

# New Zealand Seismic Surveys With the R/V Langsgeth



## 1) SHIRE

Two-ship OBS/2D MCS  
-Stations on land  
-OBS deployments  
-Long streamer MCS  
Nov 1<sup>st</sup> – Dec 7<sup>th</sup>

## 2) NZ3D

3D mcs – 15 x 60 km  
-OBS and land  
instruments  
Jan 6<sup>th</sup> – Feb 9<sup>th</sup>

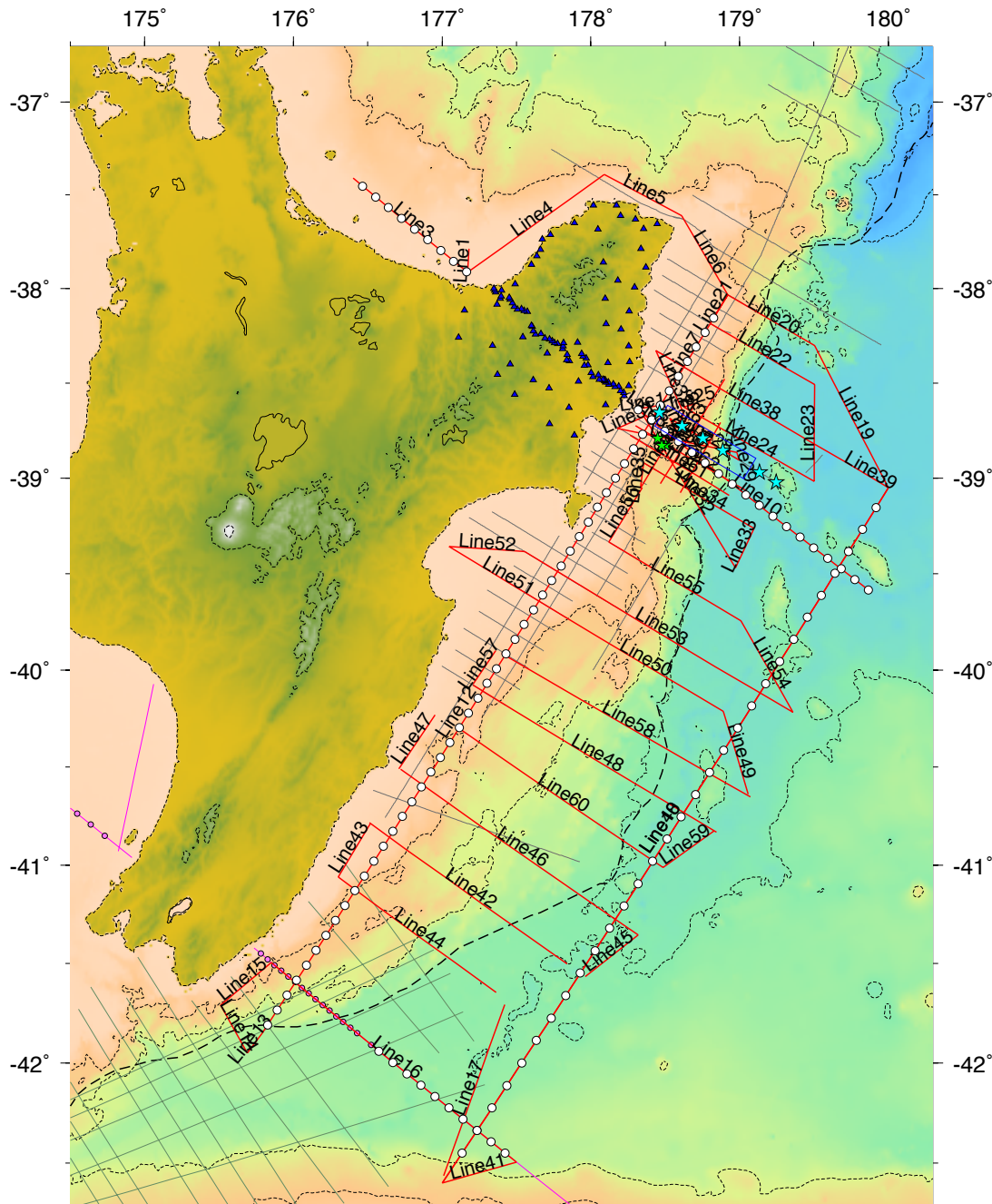
## 3) SISIE

2D OBS/MCS  
-UTIG OBS  
-Long streamer MCS  
Feb 13<sup>th</sup> – Mar 12<sup>th</sup>

# Science Goals





- SHIRE
  - Crustal scale structure of the subduction zone and variation along the margin
  - Deep sediment and seamount subduction;
  - Structure of the Hikurangi plateau (subducting crust)
- NZ3D
  - Development of the megathrust its relation to slow-slip earthquakes.
- SISIE
  - Subduction initiation along the Puysegur trench





# SHIRE

R/V Langseth & R/V Tangaroa

-  104 – Land Stations
-  110 – Japanese OBS deployments
-  1443 km OBS lines
-  4046 km MCS lines (12.7 km streamer)  
102% of planned

## Students

- 3 – Imperial College
- 2 – UT-Austin
- 1 – Otaga University
- 1- University of Auckland

## Postdoc

- 1- GNS Science

Source-receiver offset (km)

