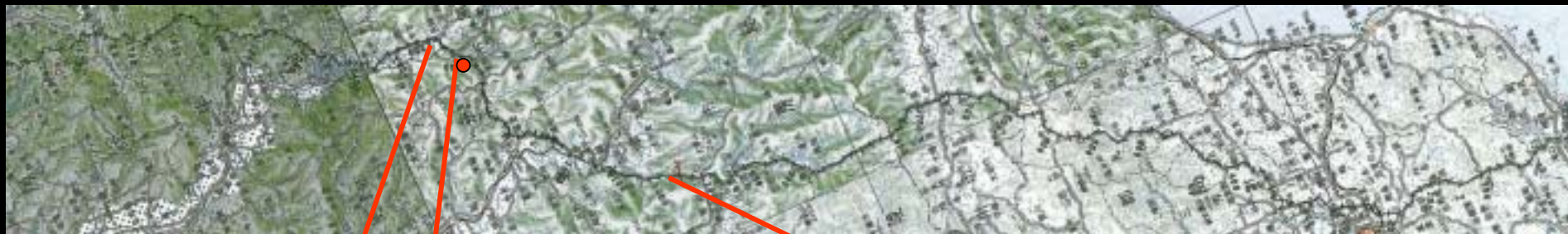
SP700



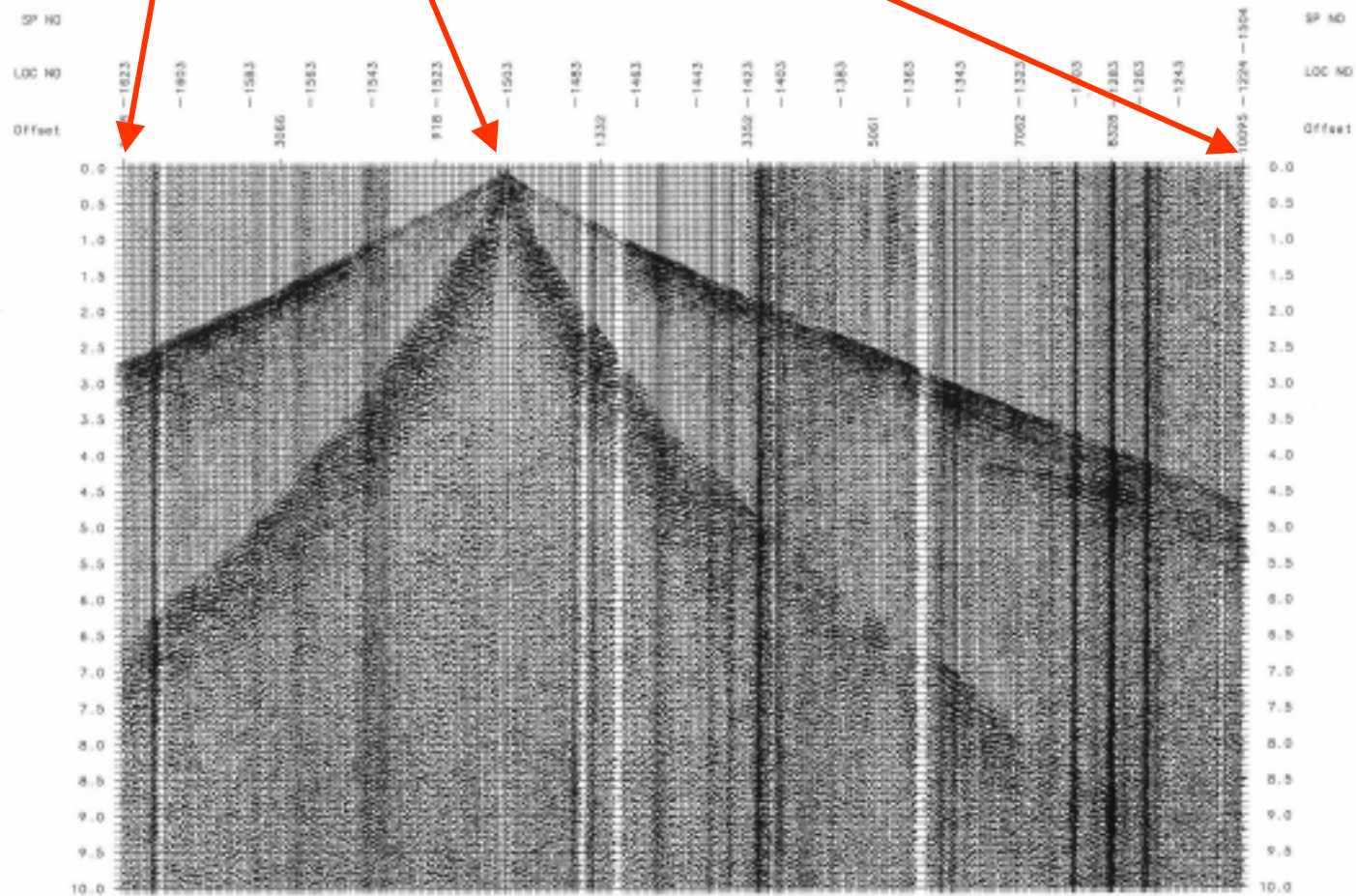
SP997



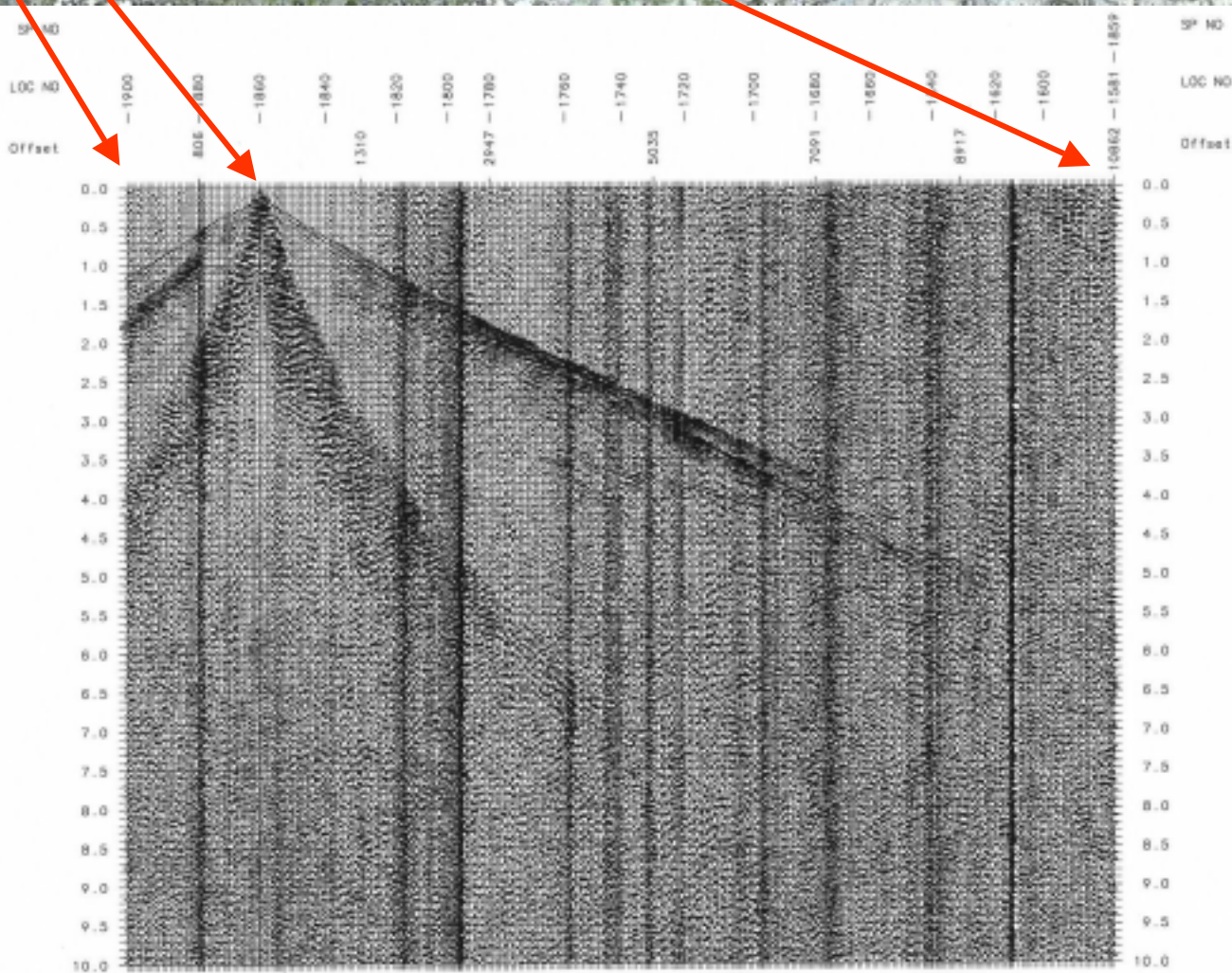
SP1311



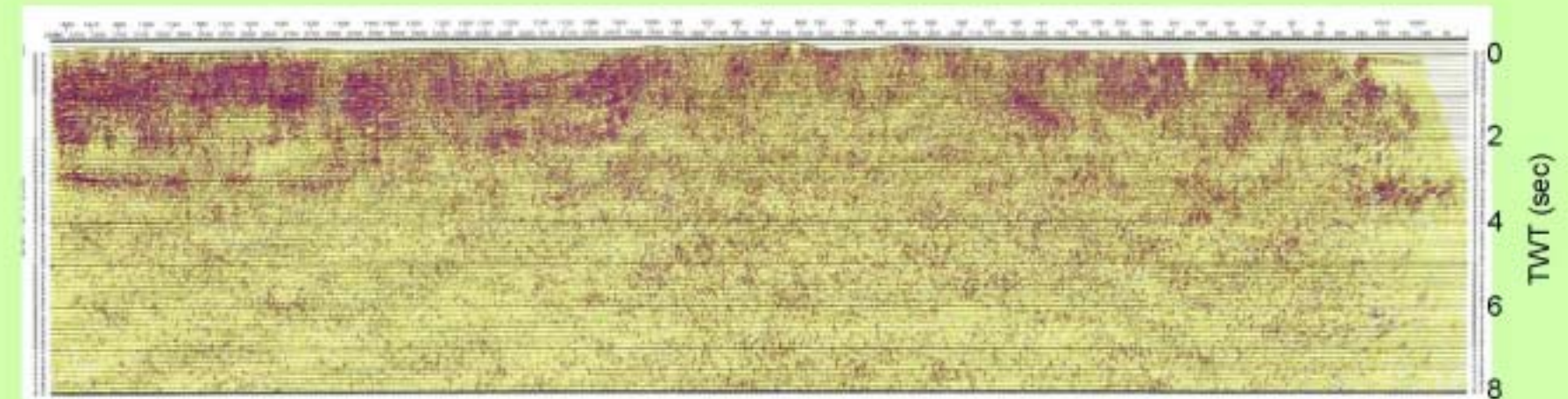
SP1504



SP1859



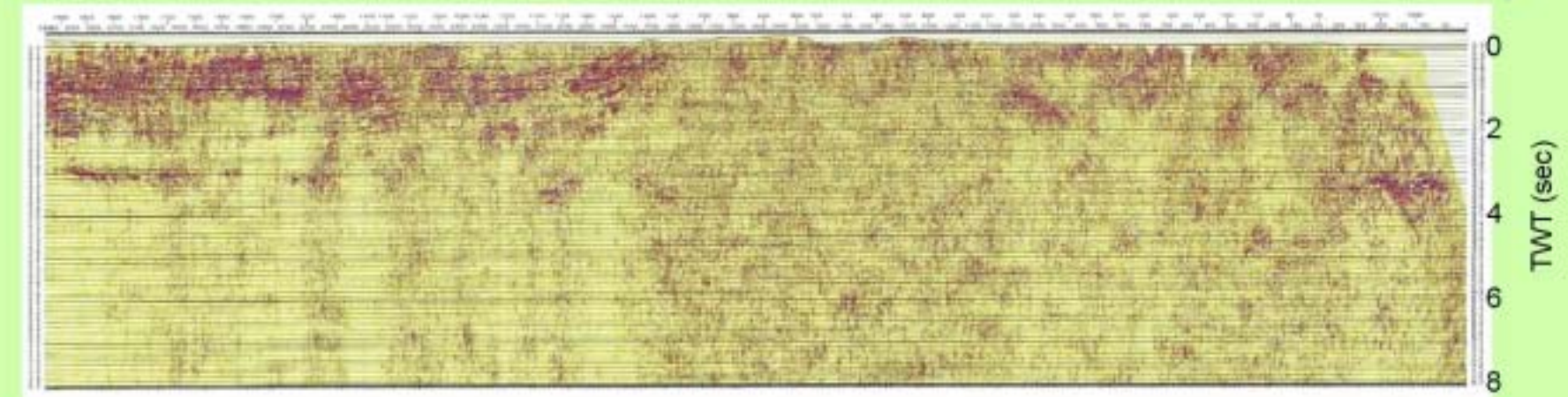
BOSO 2002 VIBROSEIS STACKED SECTION



← NORTH

Migrated Time Section

SOUTH →



Unmigrated Stacked Section

10 km

緊急暫定解釈断面

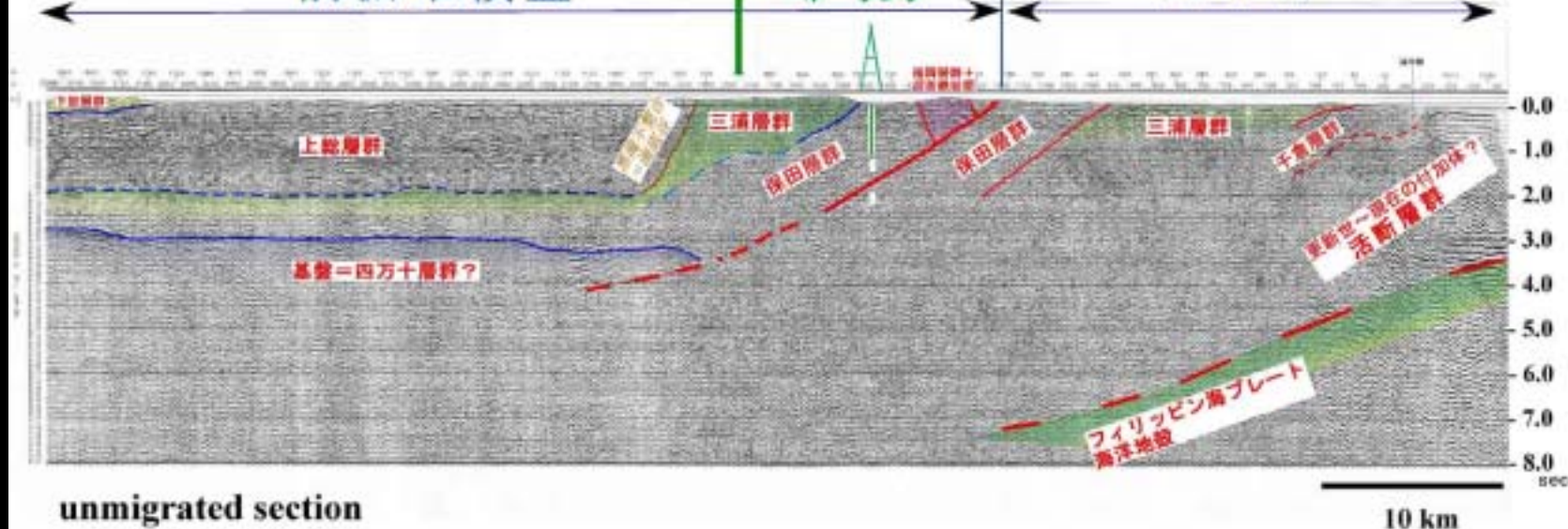
関東造盆地運動

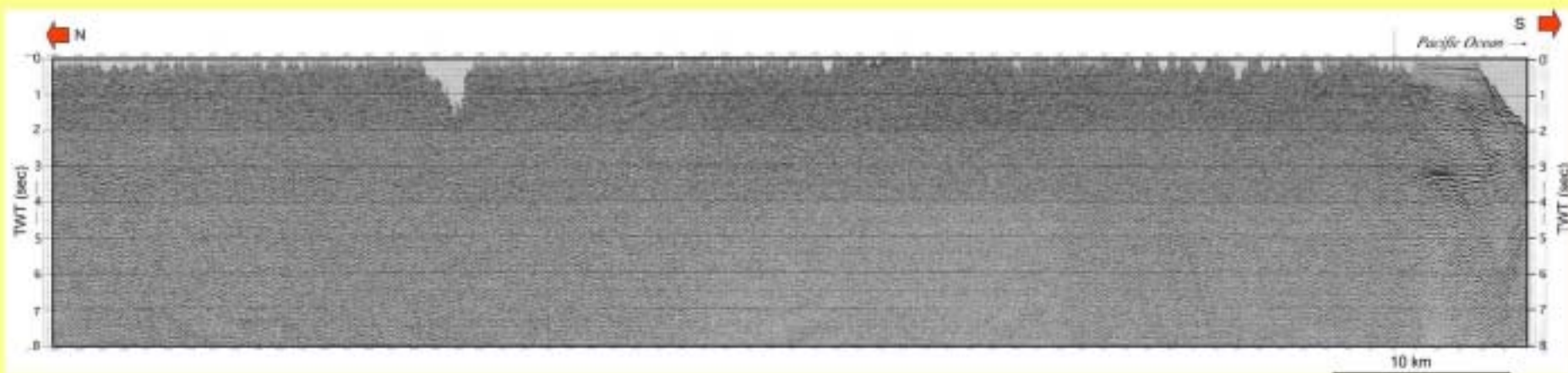
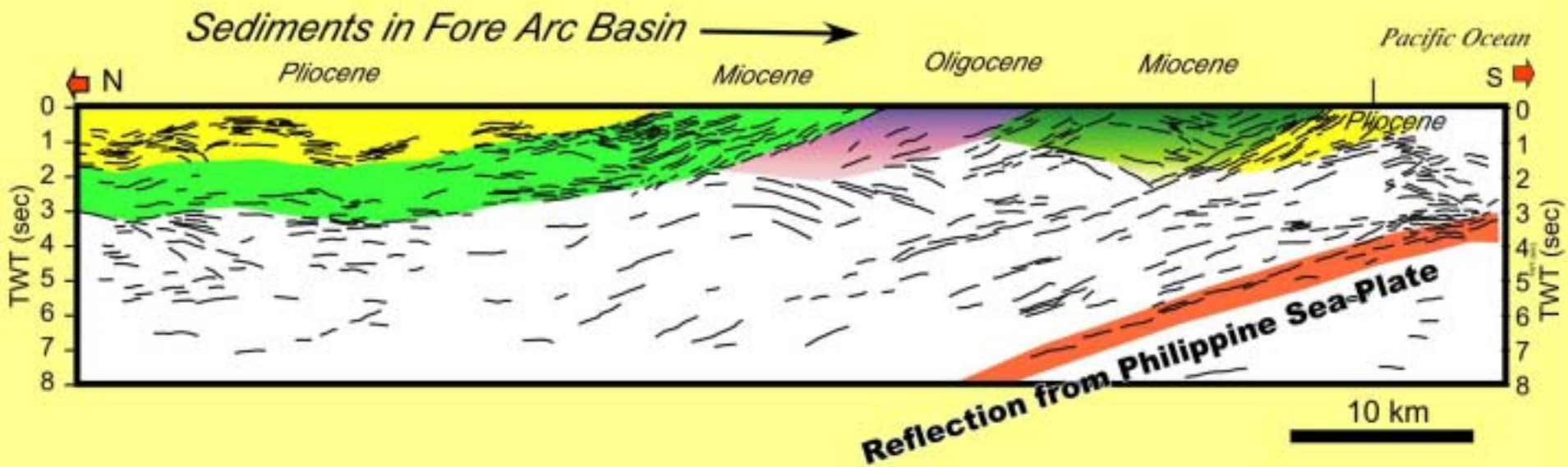
地震性隆起運動

前弧堆積盆

大大特房総
ボーリング

付加体





Preliminary Brute Stack Section for BOSO 2002

