

# Always finding faults: New Zealand 2016

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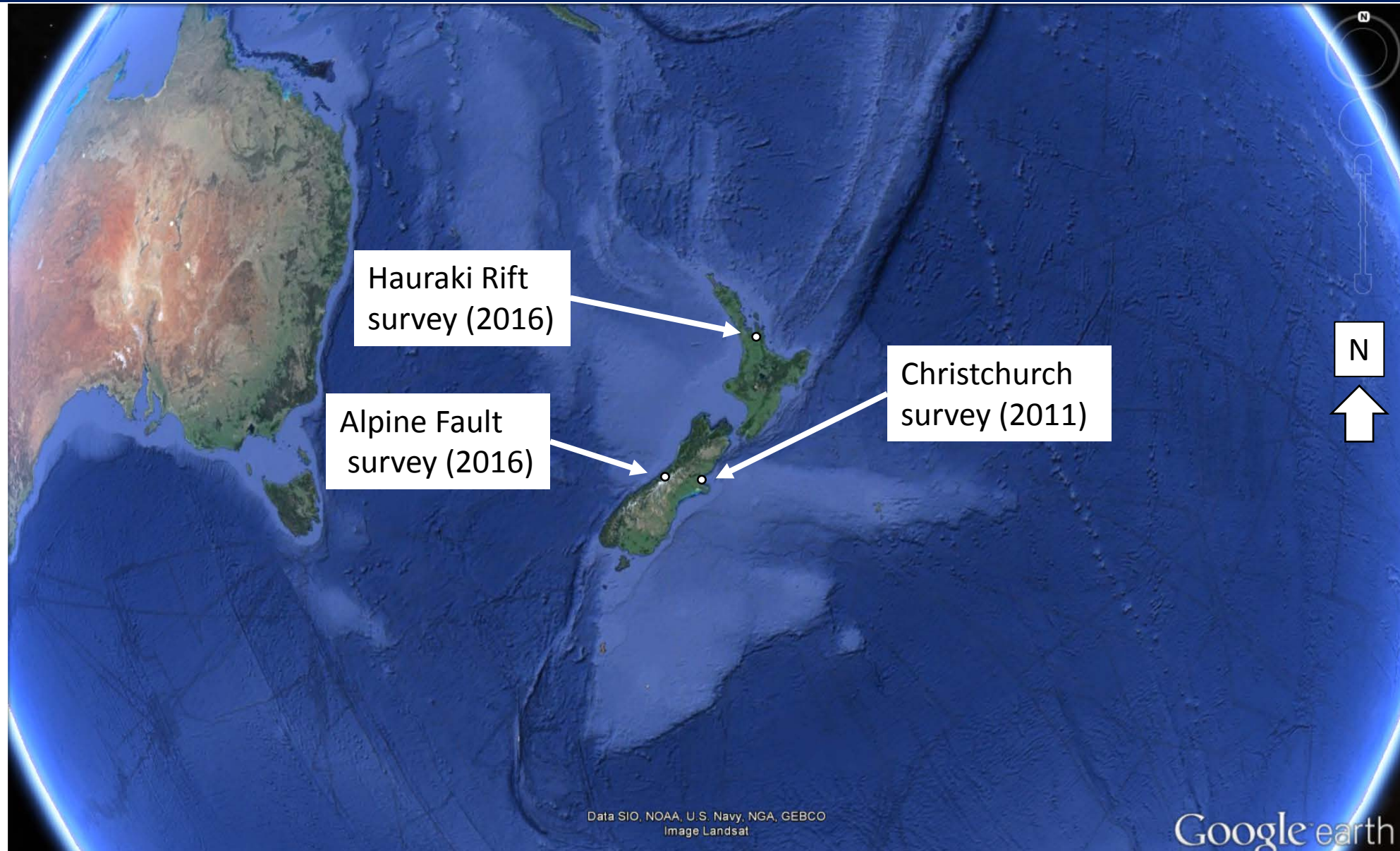
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<sup>6</sup> Victoria University of Wellington, Wellington, New Zealand