0

5

10

12.5

4

5

6

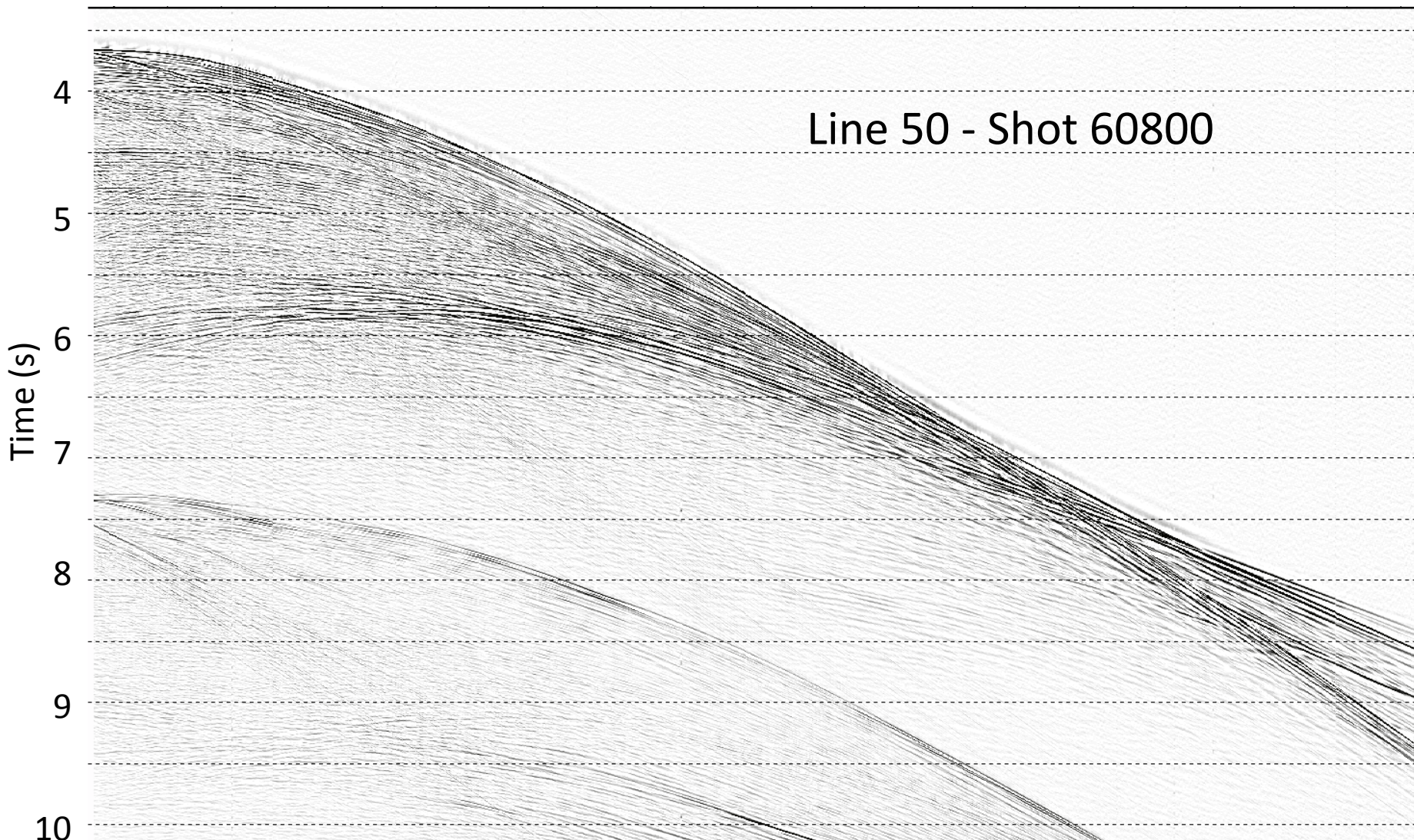
7

8

9

10

Line 50 - Shot 60800



# OBS Line 4 / MCS Line 40

S

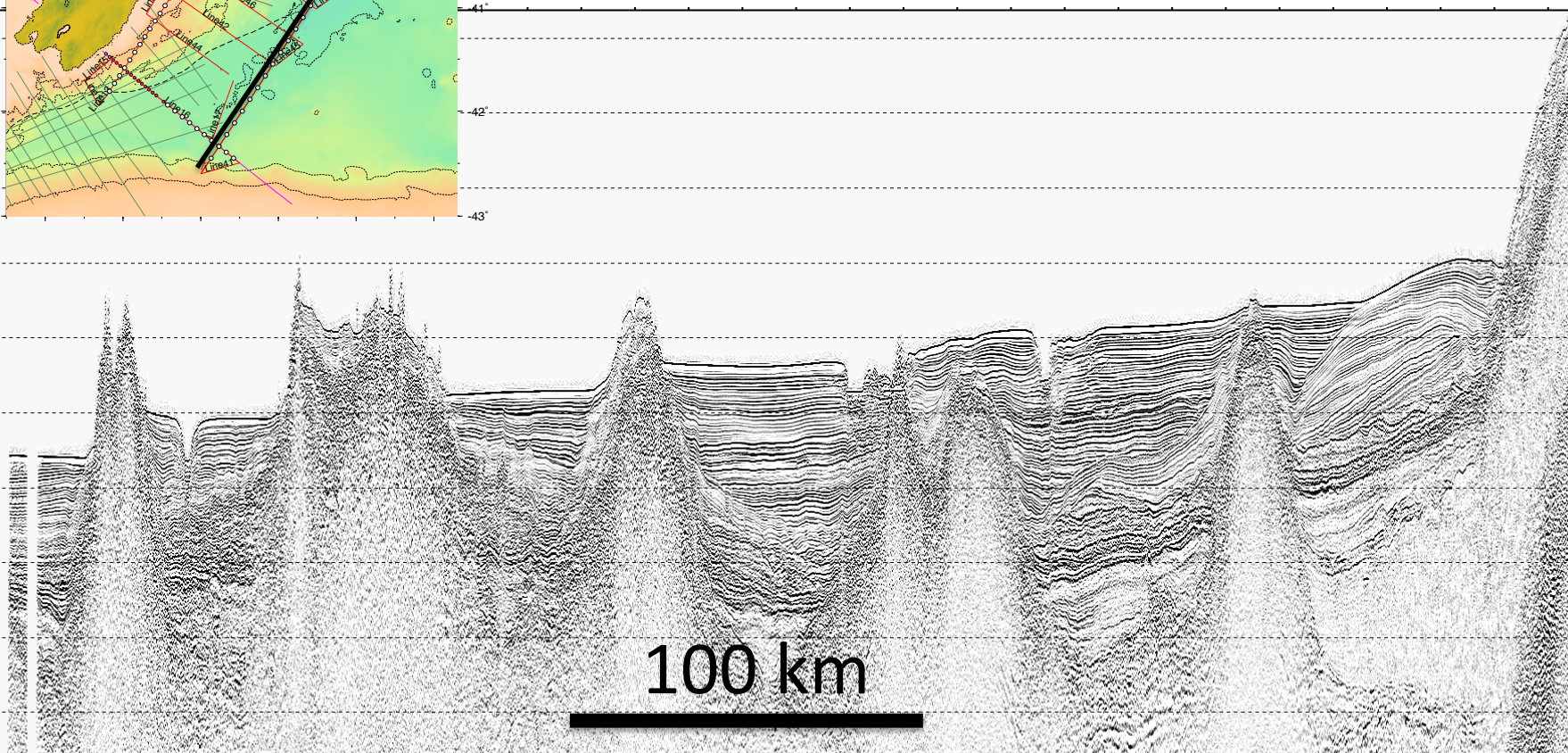
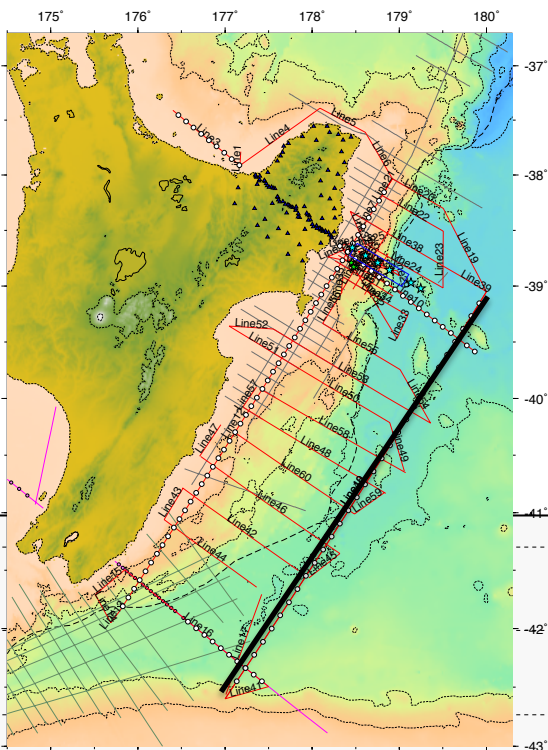
Time (s)