Data acquisition parameters for Boso 2002

Wide-angle Reflection

Length of seismic Line 157 km

Source

source	dynamite, 4 vibroseis trucks, Air-guns (2000 cu. inch)		
	30 -300 kg, 100 sweeps,	25 - 53 stacks	
No. of shots	12	8	3

Receiver information

receiver interval	50 m / 100 m		
length of spread	157 km,	30-46 km,	34 km
No. of channel	2497,	1983,	683
receiver	geophone (10/4.5 Hz)/ hydrophone		

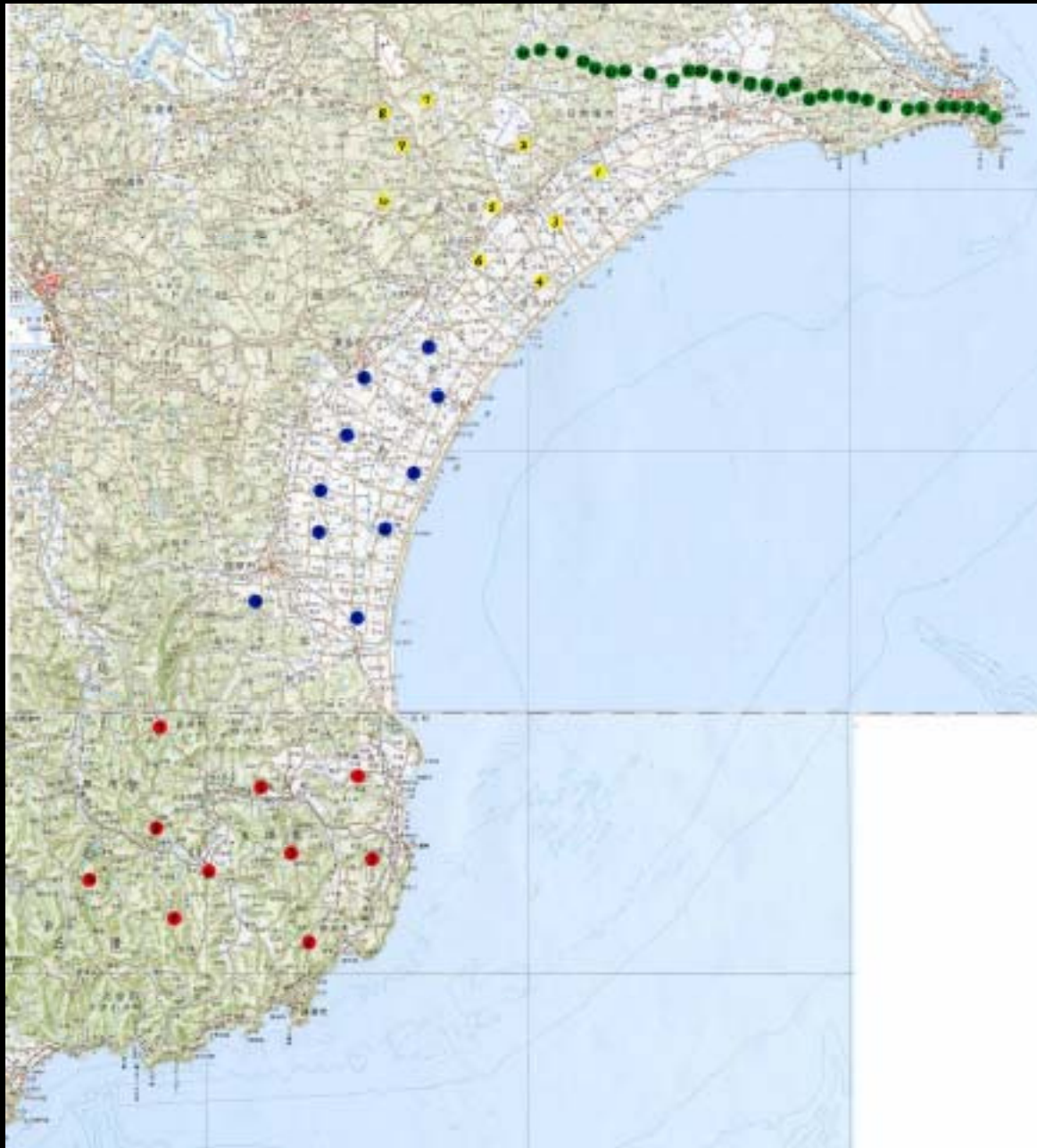
Recording information

instruments	GDAPS-4 Texan, MS2000, DAT, LS8000
sampling interval	4 ms, 10 ms
recording length	50 sec, 16 sec





