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The VISIT Hikurangi expedition, New Zealand, March/April 2023

Rebecca Bell and the VISIT team

Imperial College London

GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel

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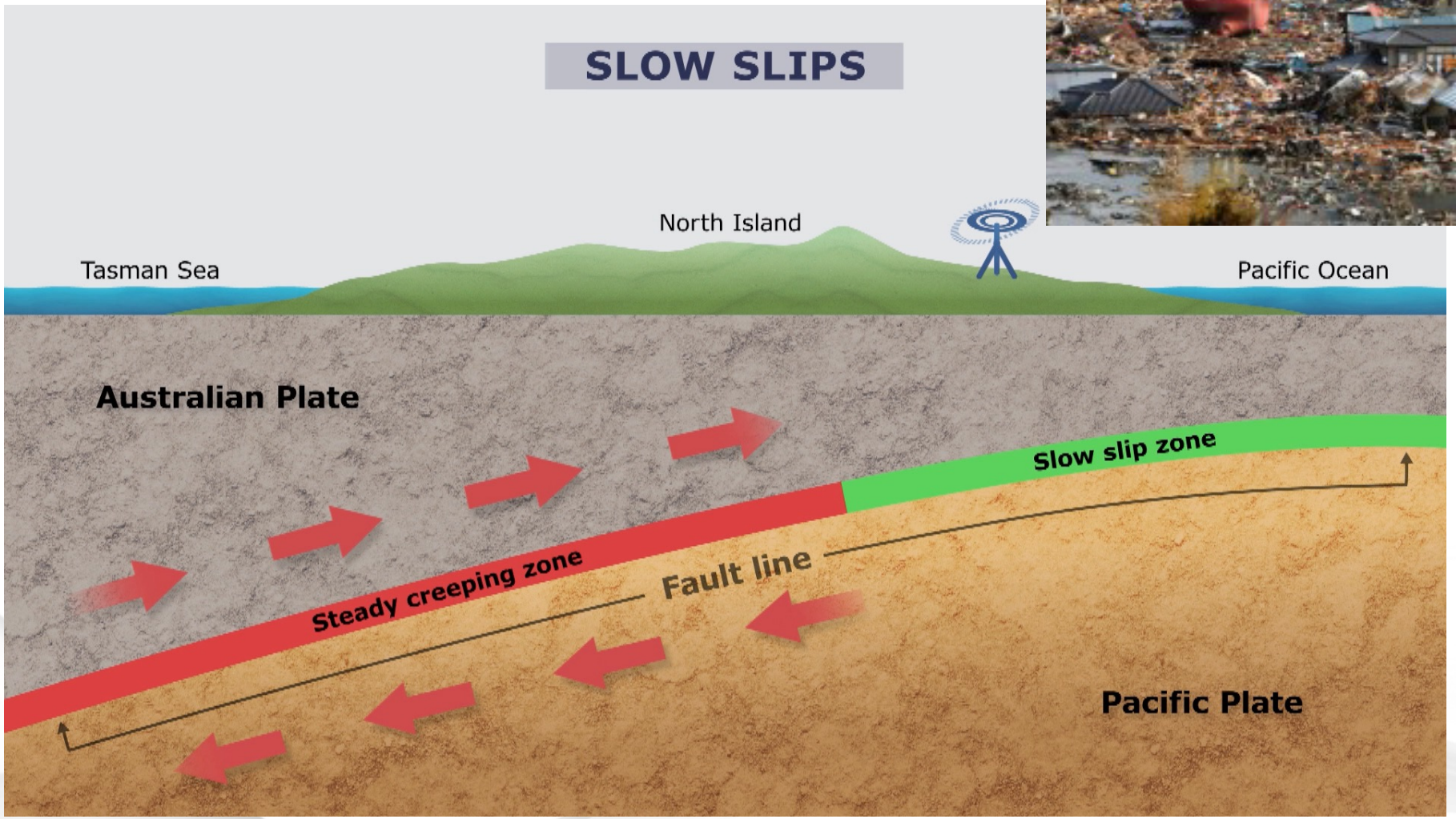
NIWA