2

4

6

100 km

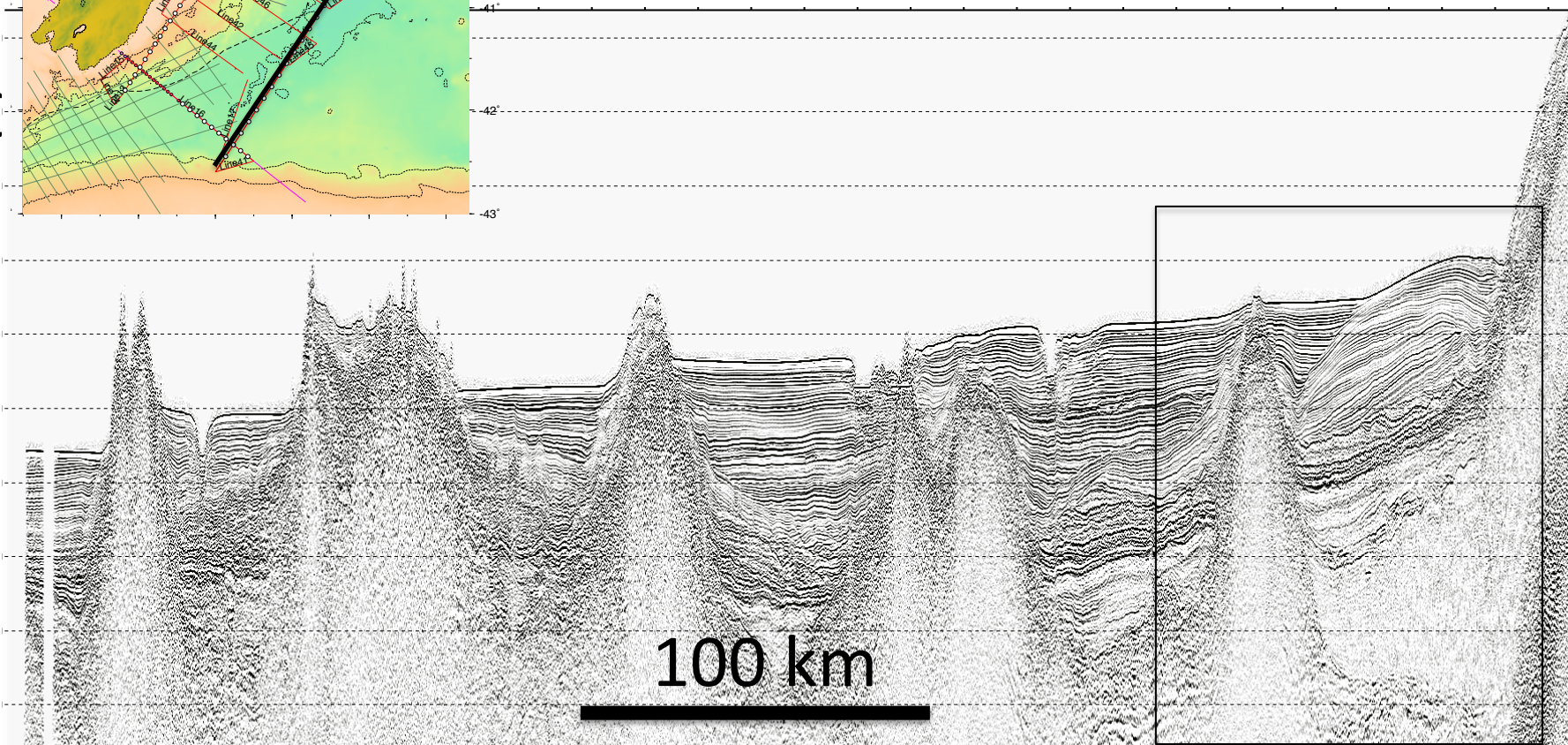
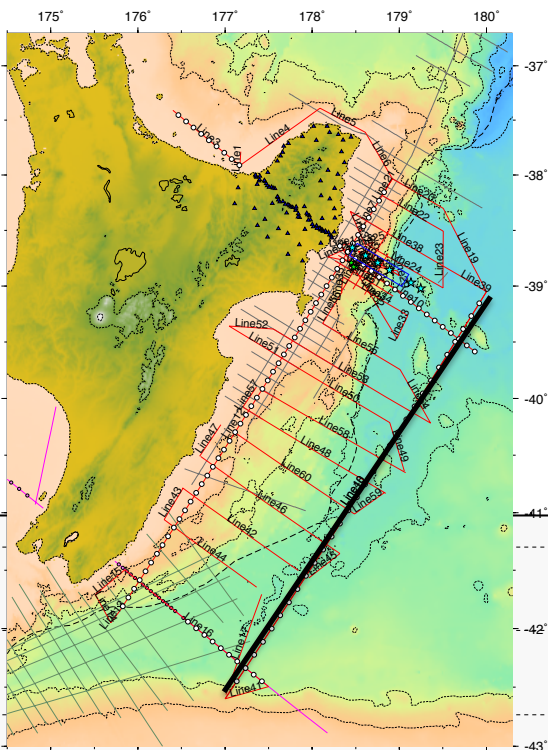