Seismic Line for Boso 2002



**独立型レコー
ダーの展開**

**屈折法による
速度構造の
解明**



ダイナマイト発破点の状況

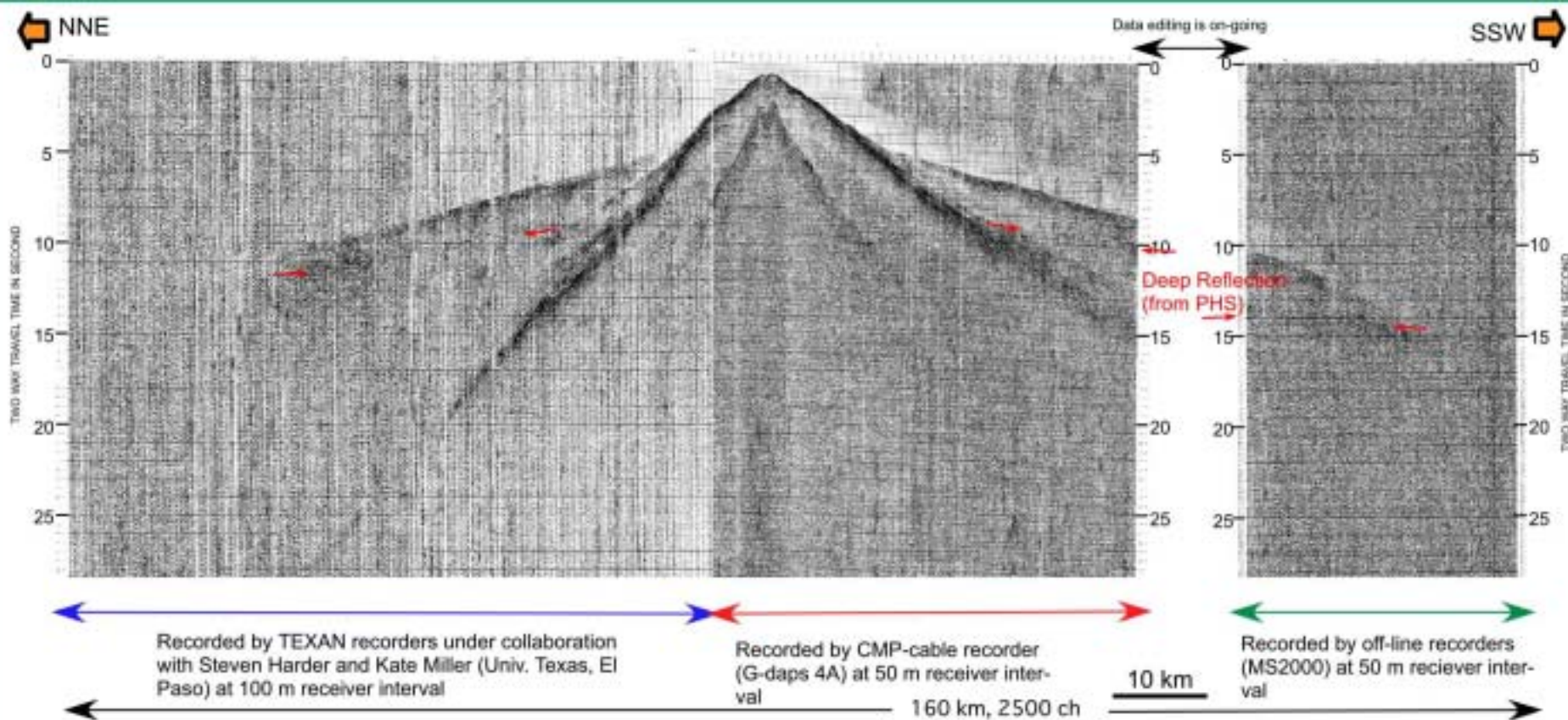


Off-line Recorder MS2000 (JGI)

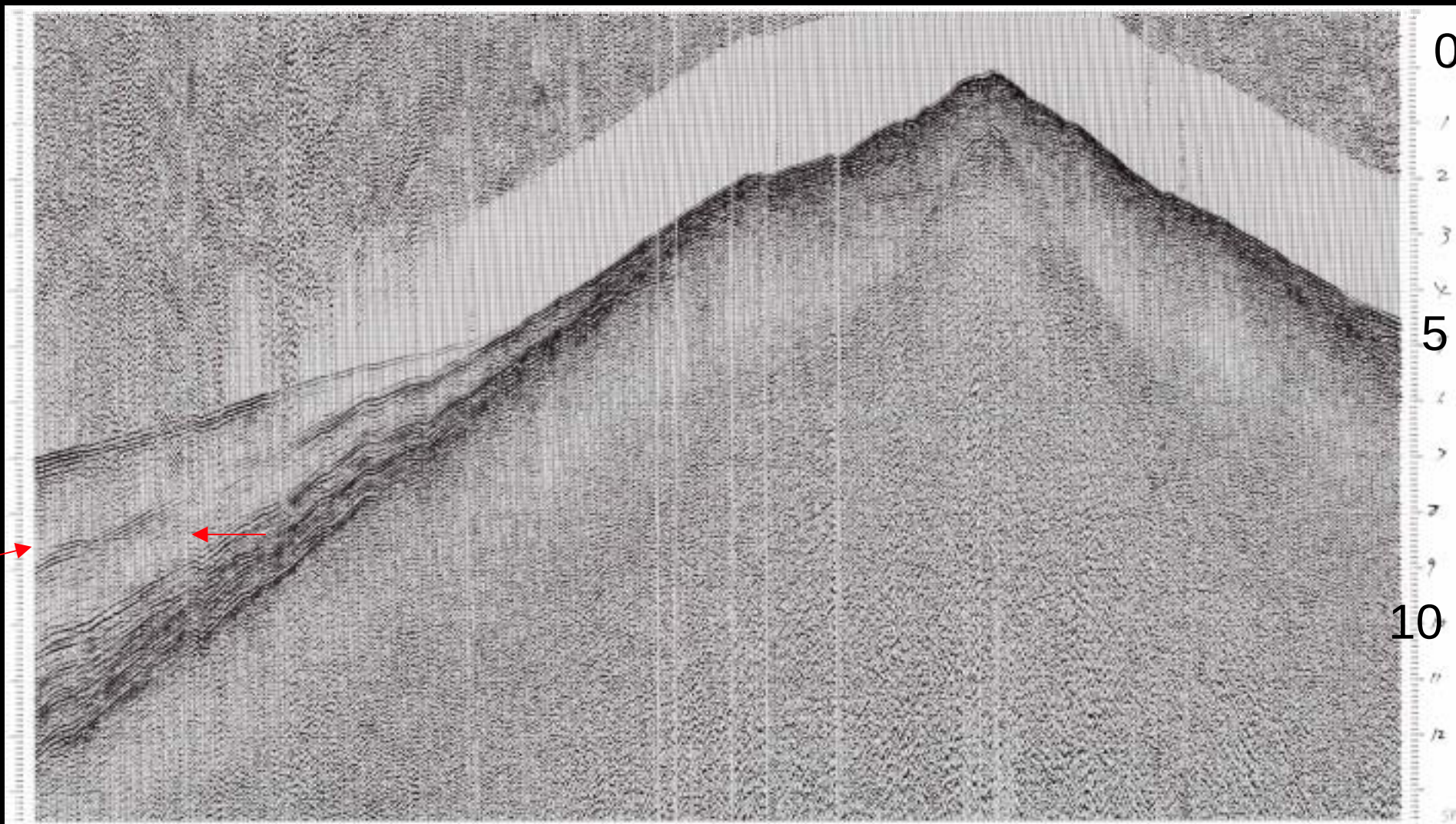
4.5 Hz geophone



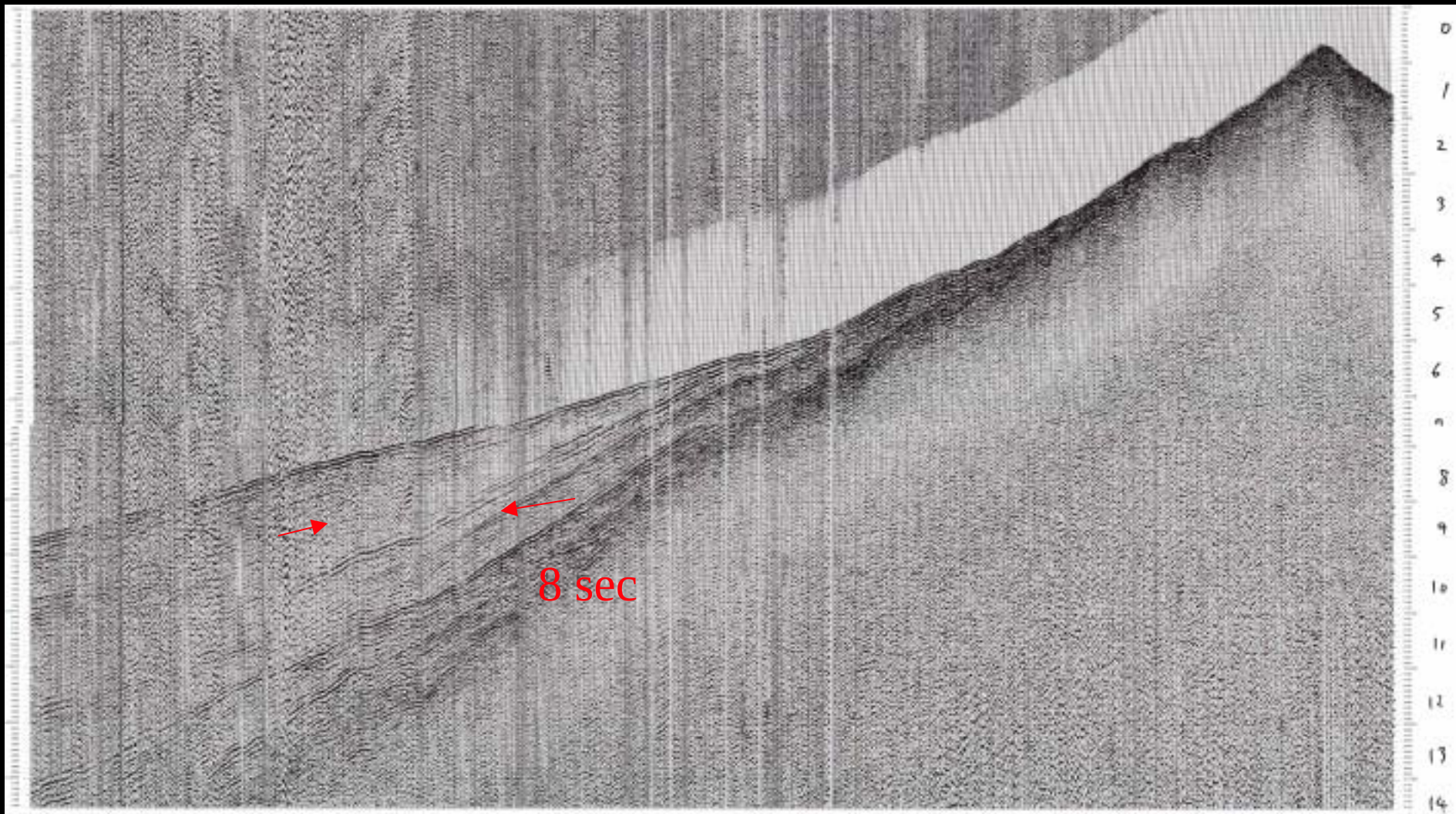
RefTek 125



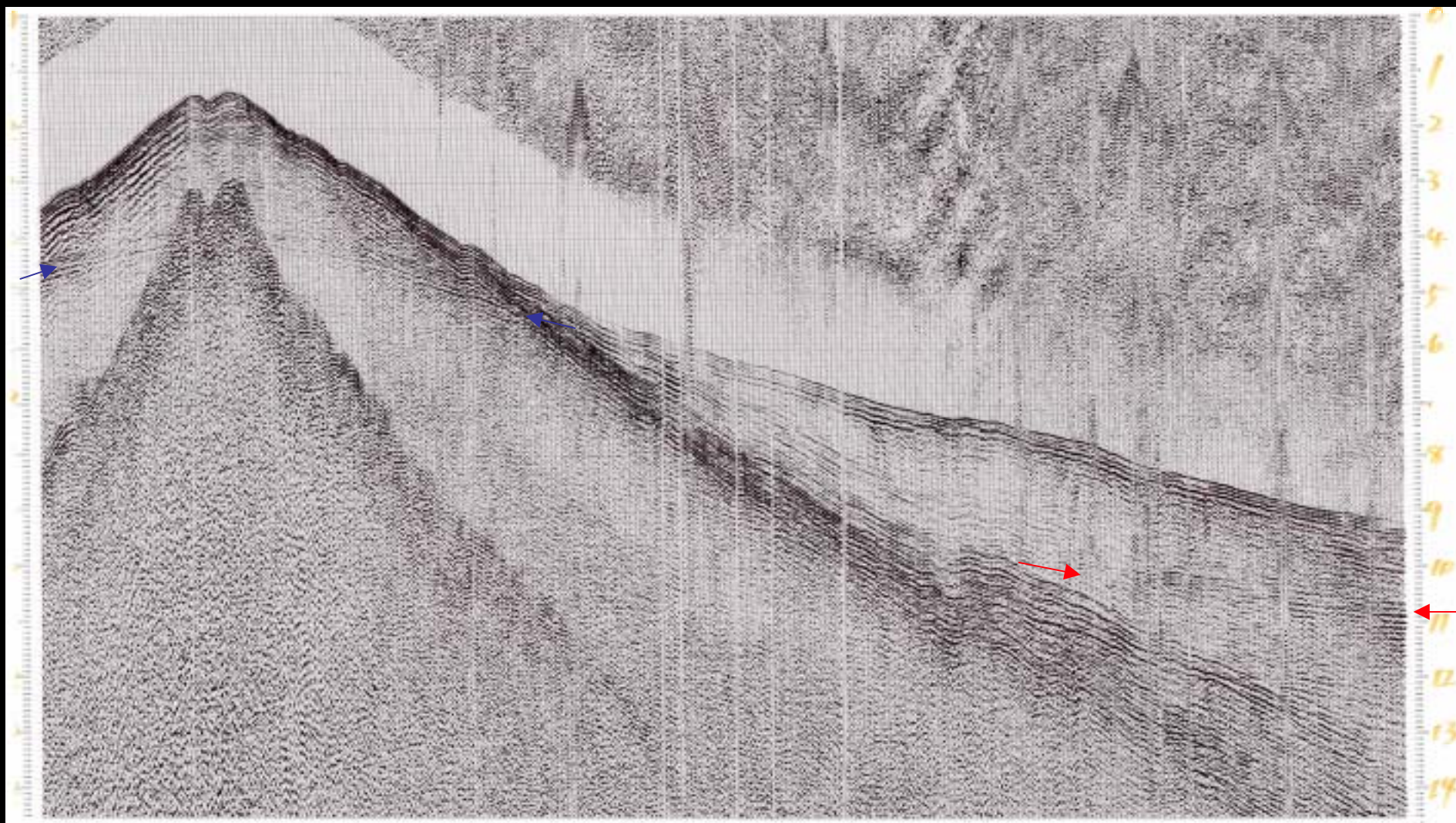
Example of shot gather (SP5-1, 100 kg, applied AGC(4000 ms) and band pass filter (4-30 Hz))