NERC SCIENCE OF THE ENVIRONMENT

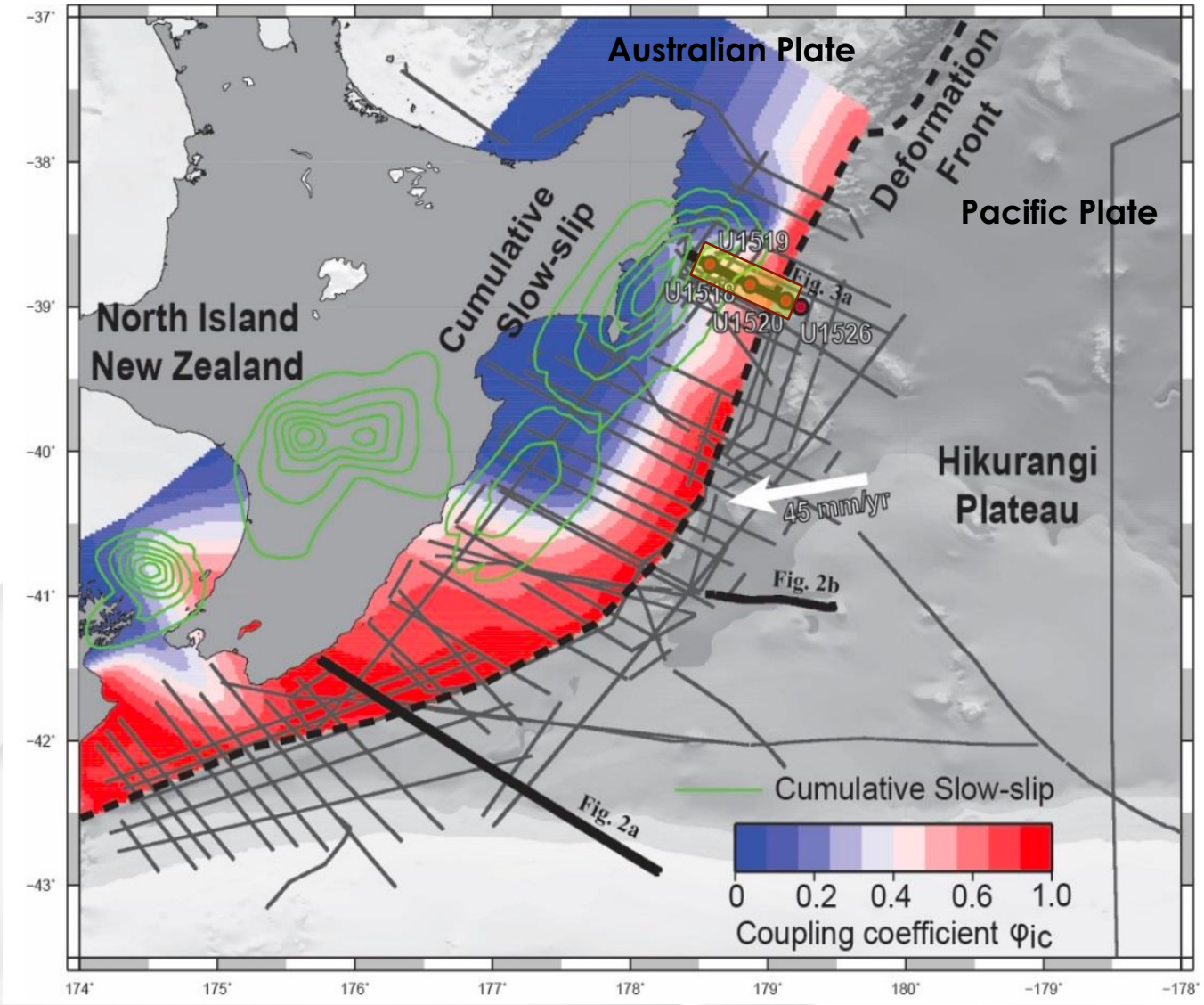
MOTIVATION FOR VISIT

nature.2016.19252



https://www.eastcoastlab.org.nz

HIKURANGI MARGIN, NEW ZEALAND