# OBS Line 4 / MCS Line 40

S

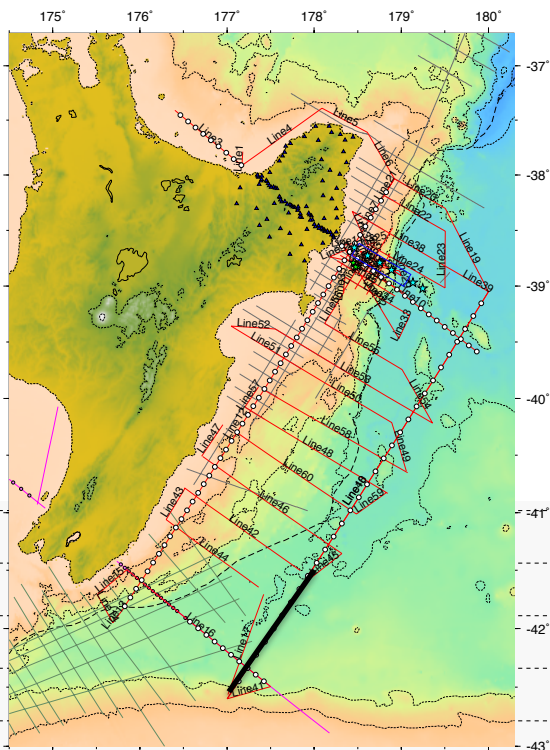
Time (s)  
2  
4  
6

100 km

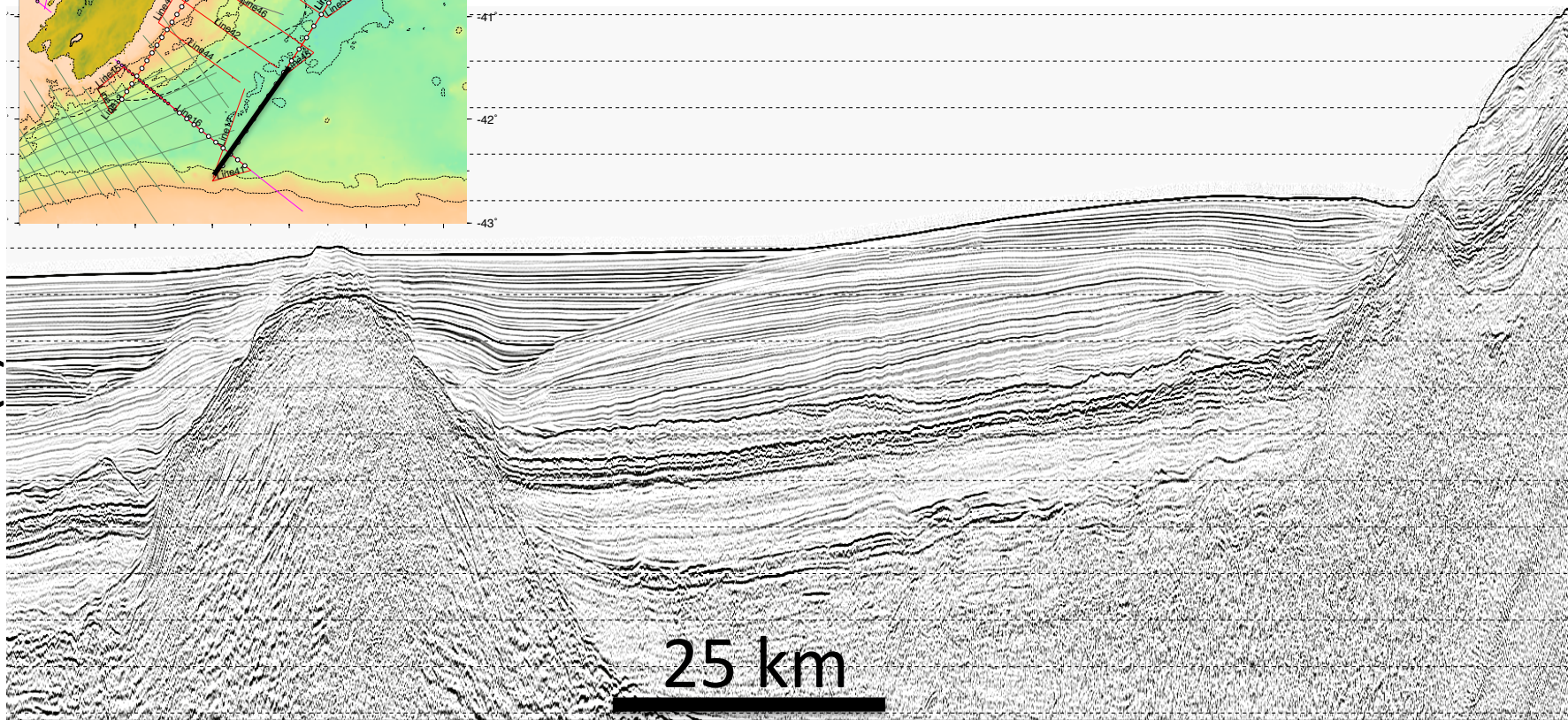


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S