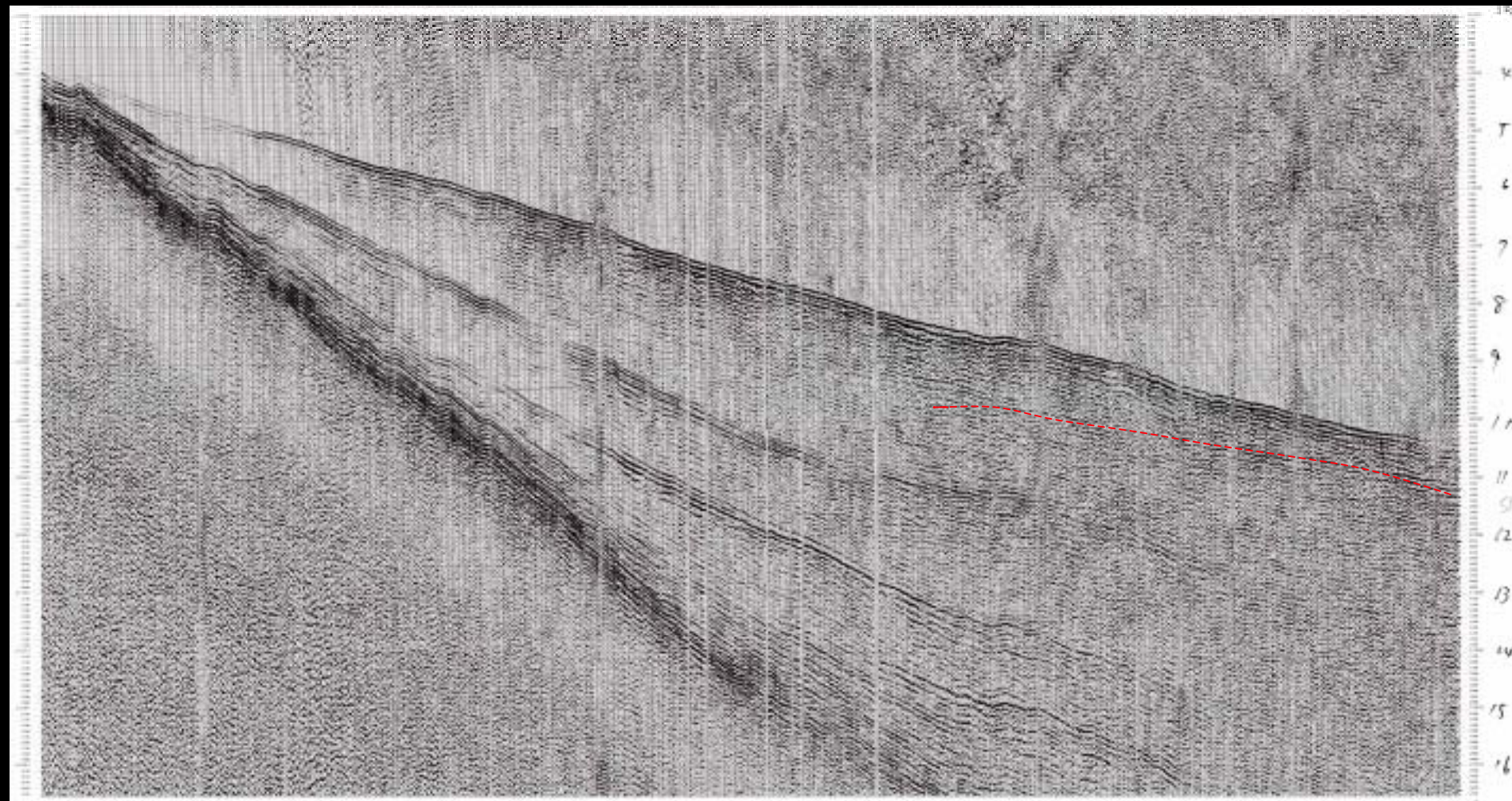
SP 4 (100 kg)



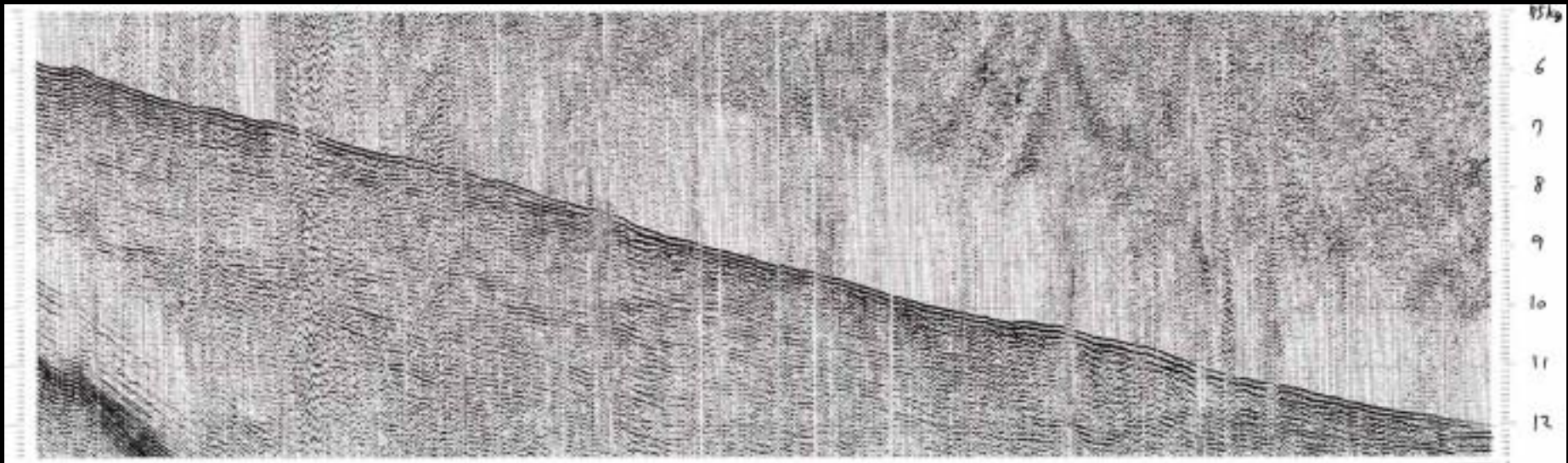
SP 3 (100 kg)



ショット点 SP5-1 (100 kg)



SP 6 (50 kg)

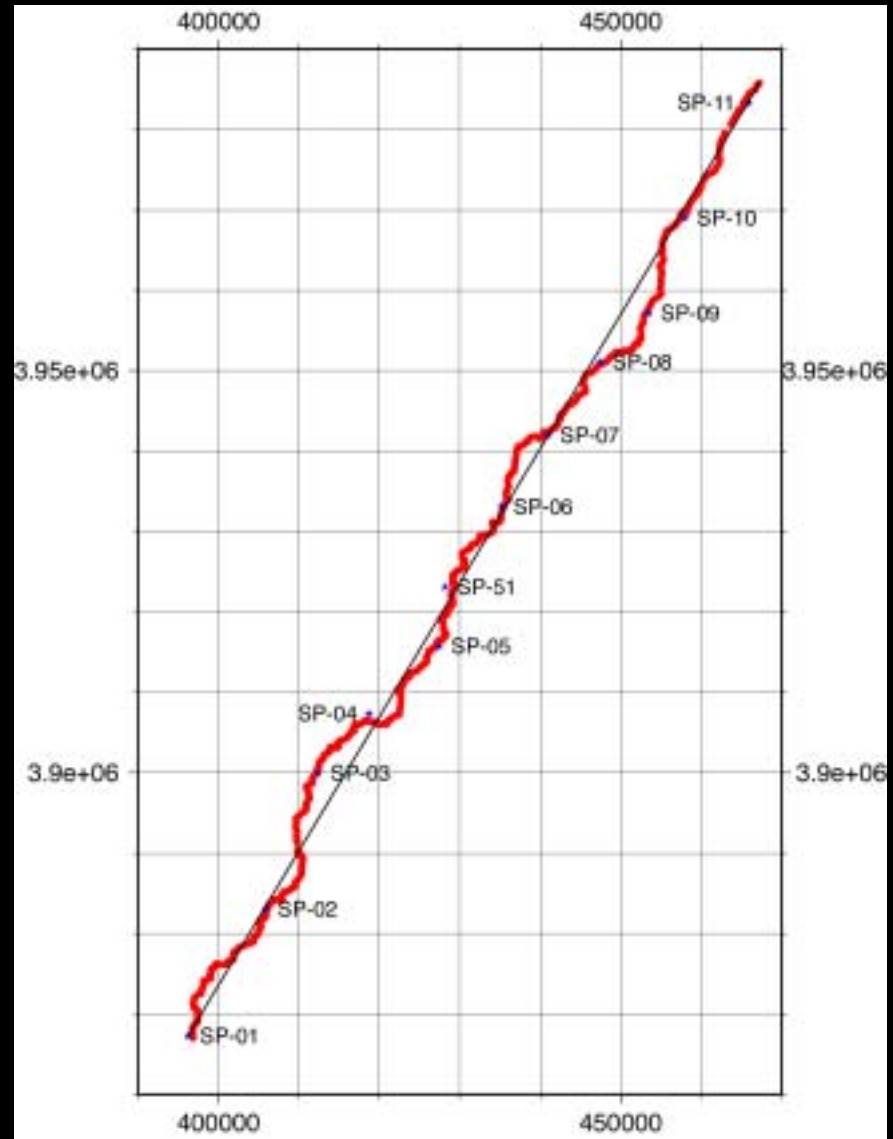


SP 7 (75 kg)

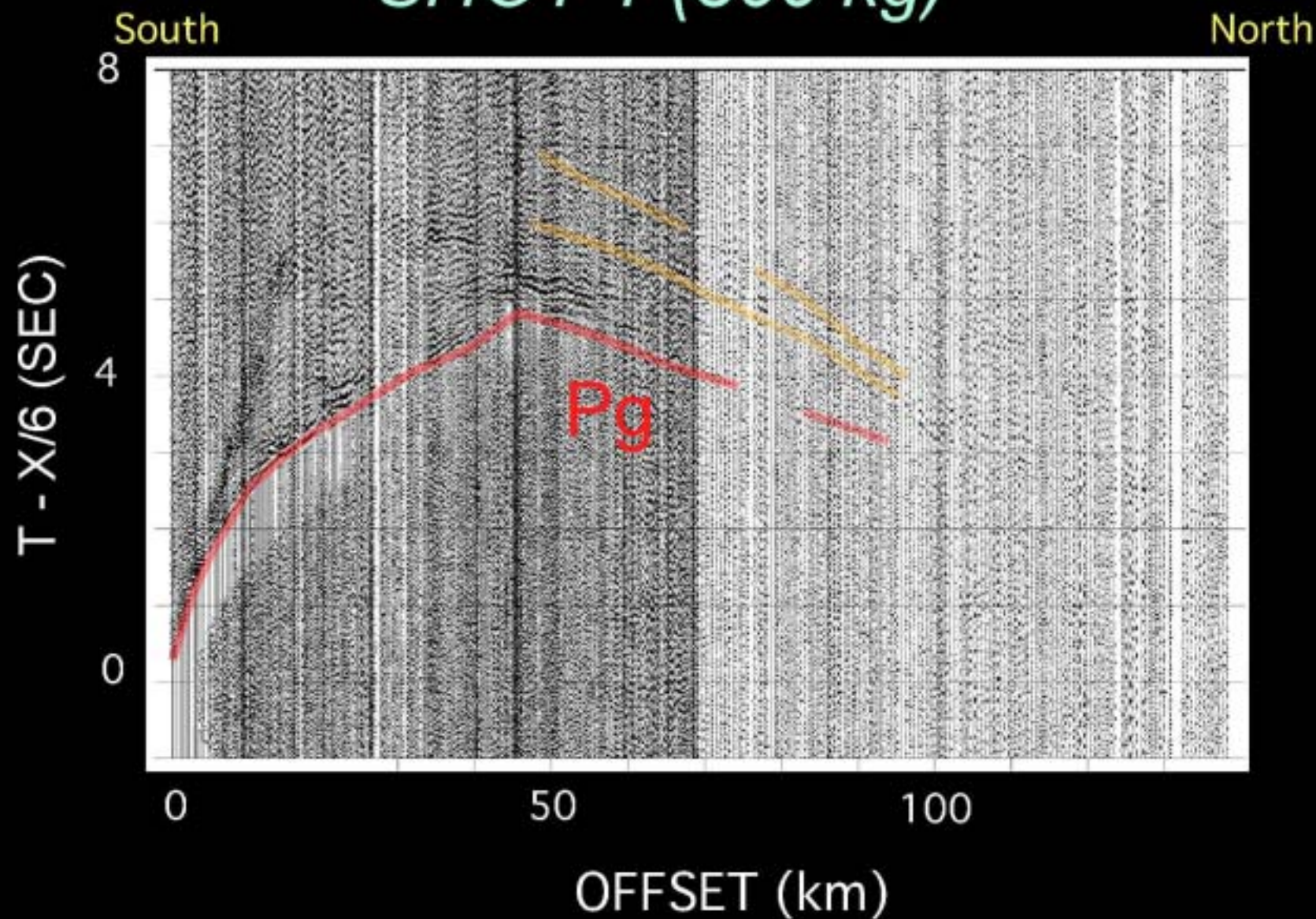
BOSO-2002 WIDE-ANGLE EXPLOSION DATA

12 shots (50-300 kg).
2437 receiver stations
(50-1000 m).