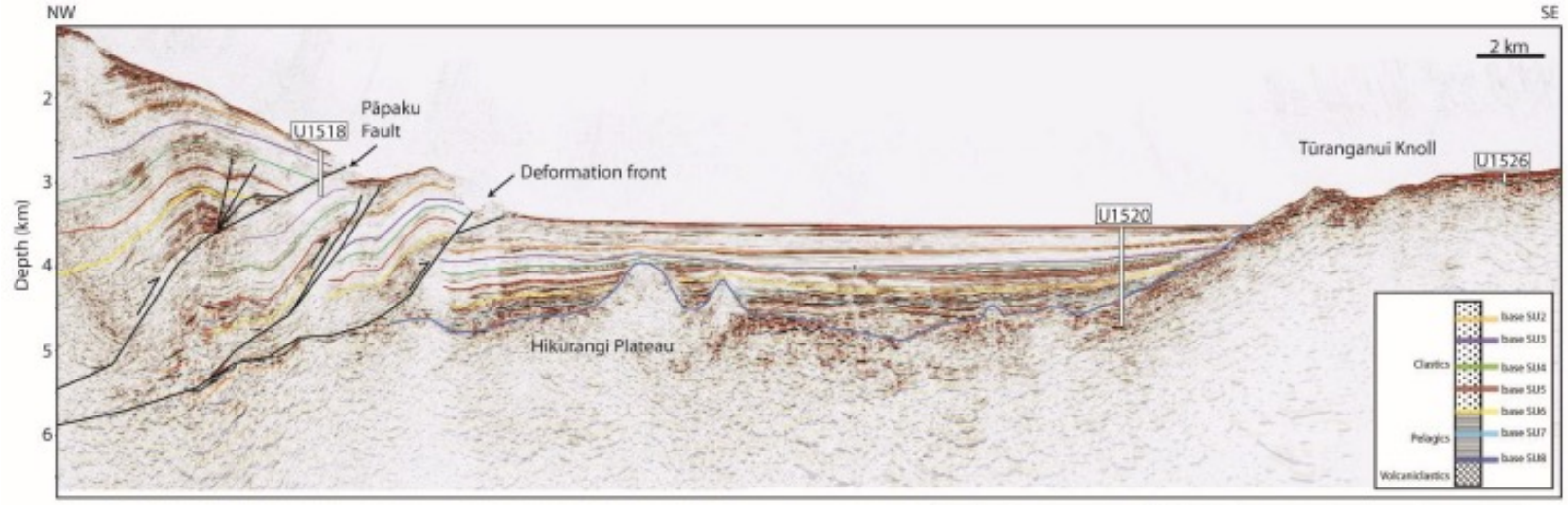


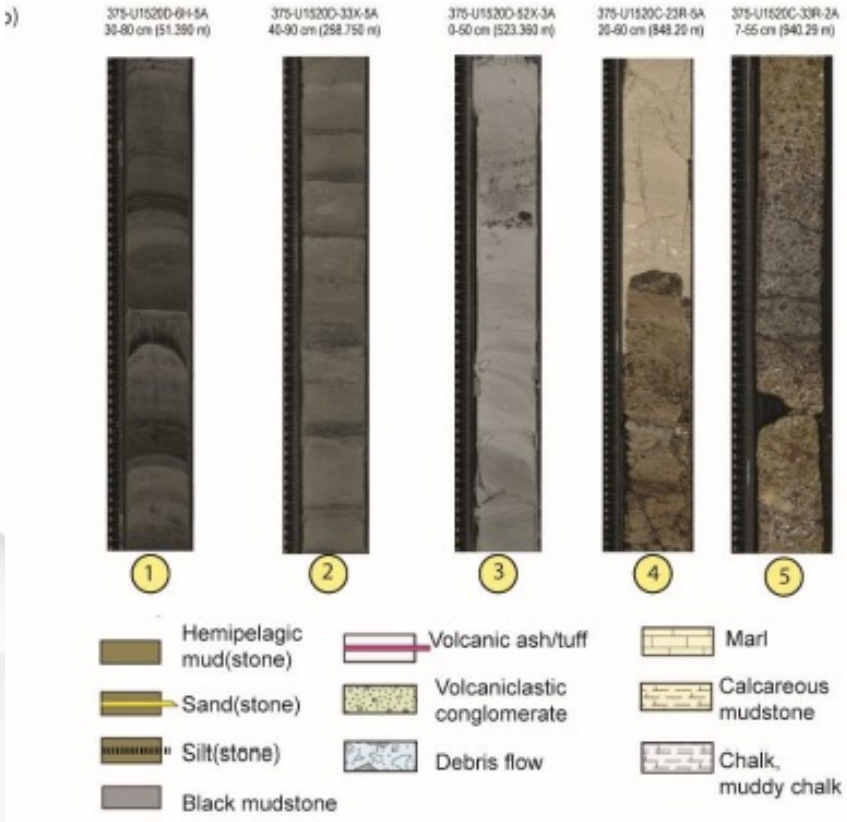
Slow slip events occur at the transition from strong to weak coupling