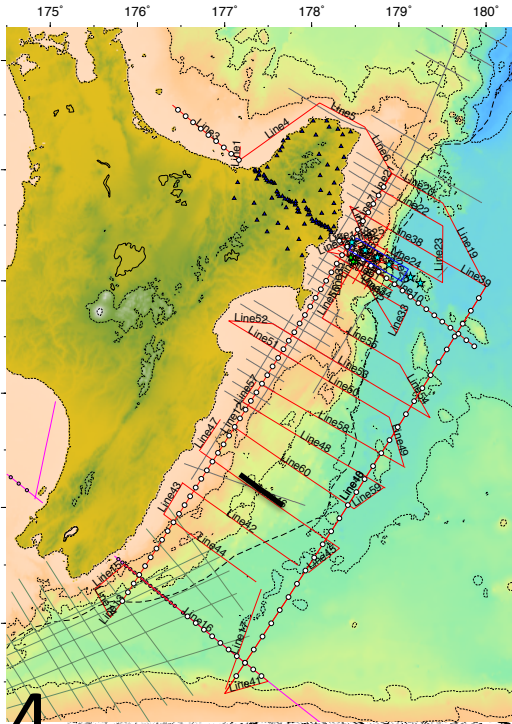
6 Time (s) 4



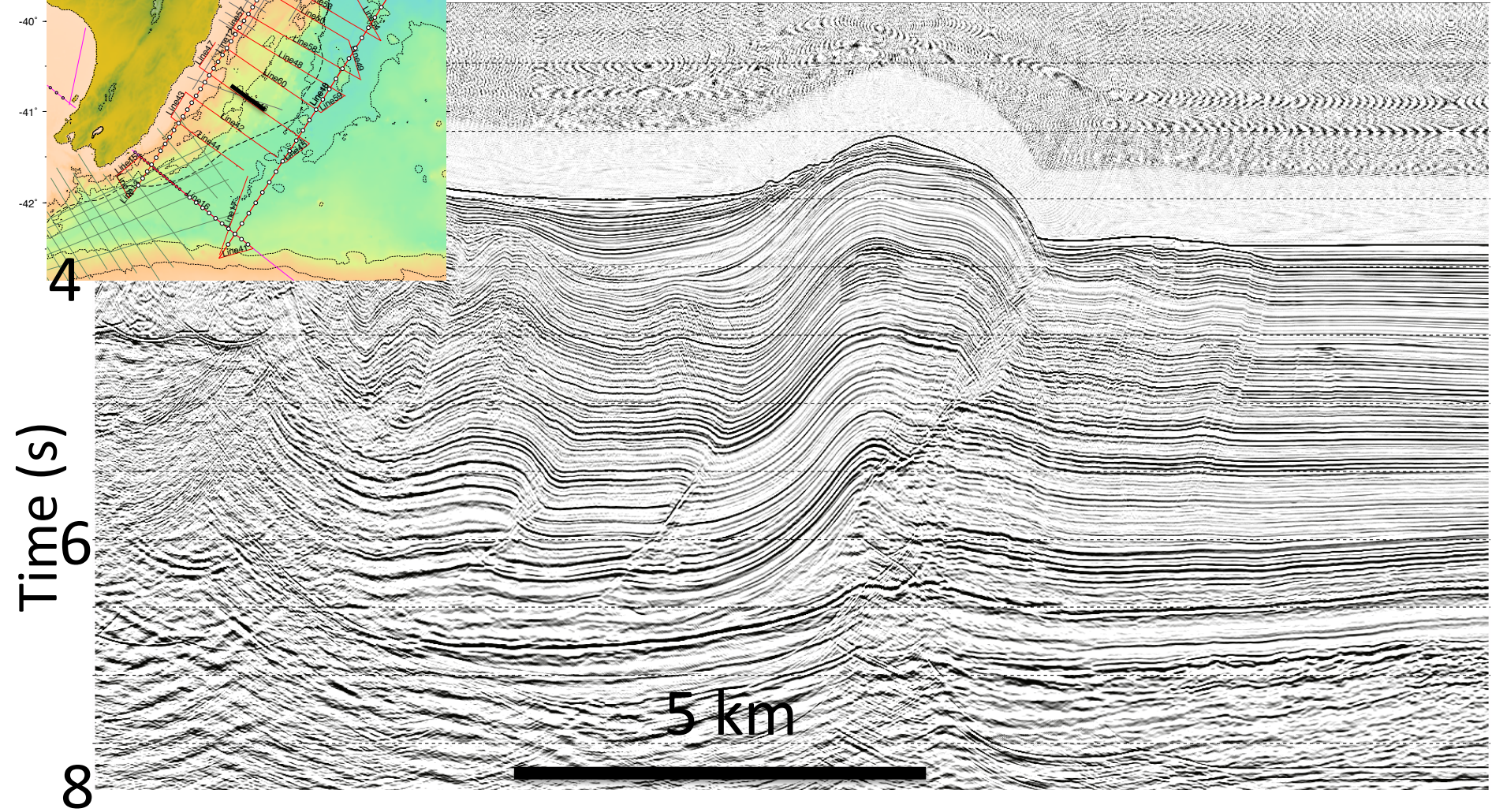
# MCS Line 44

(processed by student Team B)

E



4



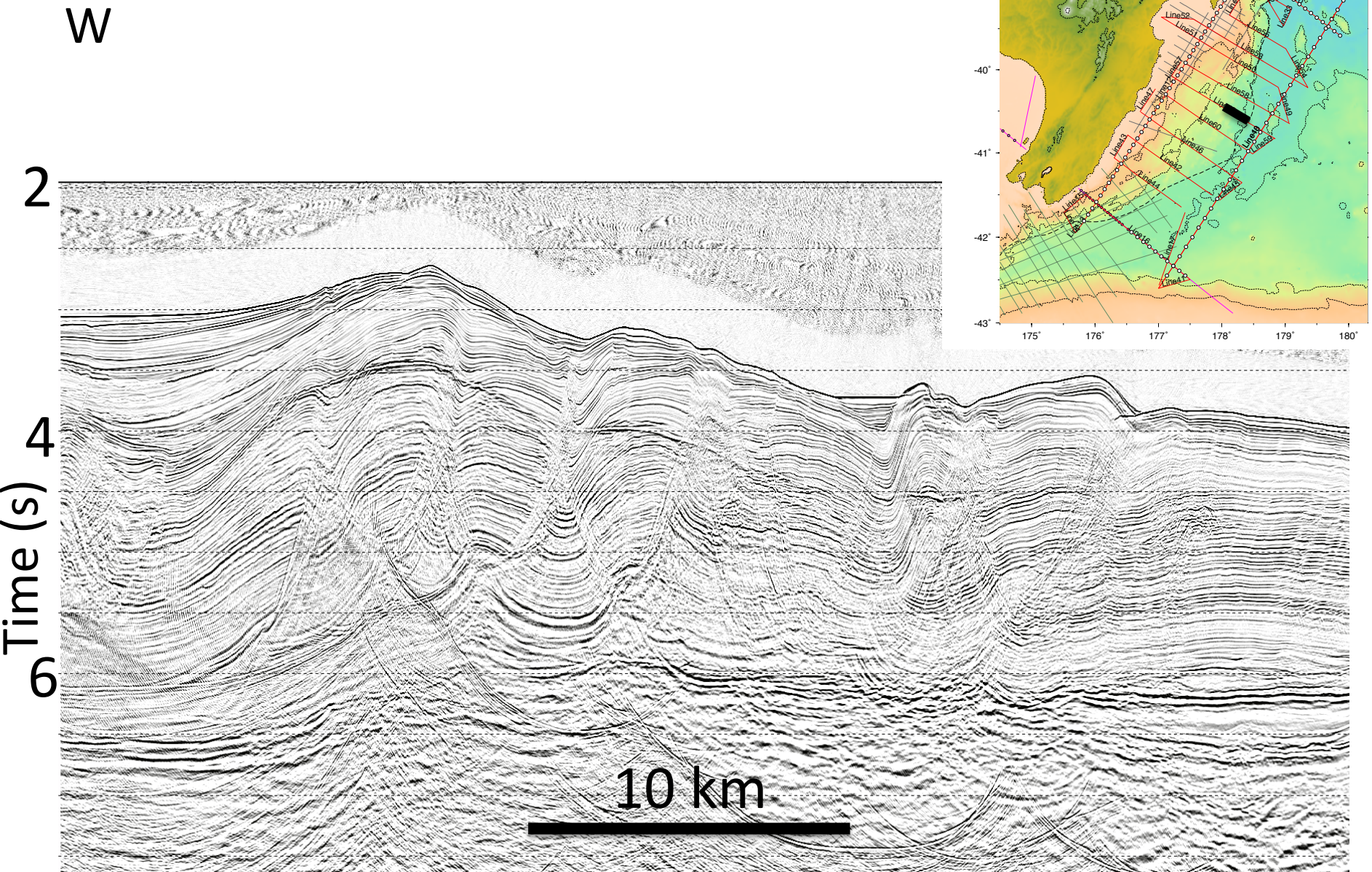
Time (s)