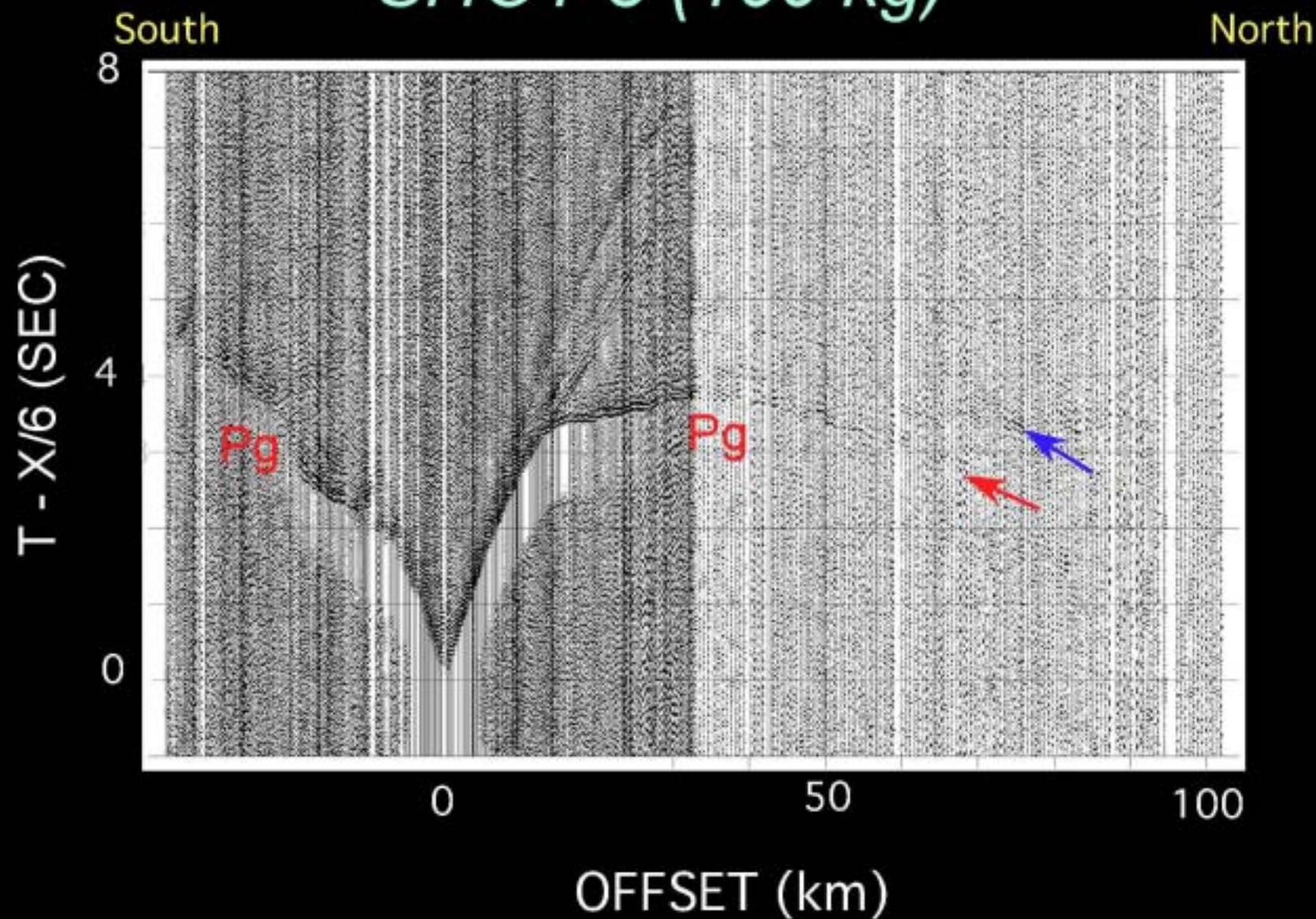
140 km transect.



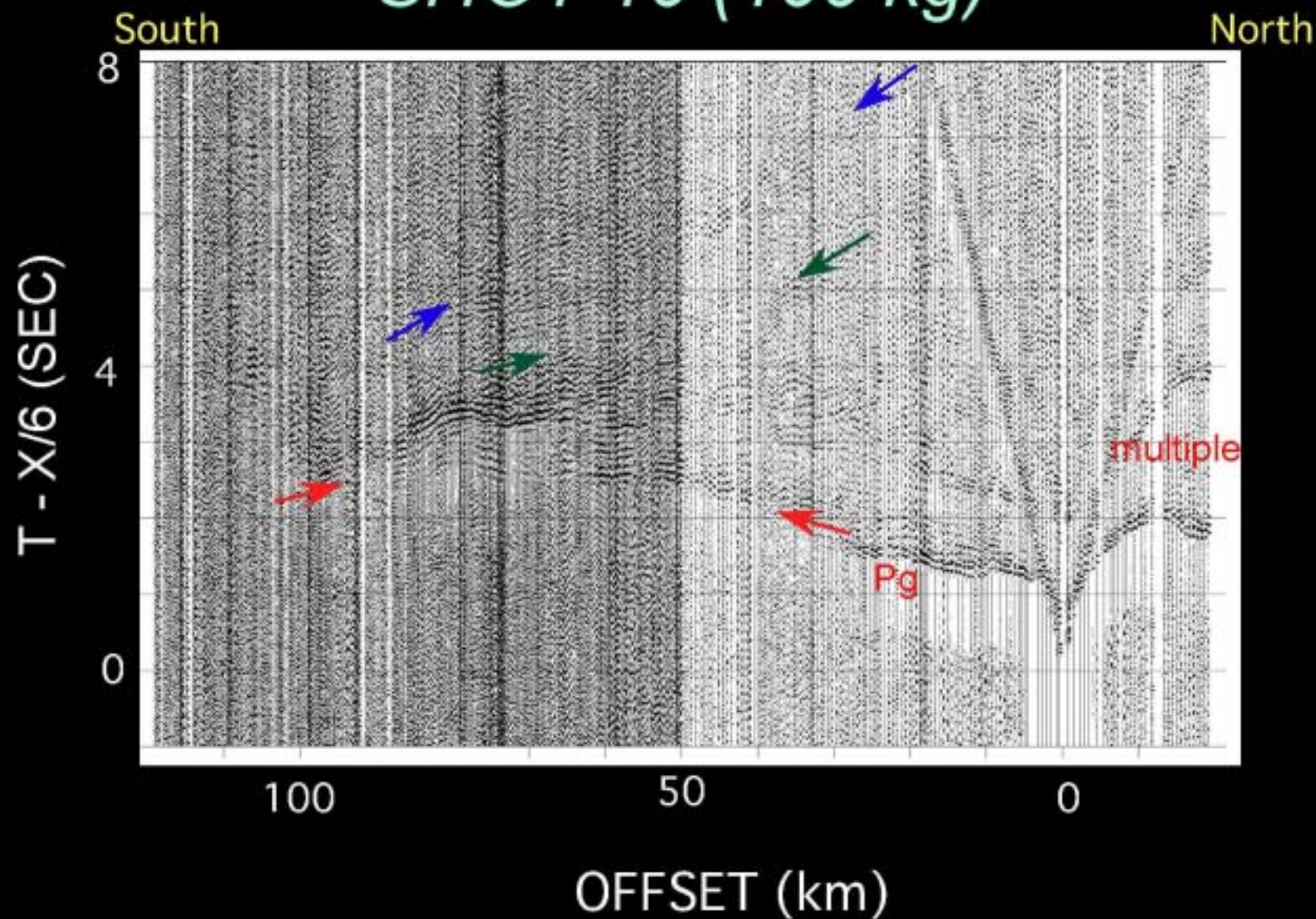
SHOT 1 (300 kg)

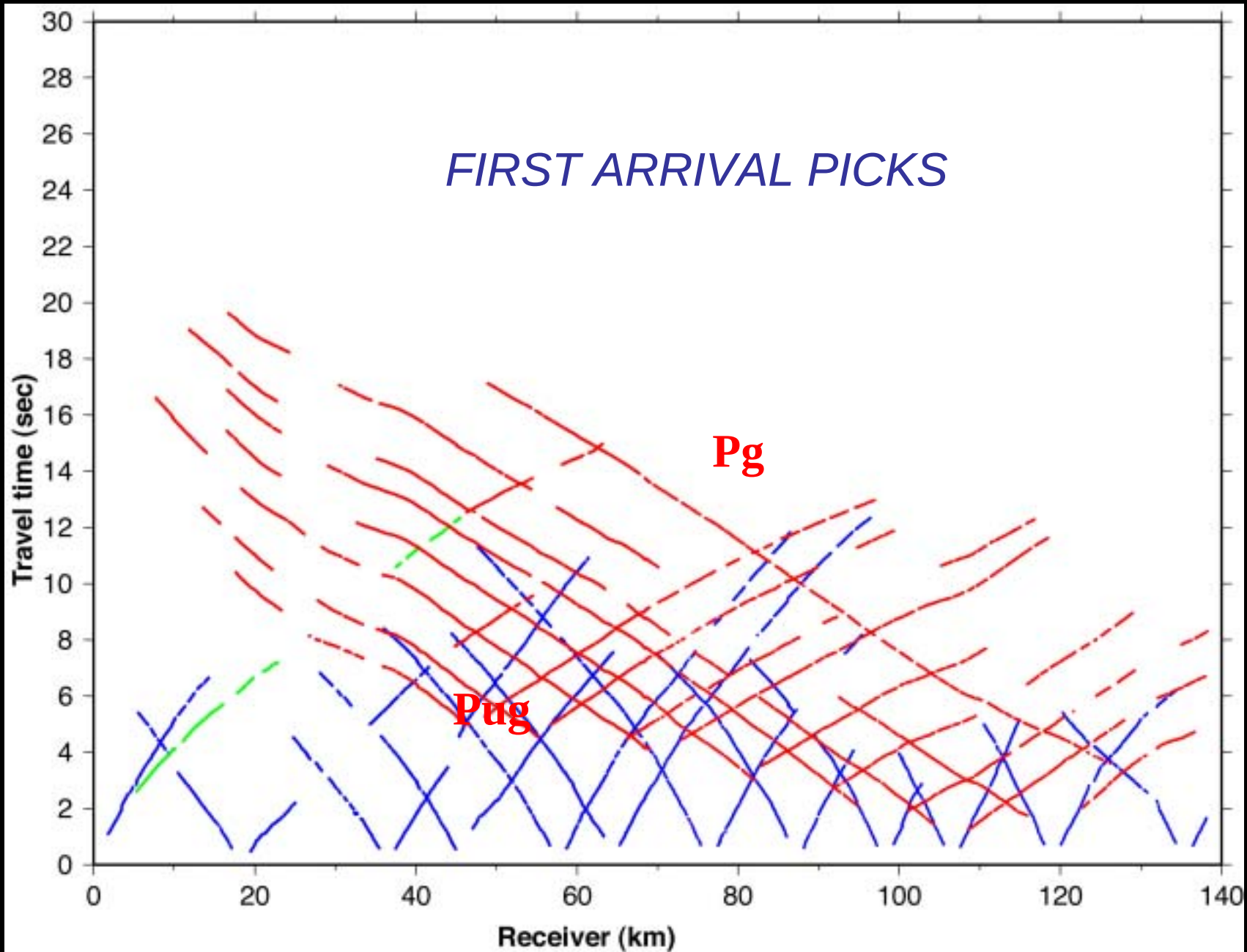


SHOT 3 (100 kg)