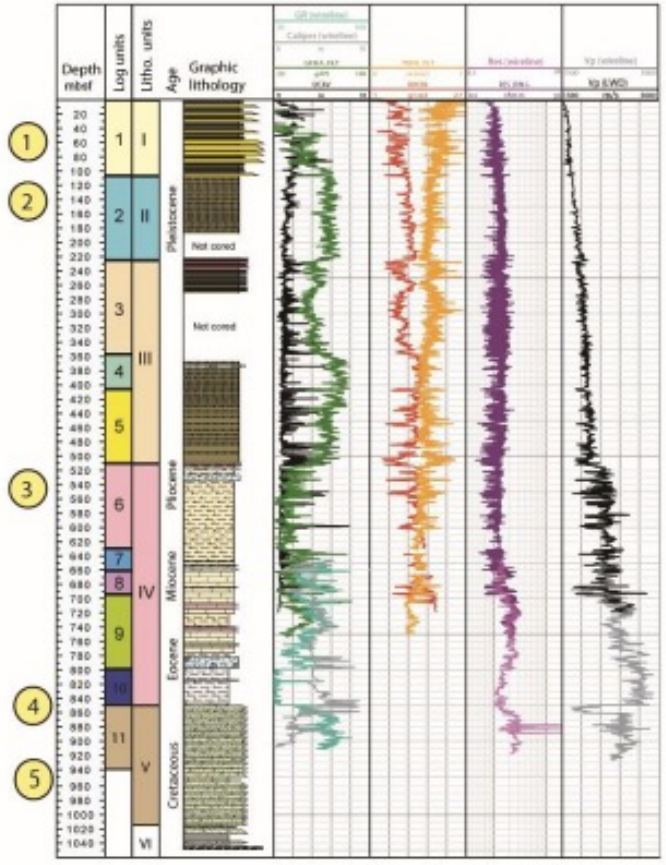
Northern Hikurangi margin:
- Shallow slow slip events
- Weakly coupled

Southern Hikurangi margin:
- Deeper slow slip events
- Strongly coupled

Understand the transition from creeping to locked interseismic behaviour, by analysing physical properties of the incoming plate


NW
SE
2 km
Depth (km)
Pāpaku Fault
U1518
Deformation front
U1520
Tūranganui Knoll
U1526
Hikurangi Plateau
Clastics
Pelagics
Volcaniclastics


375-U1520D-6H-5A 30-80 cm (51.390 m)
375-U1520D-33X-5A 40-90 cm (258.750 m)
375-U1520D-52X-3A 0-50 cm (523.360 m)
375-U1520C-23R-5A 20-60 cm (848.20 m)
375-U1520C-33R-2A 7-55 cm (940.29 m)
1
2
3
4
5
Hemipelagic mud(stone)
Sand(stone)
Silt(stone)
Black mudstone
Volcanic ash/tuff
Volcaniclastic conglomerate
Debris flow
Marl
Calcareous mudstone
Chalk, muddy chalk


Depth mbsf
Log units
Litho. units
Age
Graphic lithology
Pleistocene
Pliocene
Miocene
Eocene
Cretaceous
Not cored
Not cored

VISIT OBJECTIVES

- ***Hypothesis: The transition from creeping to locked interseismic behaviour is related to physical properties of the incoming sedimentary section.***

- **Objective 1**: Collect a new seismic reflection dataset involving trench-perpendicular and trench-parallel lines so that the thickness and seismic character of the pelagic sediments and incoming seamounts can be constrained up to 200 km east of the deformation front.

- **Objective 2**: Collect a new trench-parallel seismic reflection profile to correlate R7 to drill site U1520 and analyse changes in R7's seismic reflection character along-strike.

- **Objective 3**: Collect new seismic reflection data that provide appropriate site-survey data for a proposed IODP drilling expedition (preproposal 959, Fagereng et al.) that would target R7 directly.

THE EXPEDITION

- RV Tangaroa
- 31.03.2023 – 11.04.2023
- Wellington (New Zealand) – Wellington (New Zealand)