5 km

8

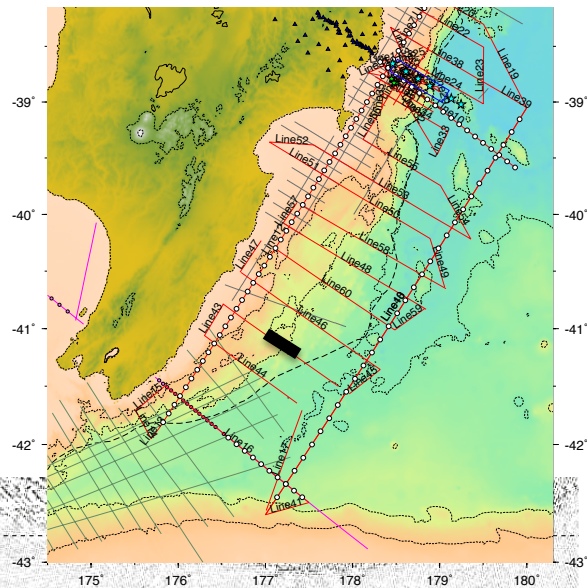


# MCS Line 48



# MCS Line 42

W

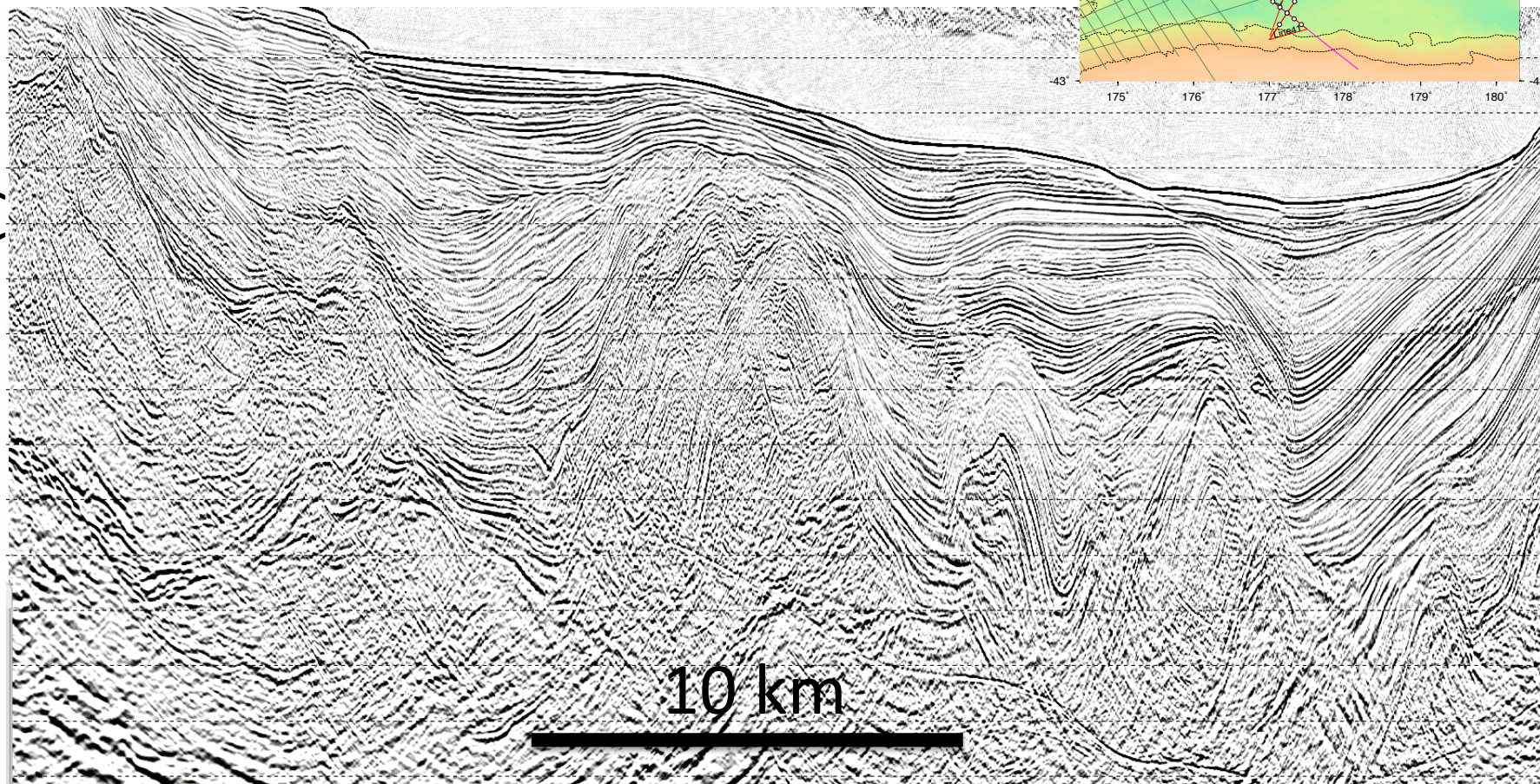


2

Time (s)

4

10 km



# MCS Line 48

W

0

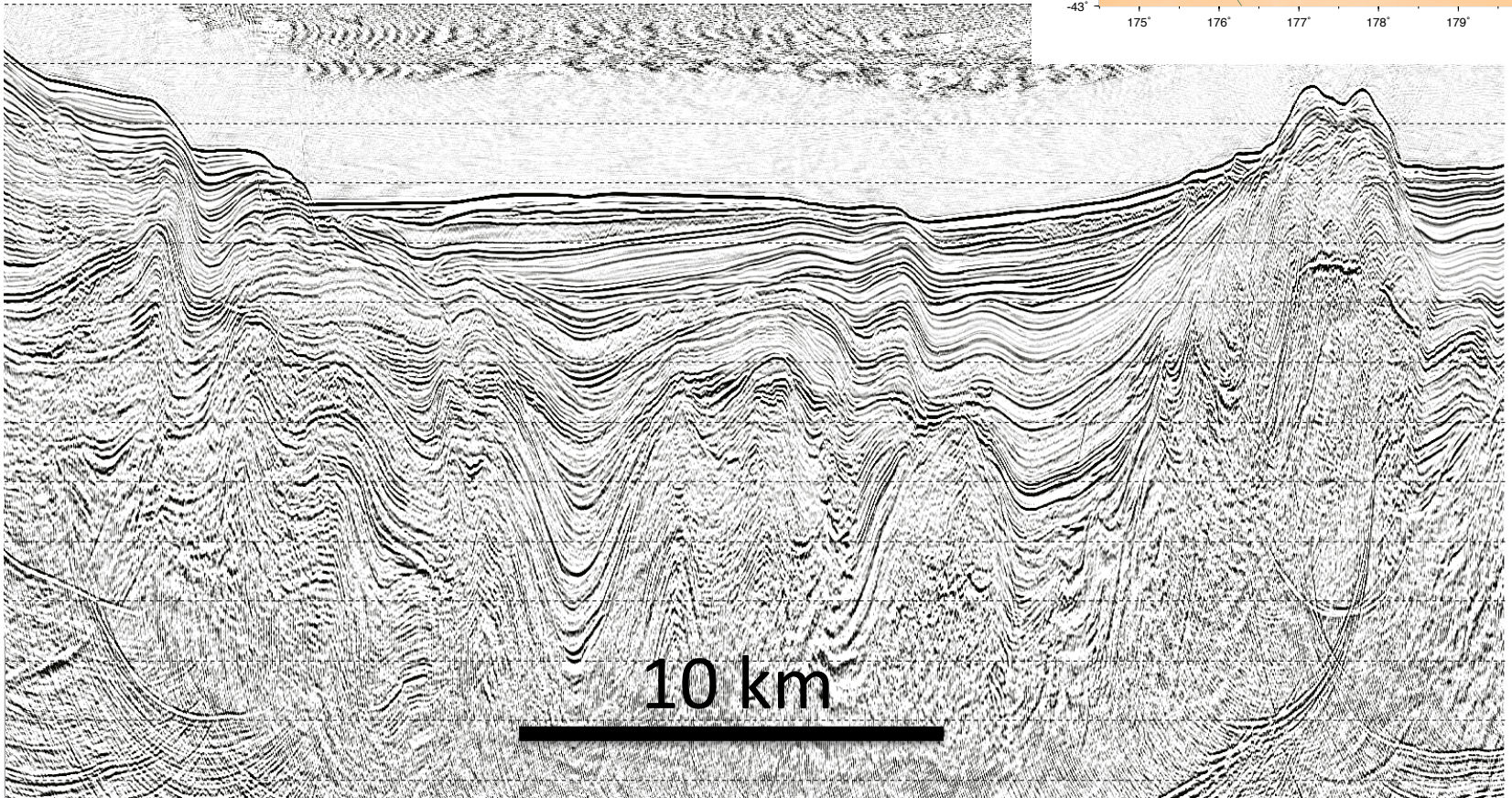
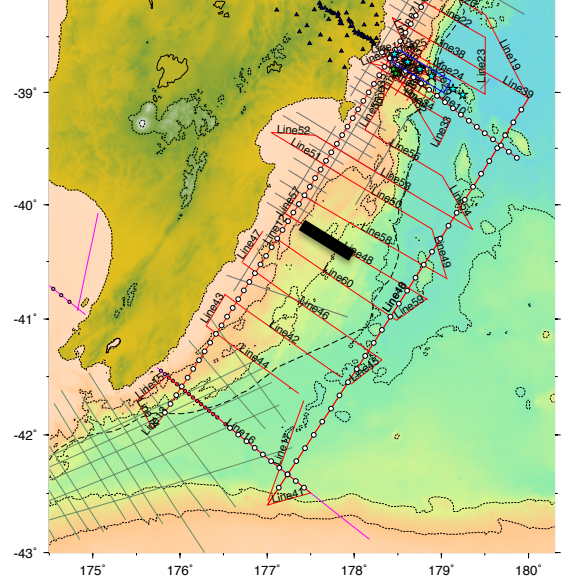
2