SHOT 10 (100 kg)

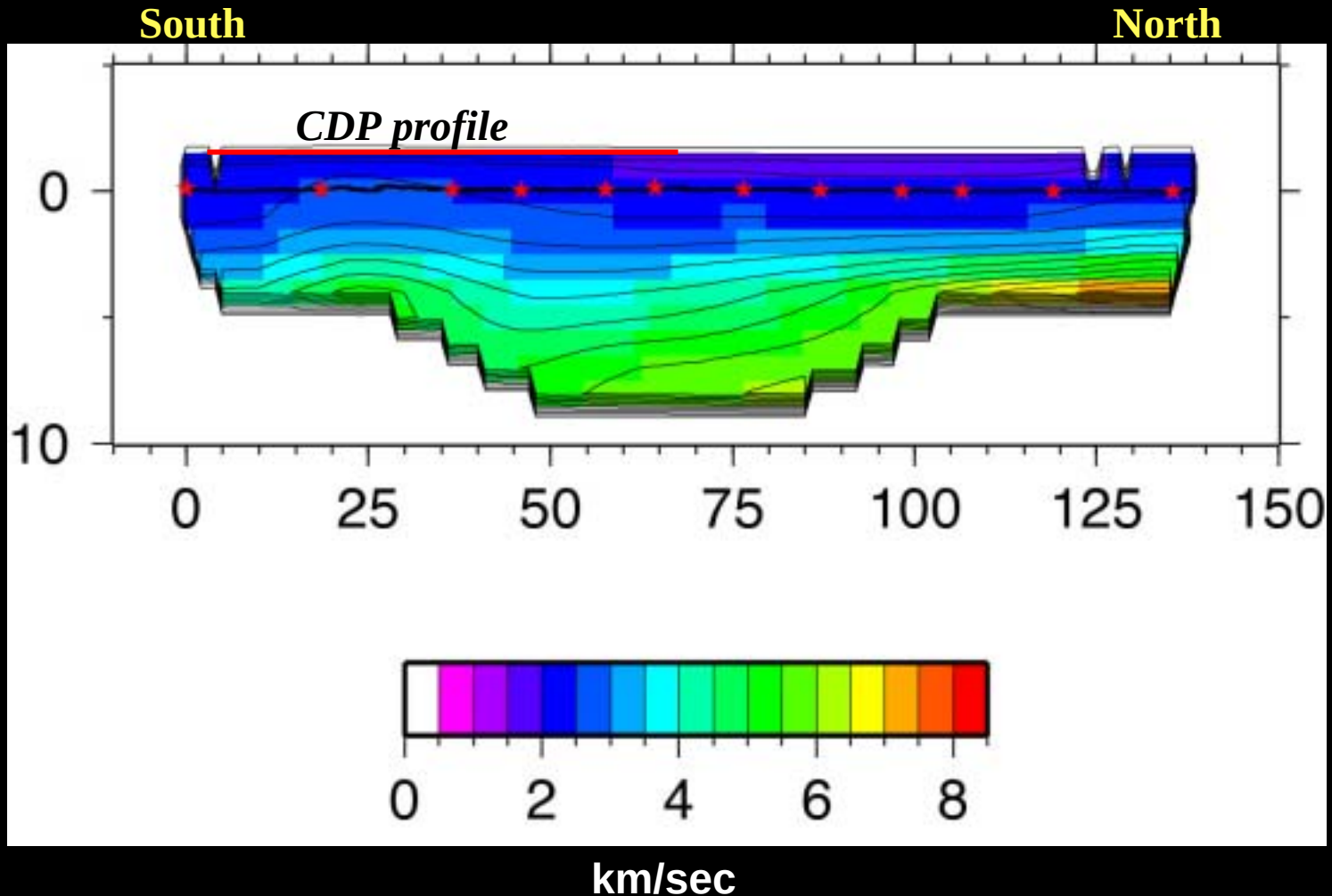




P Velocity Structure of Boso Peninsula

Upper Crust

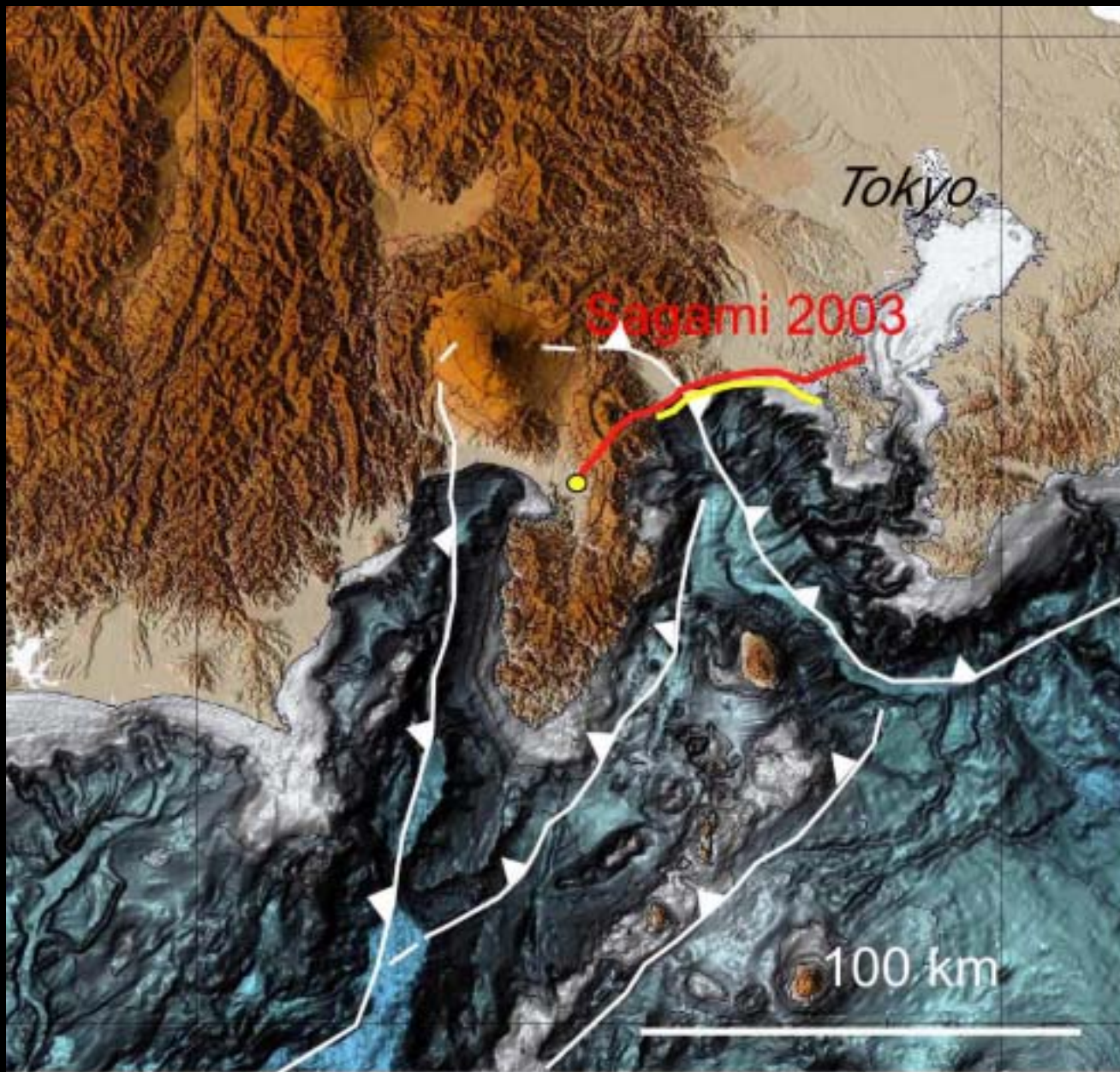
(Analysis of Deep Crust / Mantle Slabs in Progress)