THE SCIENCE PARTY

Imperial College London

GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel

GNS SCIENCE TE PŪ AO

CARDIFF UNIVERSITY

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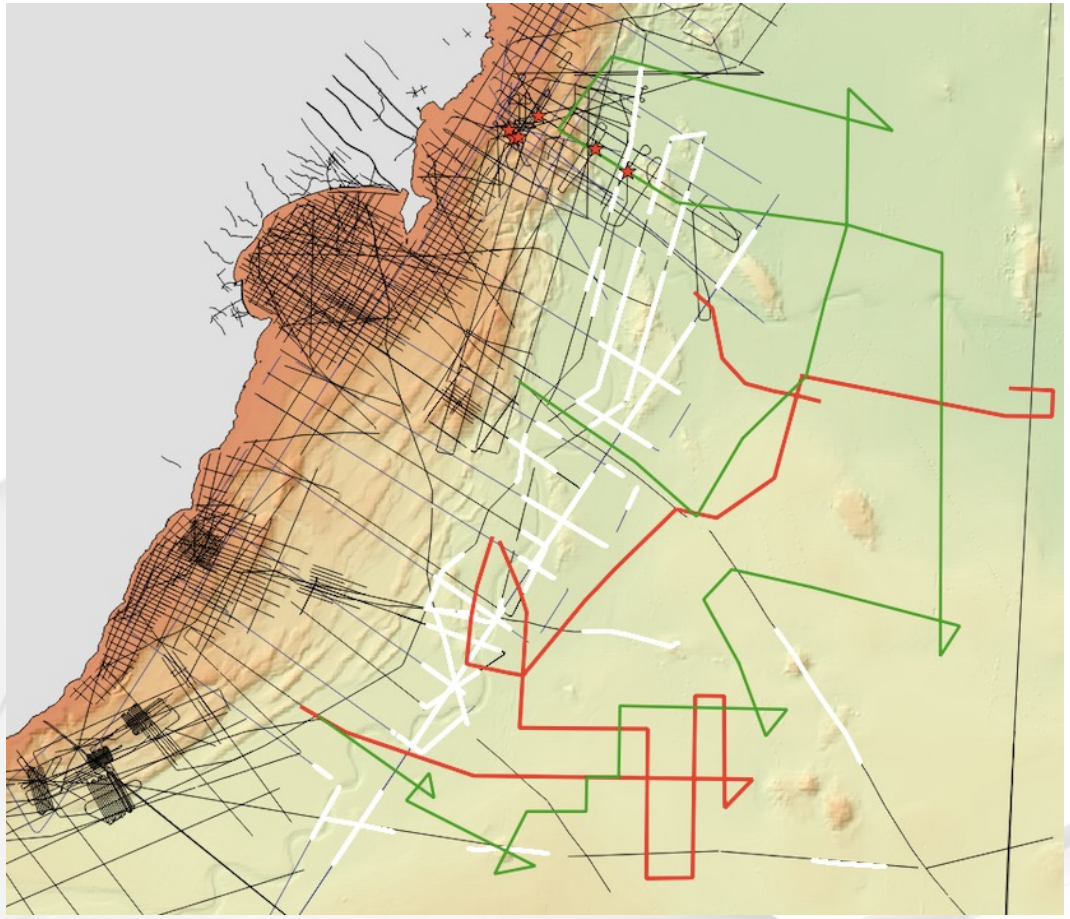
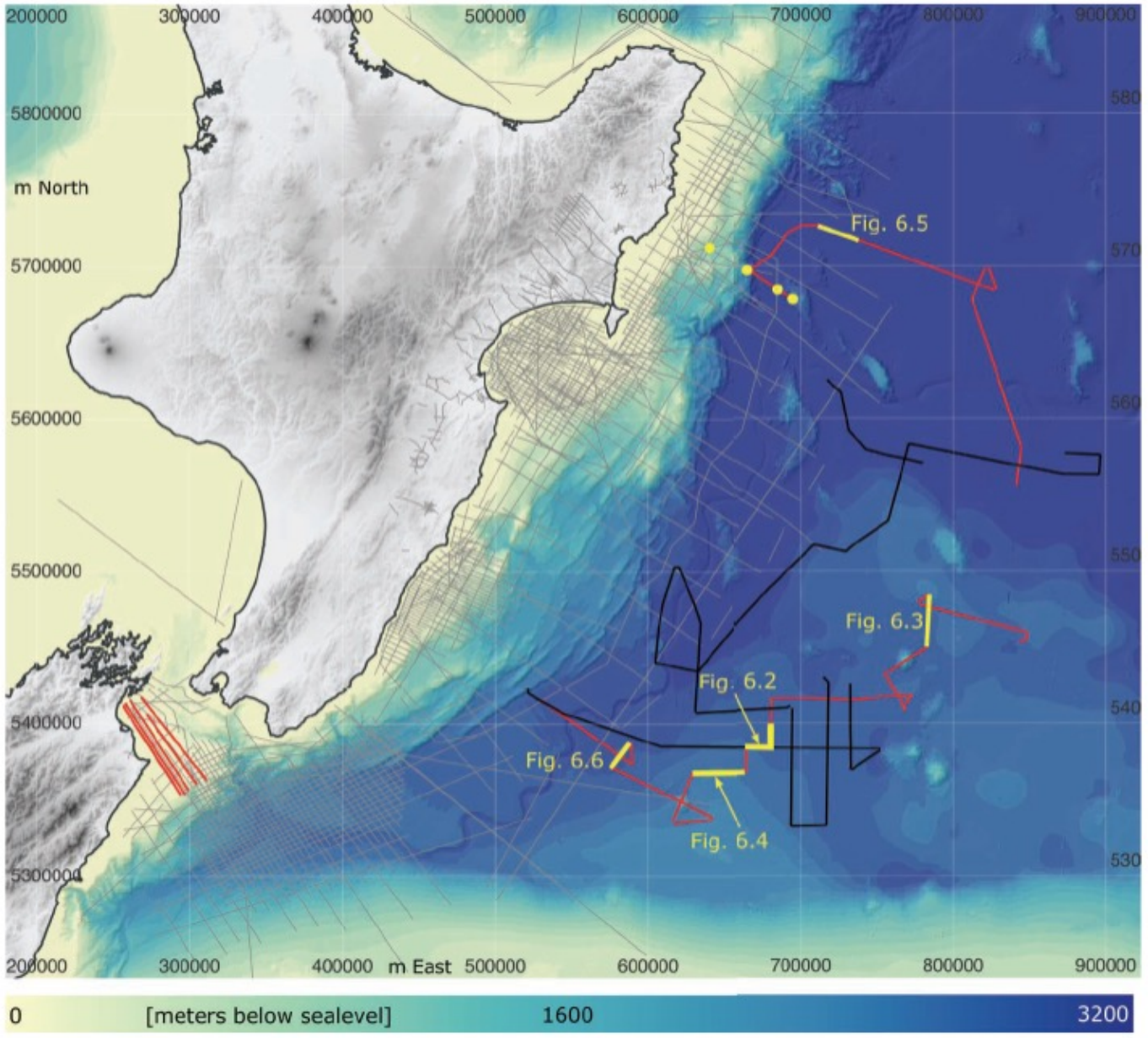
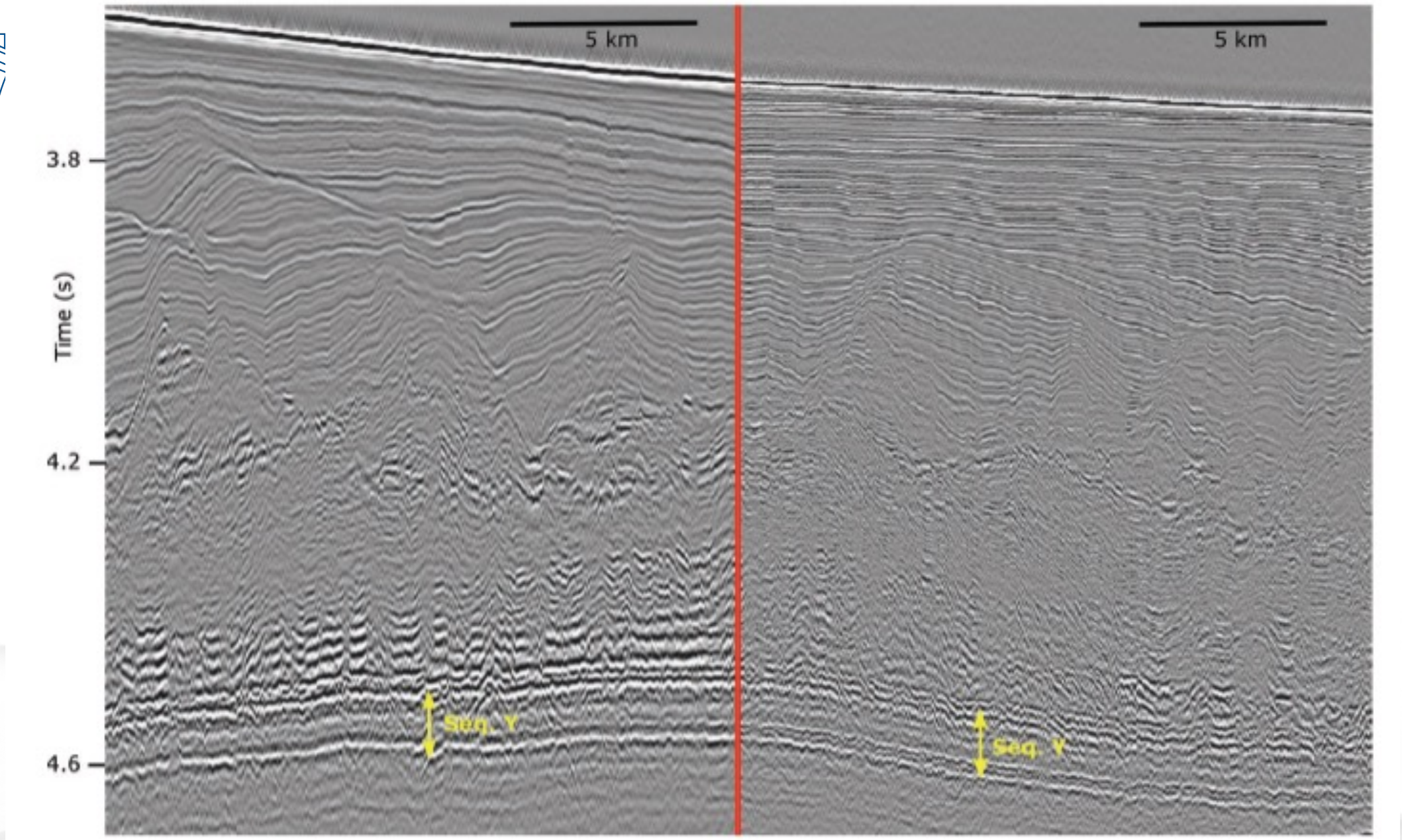
THE DATA