4

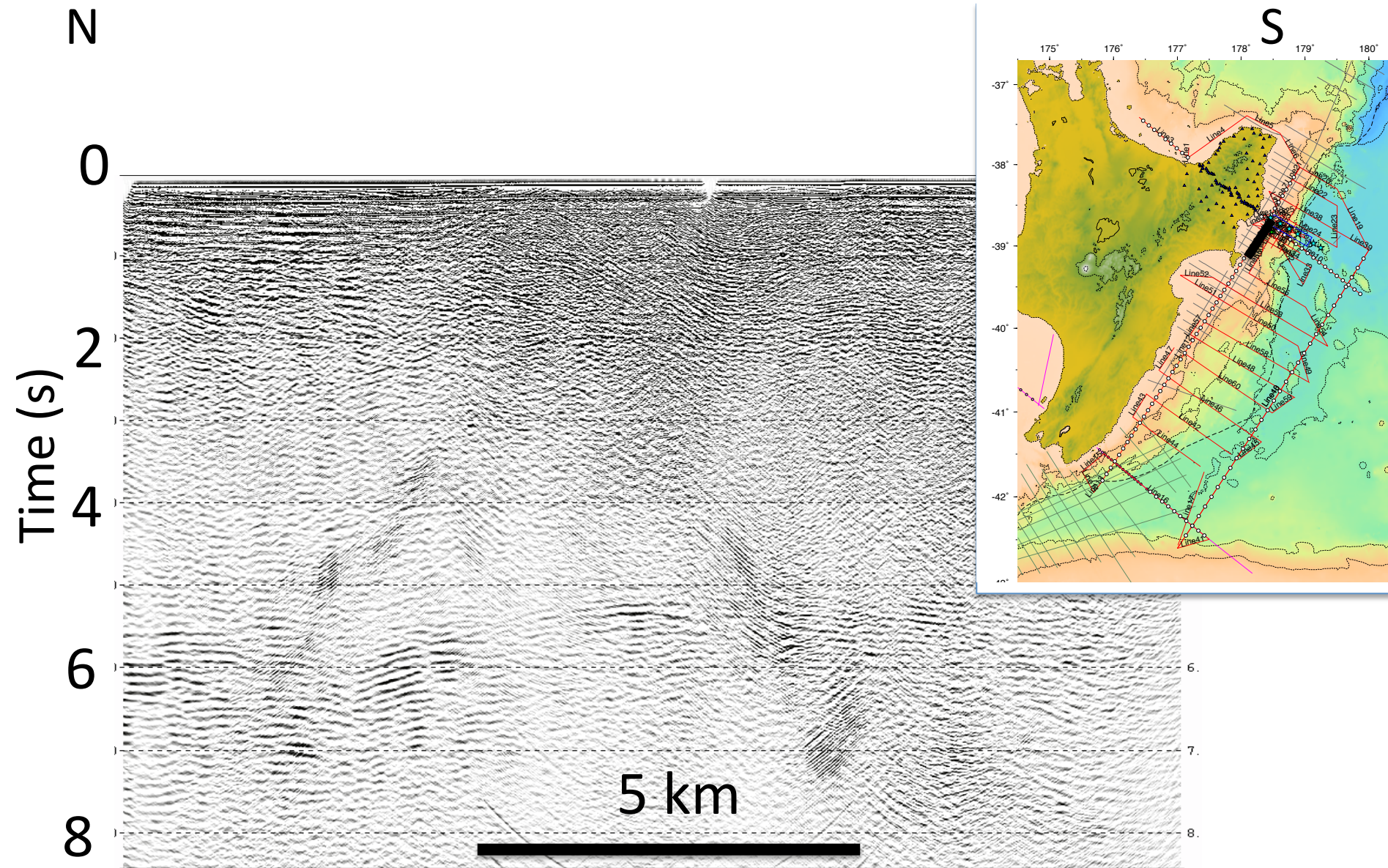
6

8

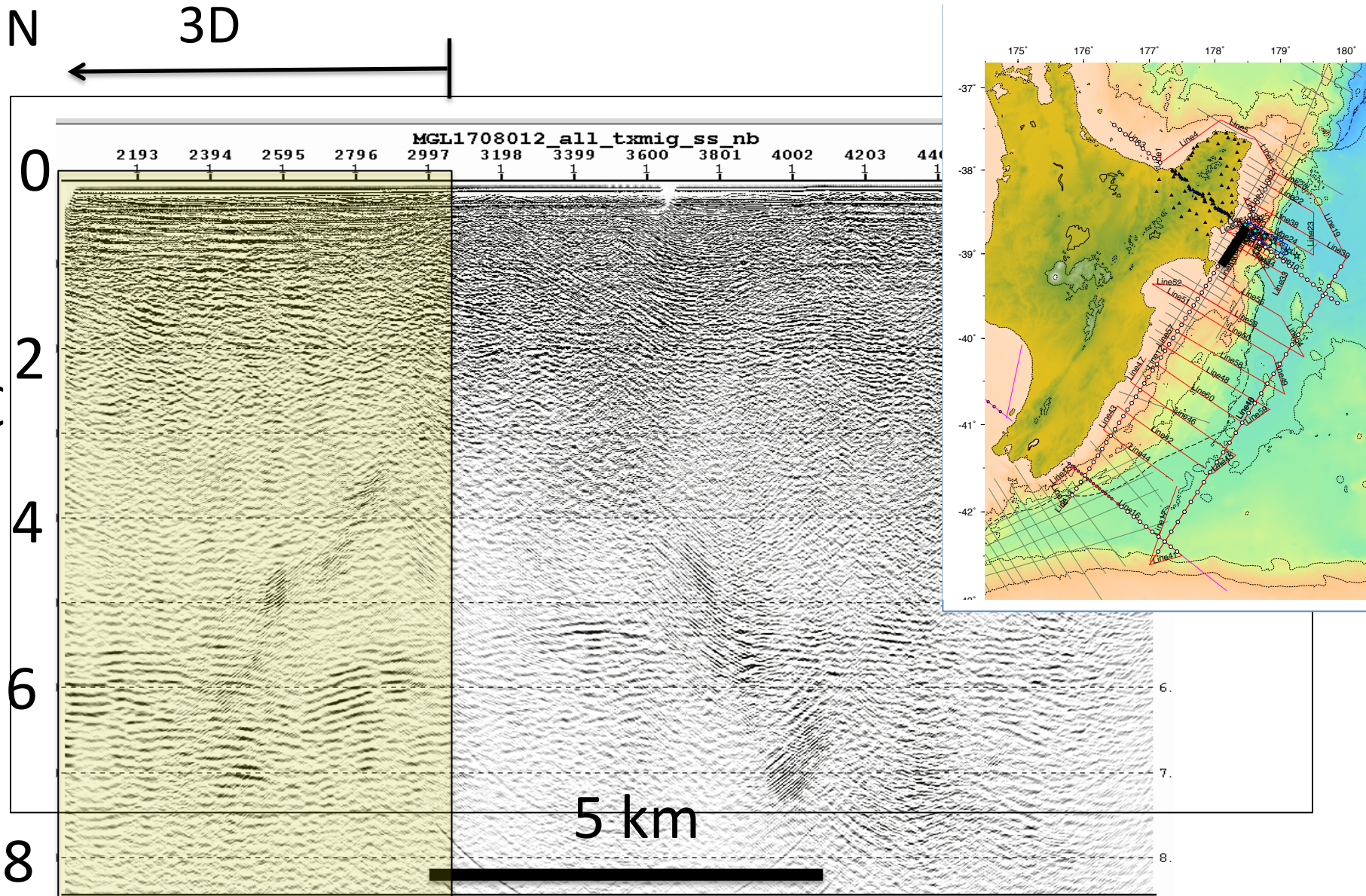
10 km



# OBS Line 3/MCS Line 12

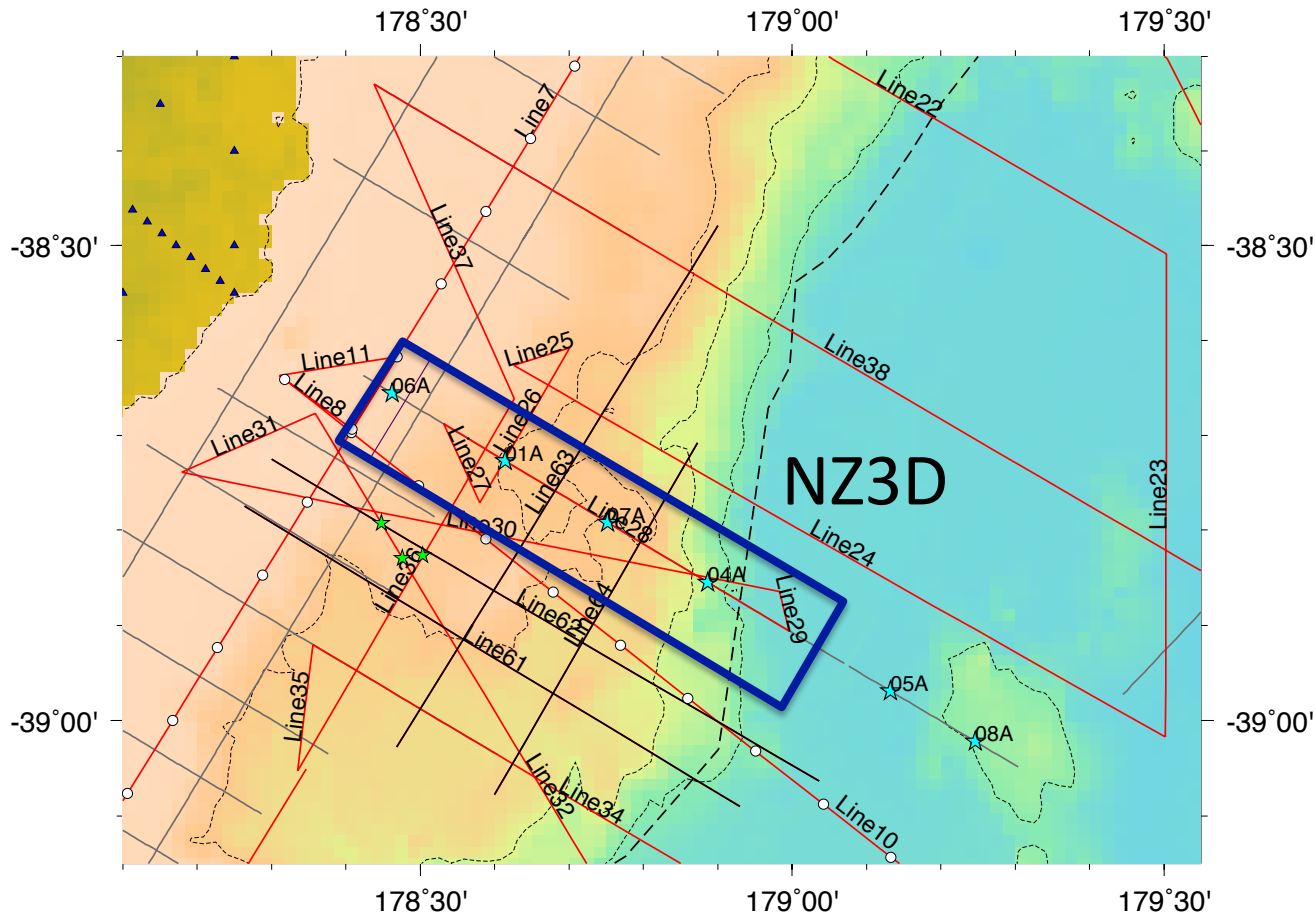


# OBS Line 3/MCS Line 12



# NZ3D

Jan 6<sup>th</sup> – Feb 9<sup>th</sup>



15 x 60 km  
3D Survey

96 – Japanese  
OBS

110 NZ+ 196 UK  
On land  
seismometers

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**Source silent/shutdown.** Two PSOs and one PAM operator conduct a 30 minute pre-clearance survey. Decision Point (Yes/No): Any marine mammal detected within, approaching, or entering the **500 meter exclusion zone**, or any sea turtle within, approaching, entering the **195 dB radius**.

**Delay source operations.** Decision Point (Yes/No): Protected species is observed exiting the **500 meter BUFFER zone**

**Begin ramp-up after:**  
 1) 15 minutes following last sighting of small odontocetes, pinnipeds or sea turtles  
 2) 30 minutes following last sighting of mysticetes or large odontocetes

**Source operating at a ramp-up or at full volume**

Any marine mammal detected within, approaching, entering the **500 meter buffer zone**

Warning call that animals are in the zone

Marine mammal detected within, approaching, entering the **500 meter exclusion zone**

**POWER DOWN**  
 Source volume reduced to a single 40 in3 element

Marine mammal detected within, approaching, entering the **100 meter exclusion zone**, or any sea turtle within, approaching, entering the **195 dB radius**.