大都市圏地殻構造探查 相模 2003

2003年2月初旬3月中旬

2003 2 13

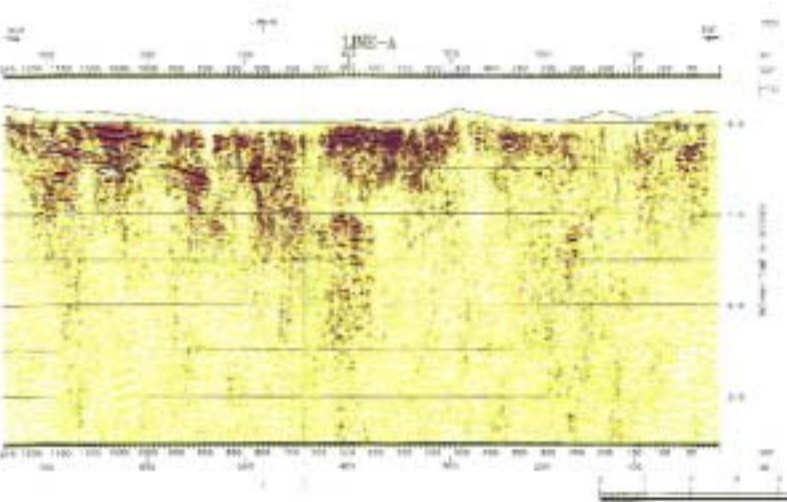


地震探査測線
相模2003

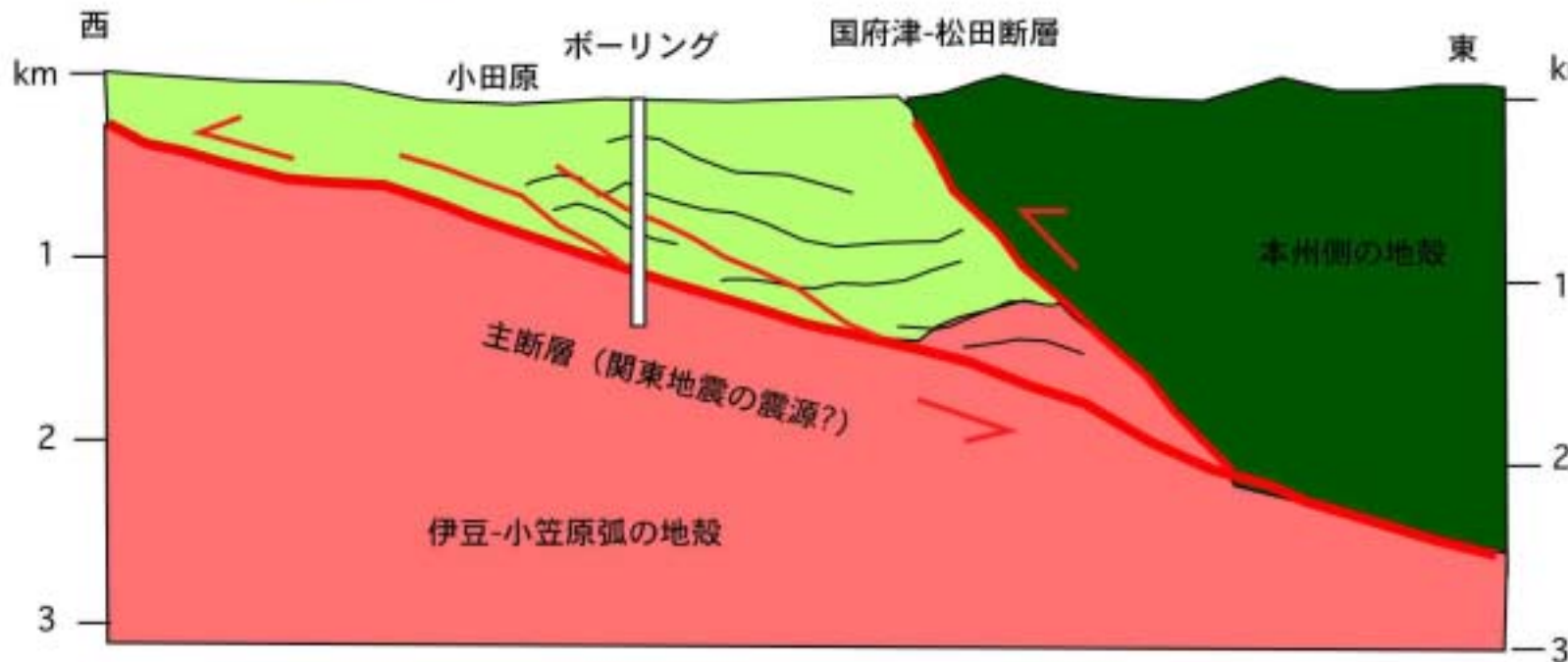
Air-gun
shooting
line

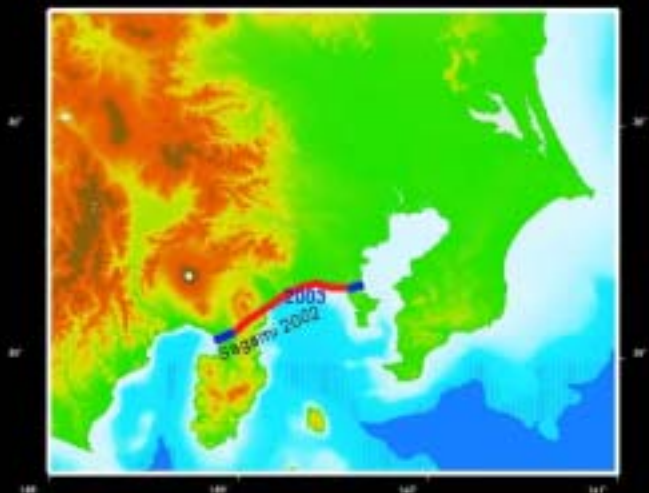
足柄平野におけるボーリング調査の概念図

神奈川県で平成13年度
に実施した反射法地震探
査断面

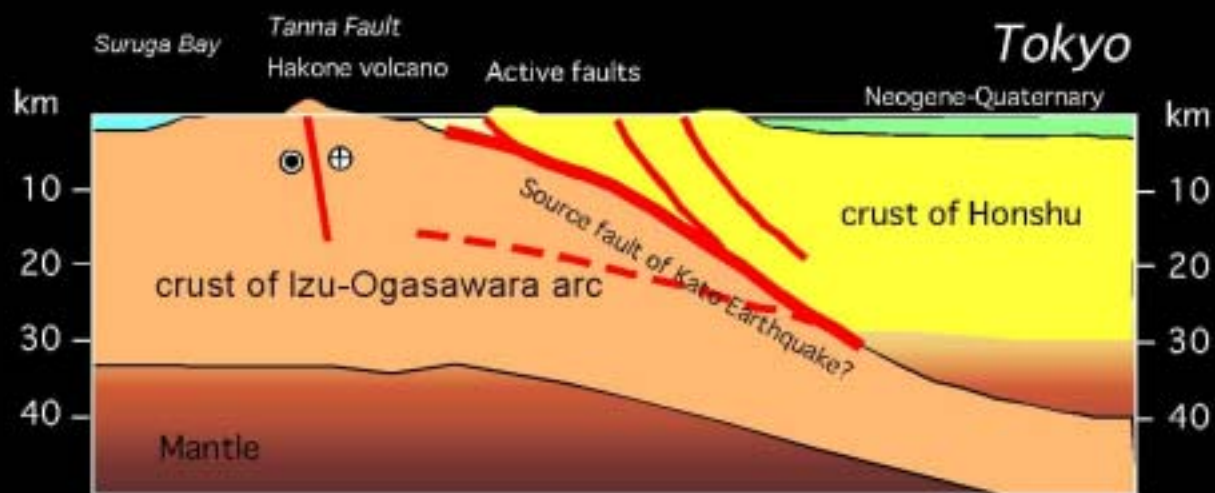


伏在断層の存在の調査
年代測定による断層の変位速度
堆積層の弾性波速度構造
高感度地震観測





SAGAMI 2003





湘南海岸における受振器の展開作業





2003 2 5

Data acquisition parameters for the western part of the Sagami 2003

Length of seismic Line 33.4 km

Source

source	4 vibroseis trucks
sweep frequency	6-30 Hz
sweep length	24 sec
No. of sweeps	50 - 100
shot interval	200 m (standard)
total No. of shots	98

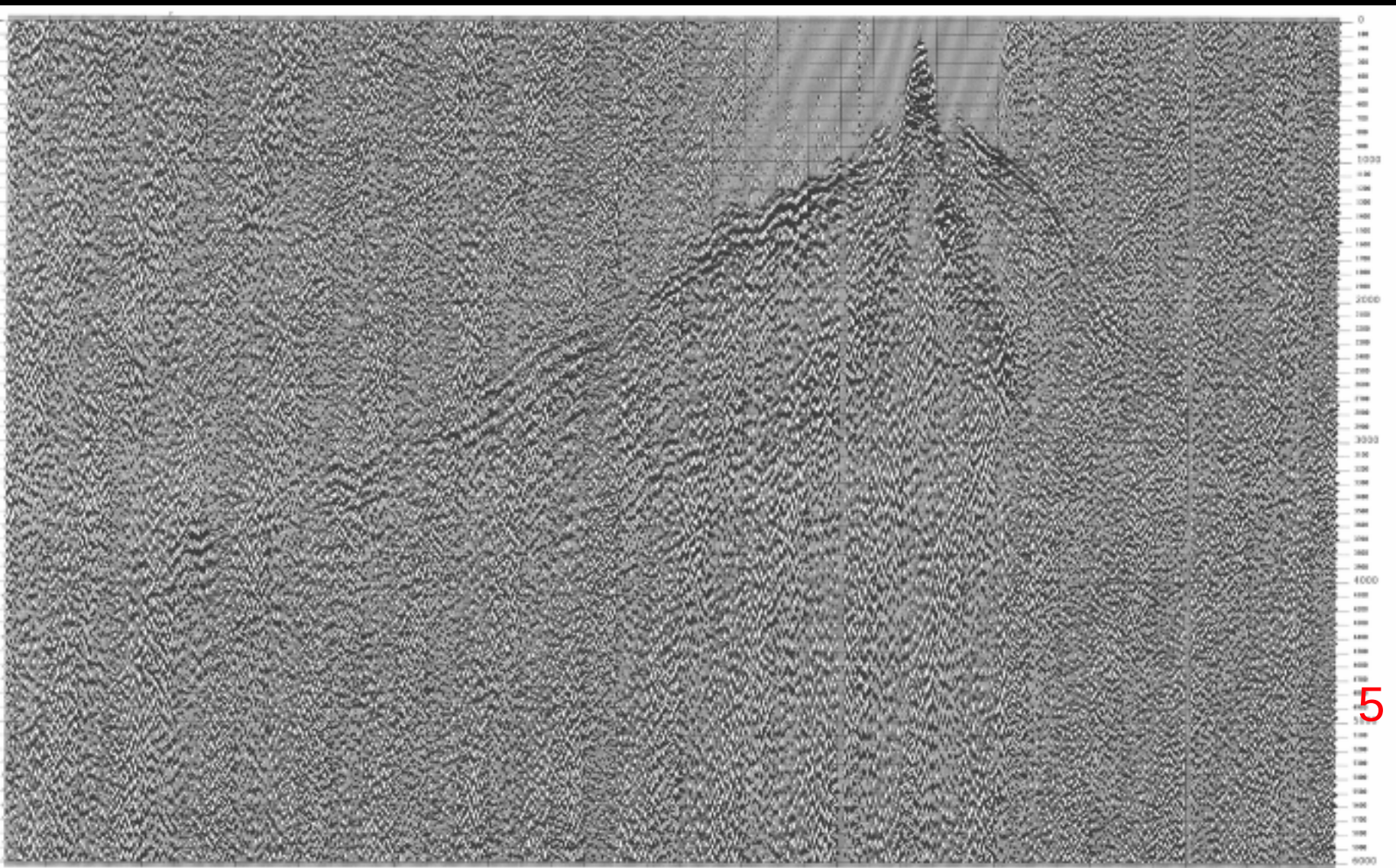
Receiver information

receiver interval	50 m
No. of channels	516 - 668 ch
natural frequency	10 Hz

Recording information

instruments	GDAPS-4
sampling interval	4 ms
recording length	16 sec





バイブロサイス 50 sweeps

Data acquisition parameters for the eastern part of the Sagami 2003

Length of seismic Line 54.1 km

Source

source	Air guns 1500 cu.inch
pressure	2000 psi
shot interval	100 m (standard)
total No. of shots	689

Receiver information

receiver interval	50 m
No. of channels	650 ch
length of spread	32.5 km
natural frequency	10 Hz

Recording information

instruments	GDAPS-4
sampling interval	4 ms
recording length	16 sec



Data acquisition parameters for Sagami 2003

Wide-angle Reflection

Length of seismic Line 54.1 km

Source

source	Air guns 1500 cu.inch 50 - 96 stacks	dynamite	200kg
total No. of shots	6	1	