The plan (red)



The data (red)





TAN2104 (2020)

TAN2305-VISIT (2023)

SEISMIC DATA

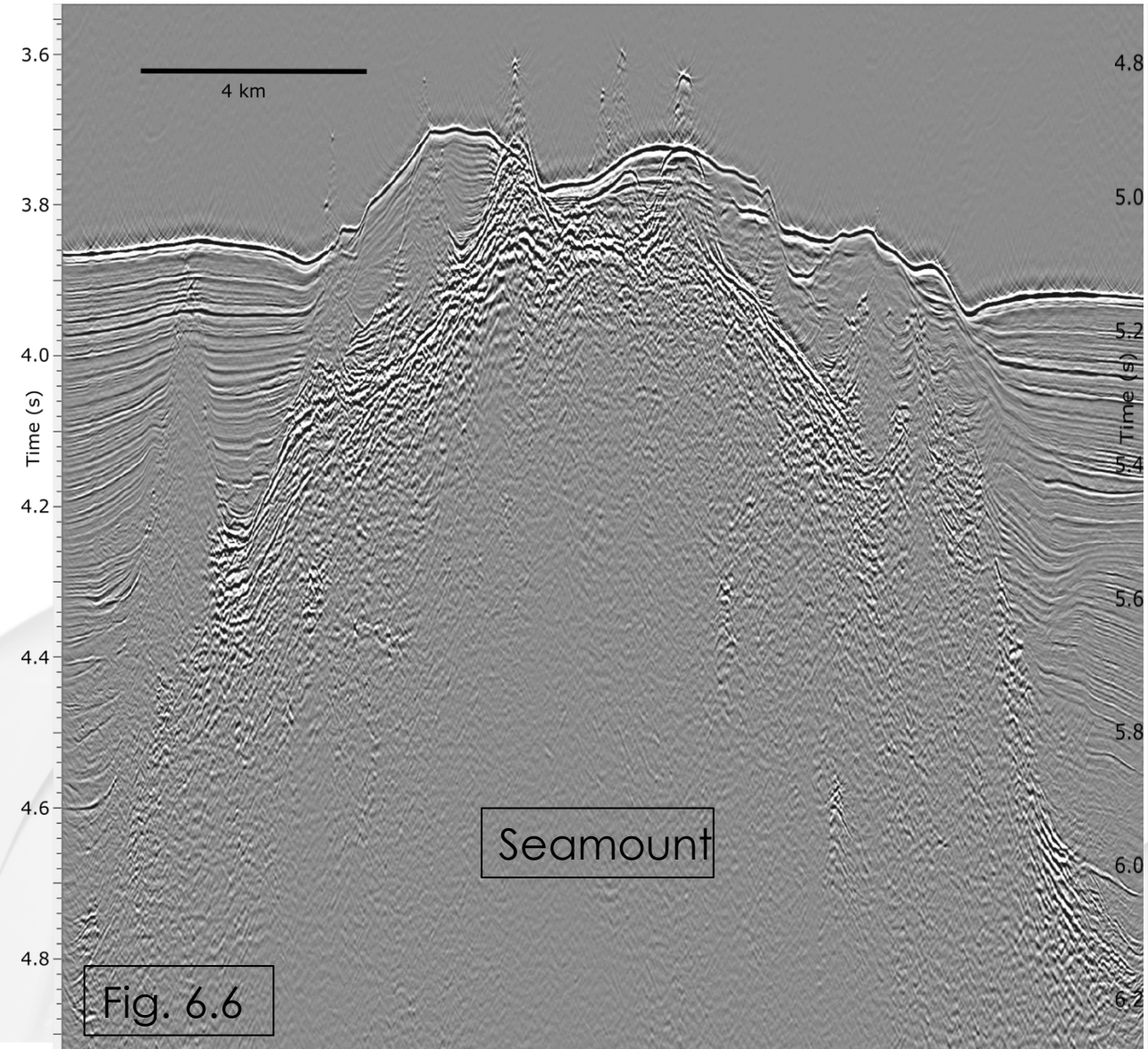


Fig. 6.6