**SHUTDOWN**  
 Source silenced completely.

Decision Point (Yes/No): Marine mammal observed exiting the **500 meter exclusion zone**

Marine mammal still within the 500 meter exclusion zone **30 minutes** after power down initiated

**Exceptions and Other Mitigation Requirements**

**Positively identified** short-beaked common dolphins, dusky dolphins, and southern right whale dolphins detected within, approaching, entering the **500 meter exclusion**

Do not have to power down or shut down, but will delay operations if silent

Acoustic only detection of dolphins (excluding Hector's/ Maui species)

Hector's dolphin or Maui dolphin detected visually or acoustically at **ANY** distance to the source

**SHUTDOWN** – then initiate ramp-up procedures **15 minutes** after last sighting/detection

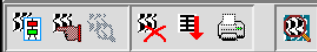
Large whale with a calf, group of 6+ large whales, beaked whale, or kogia sp., detected at **ANY** distance to the source

**SHUTDOWN** – then initiate ramp-up procedures **30 minutes** after last sighting/detection

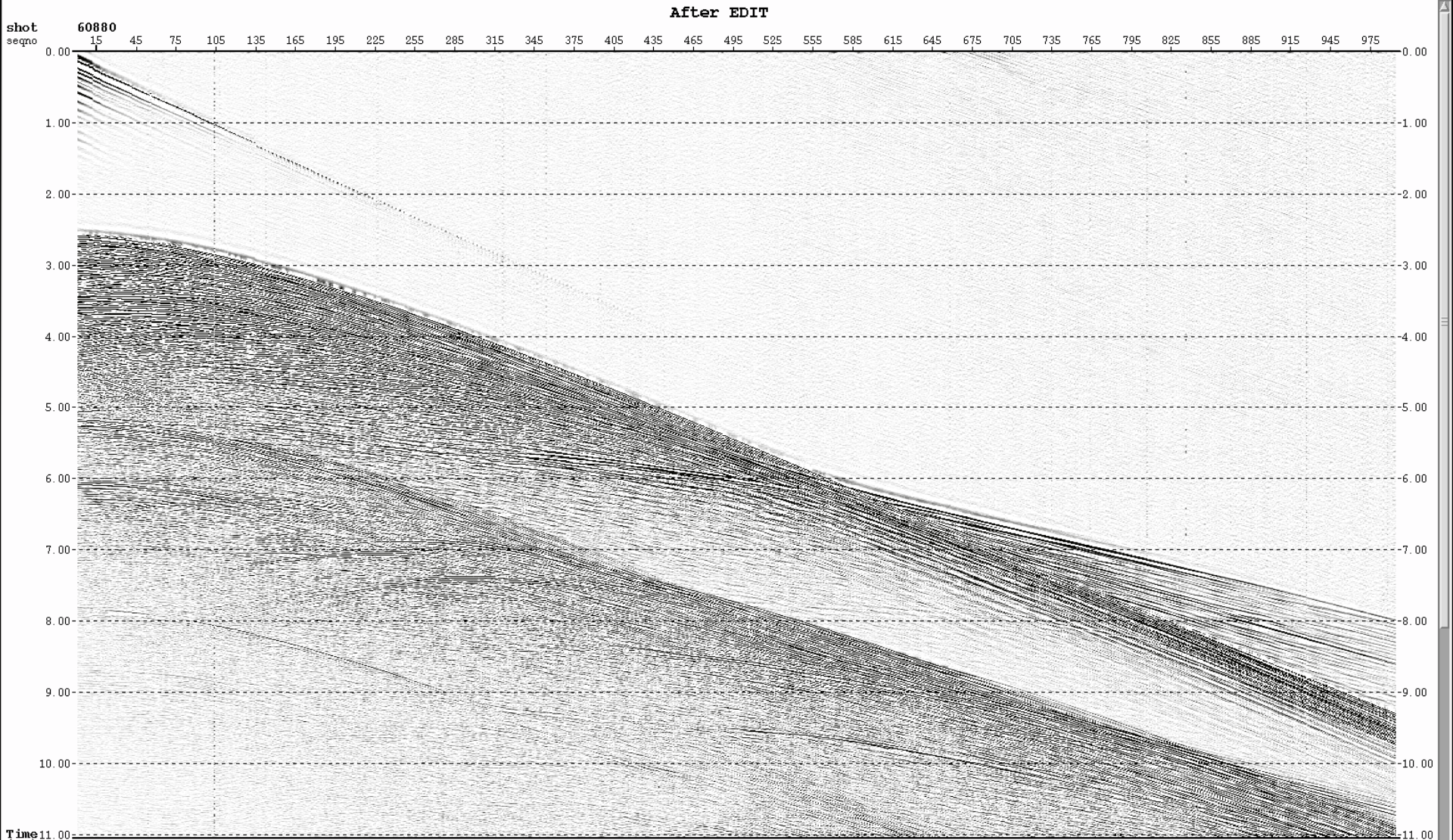
Acoustic only detection of a sperm whale that cannot be definitively localized outside of **500 meter exclusion zone**

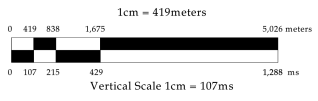
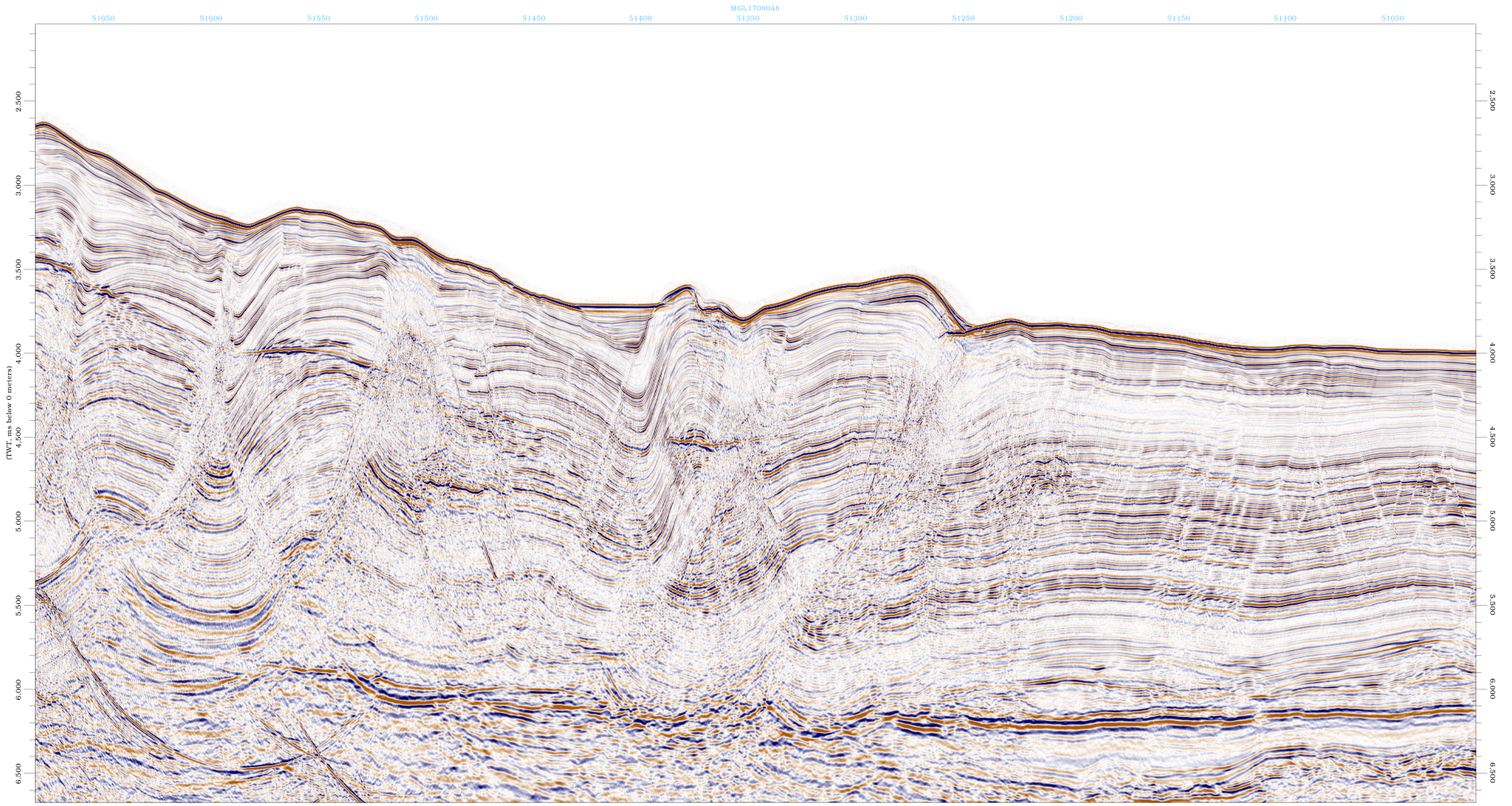
**POWERDOWN** the source as a precaution then follow the procedures as outlined above

Acoustic only detection where there is a possibility that the vocalizations could be from a beaked whale, sperm whale or kogia sp, and the distance from the source is uncertain



Survey: shire@IG-889392  
Line: 050 Job: NEW





<b>OWUTIG SHIRE</b>		
Date: 11/26/2017		Interpreter: LGC epos