Receiver information

receiver interval	50 m
No. of channels	1452 ch
natural frequency	10 Hz

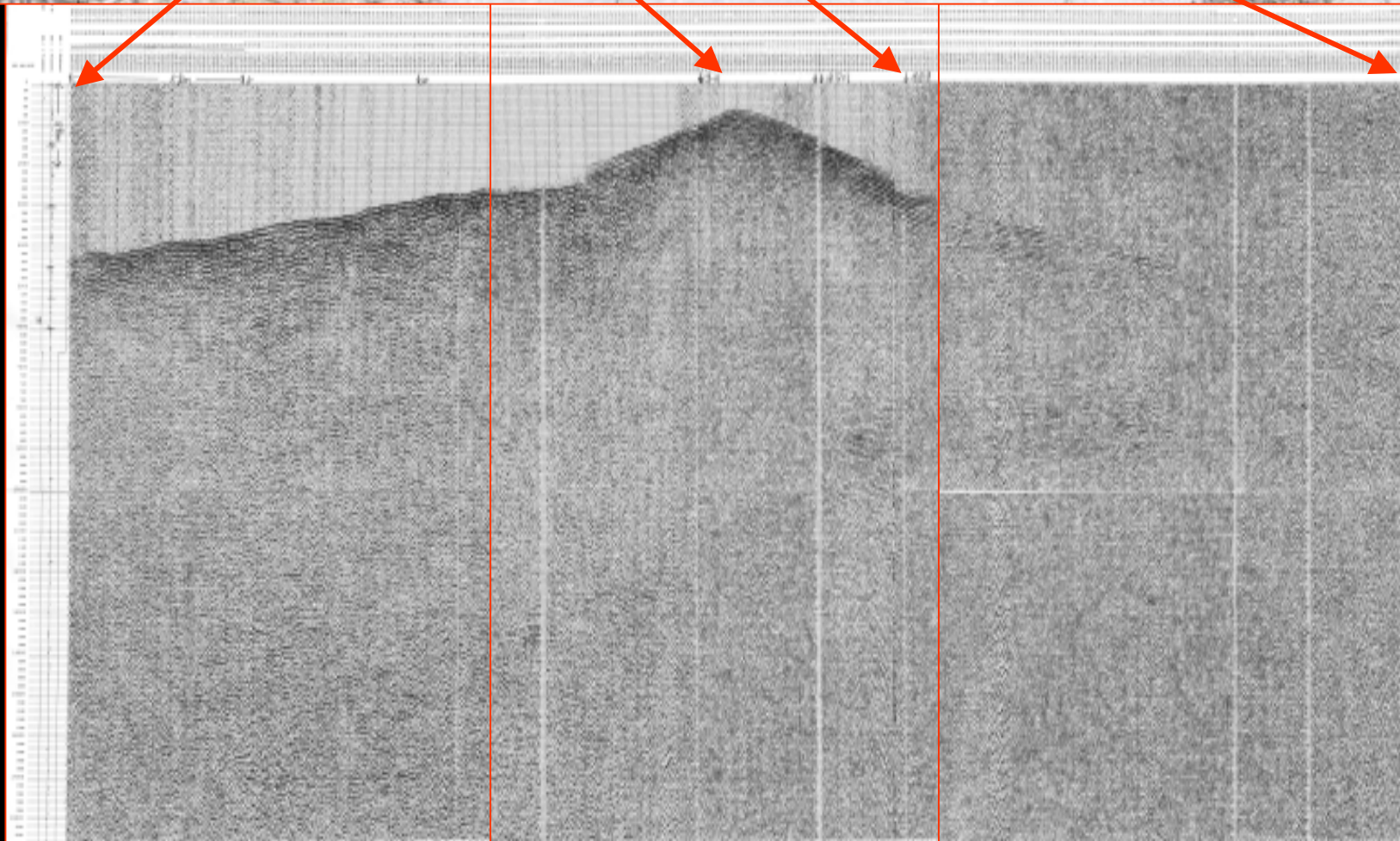
Recording information

instruments	GDAPS-4
sampling interval	4 ms
recording length	30 sec



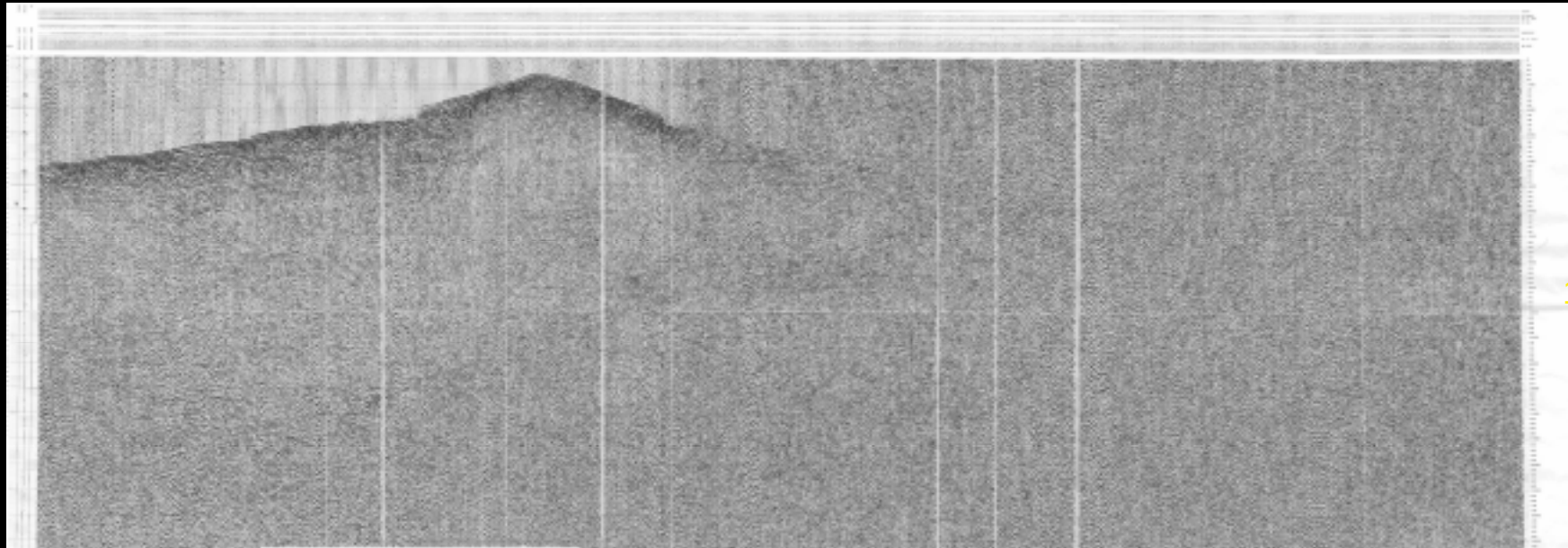






西
三島

東
鎌倉



20 km

Location A3 小田原港沖
エアガン 1500 ci

西
三島

東
鎌倉



10 sec

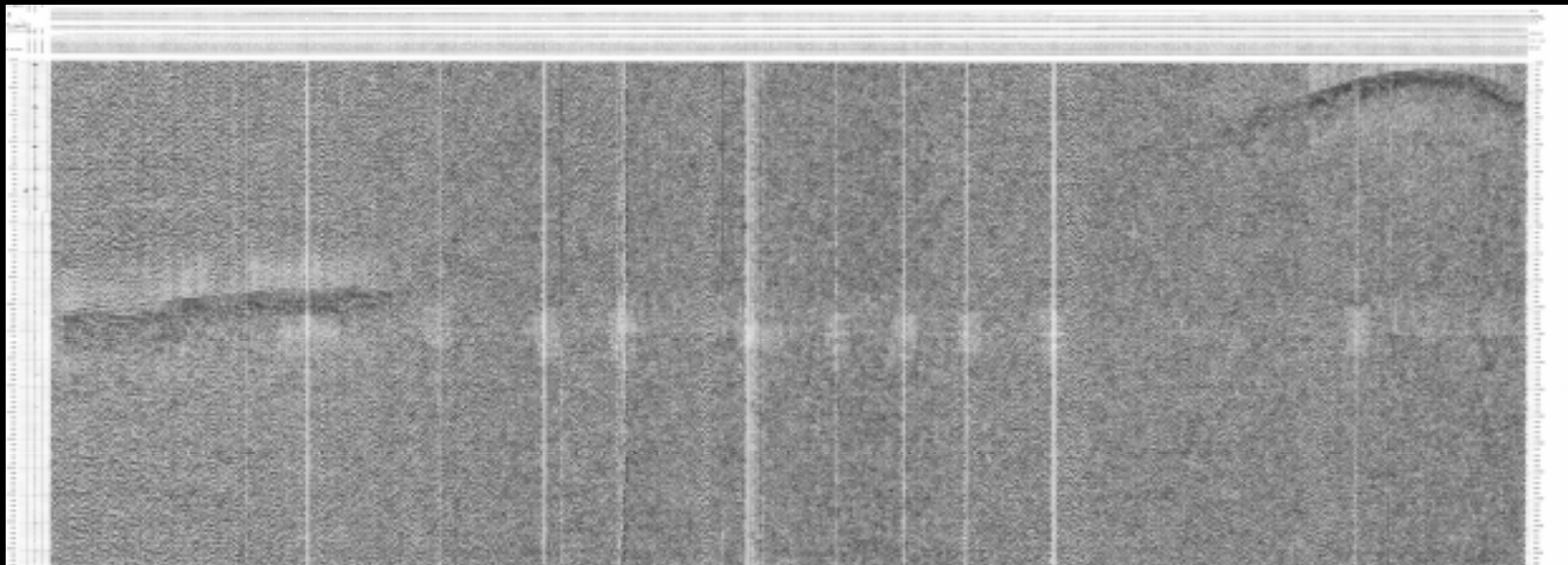
20 km



Location A4 平塚港沖
エアガン 1500 ci

西
三島

東
鎌倉

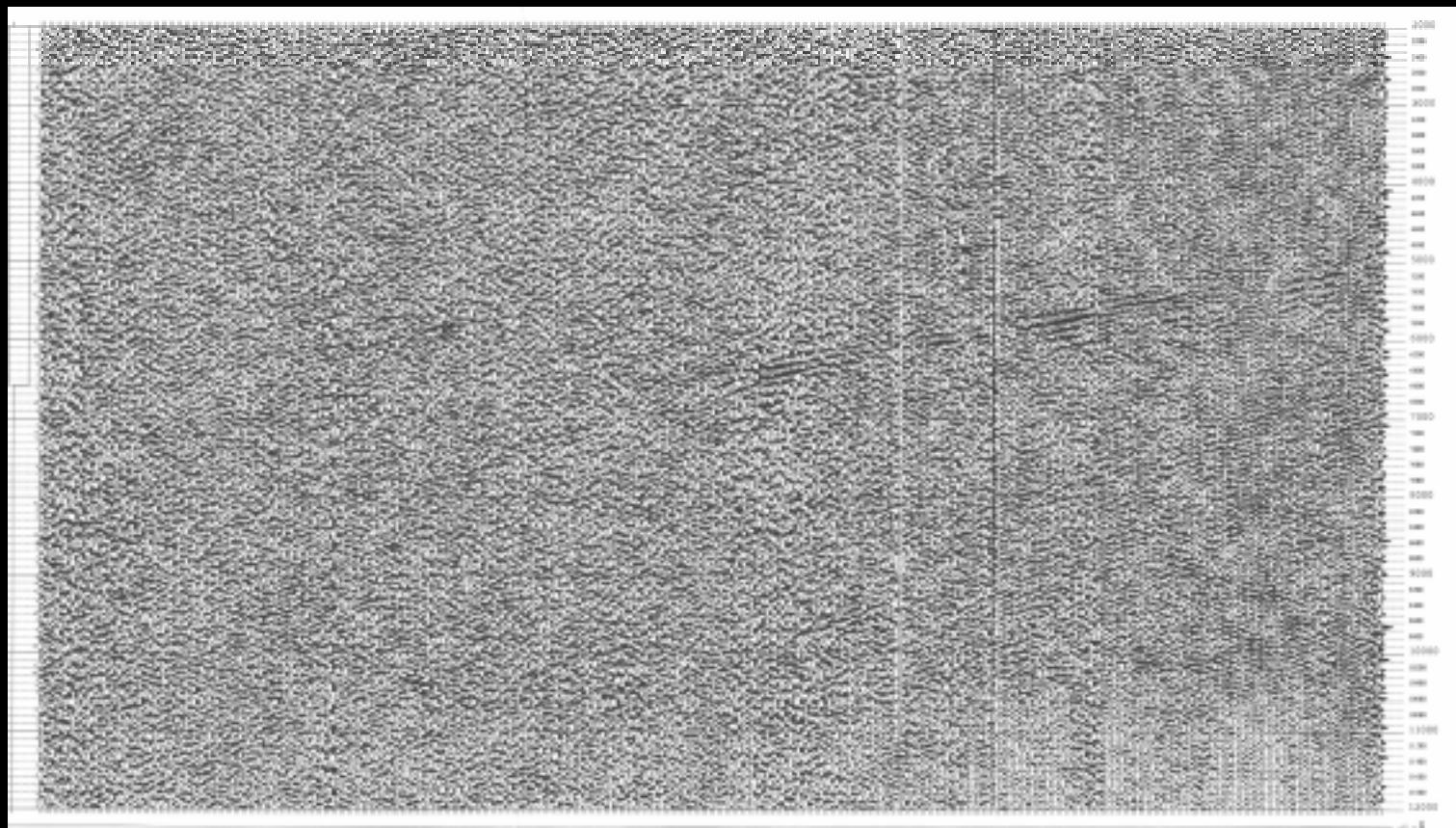


20 km

10 sec

Location A2 鎌倉沖
エアガン 1500 ci

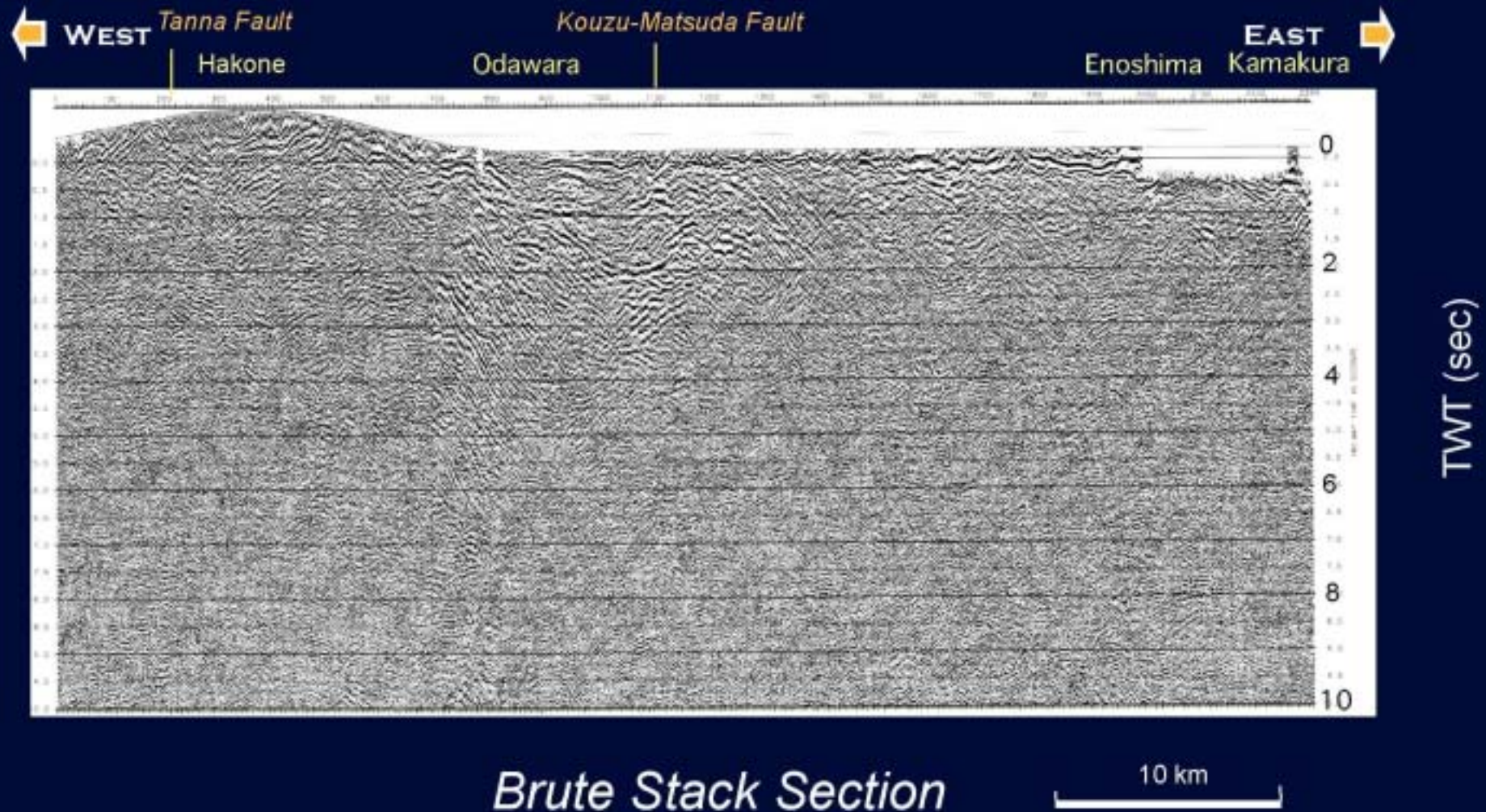
鎌倉



10 sec

A5 東京湾横浜沖

SAGAMI 2003 BRUTE STACK SECTION



SAGAMI 2003 BRUTE STACK SECTION