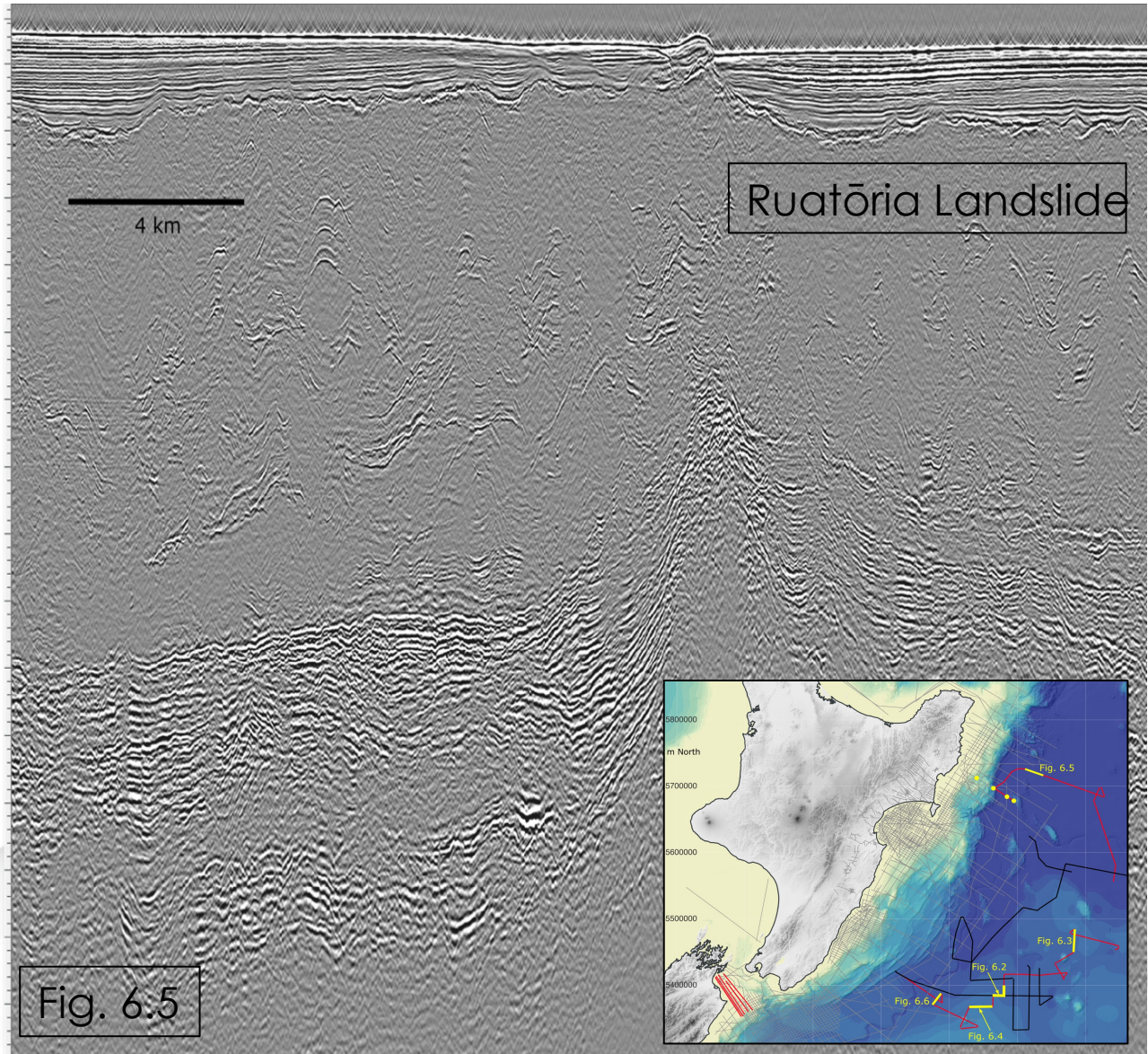


Fig. 6.5

OUTREACH AND EDUCATION

A big thank you to the Eurofleets+ program, NIWA and our sponsors