<sup>7</sup> University of Otago, Dunedin, New Zealand

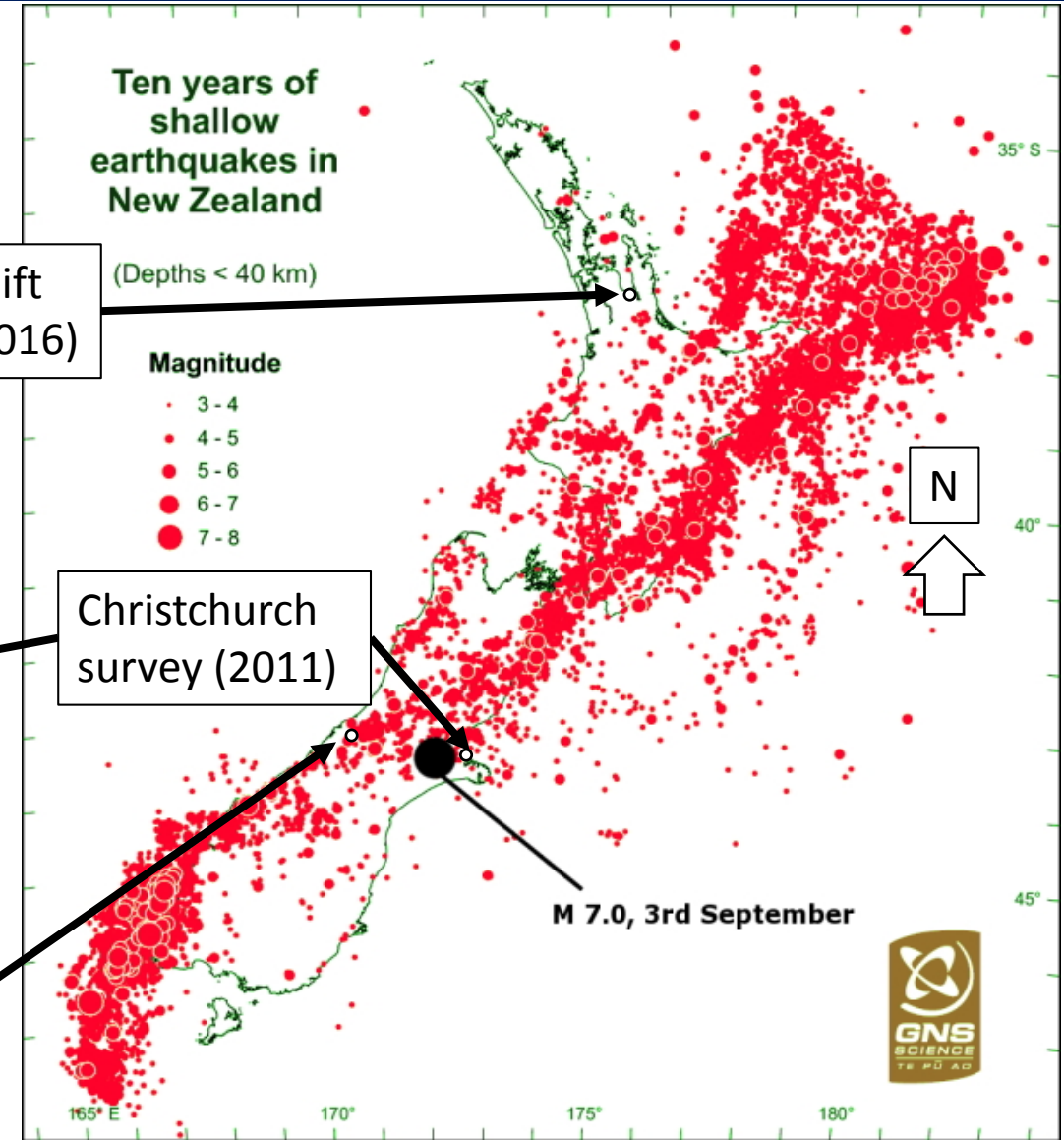
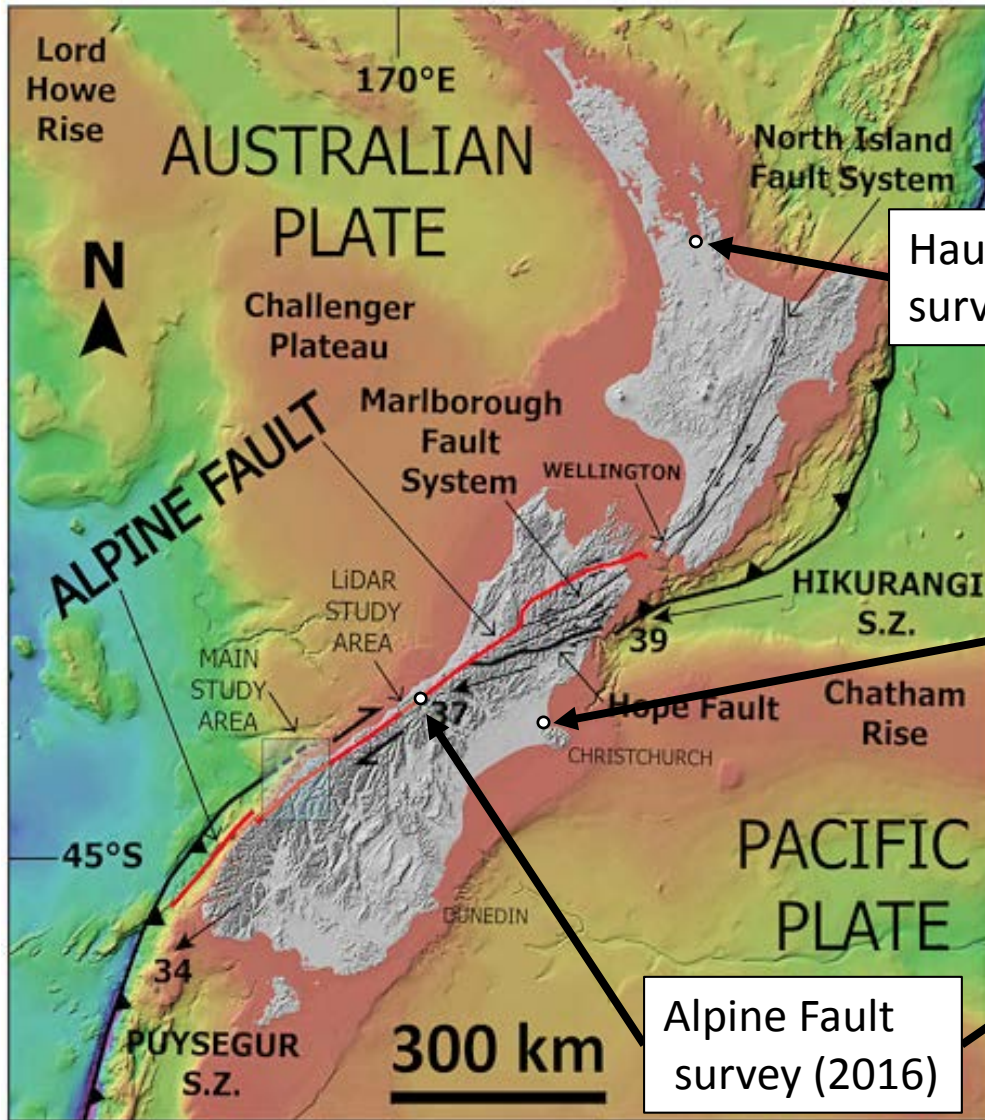
<sup>8</sup> GNS Science, Lower Hutt, New Zealand

# Overview: Location





# Overview: New Zealand Tectonics, Earthquakes

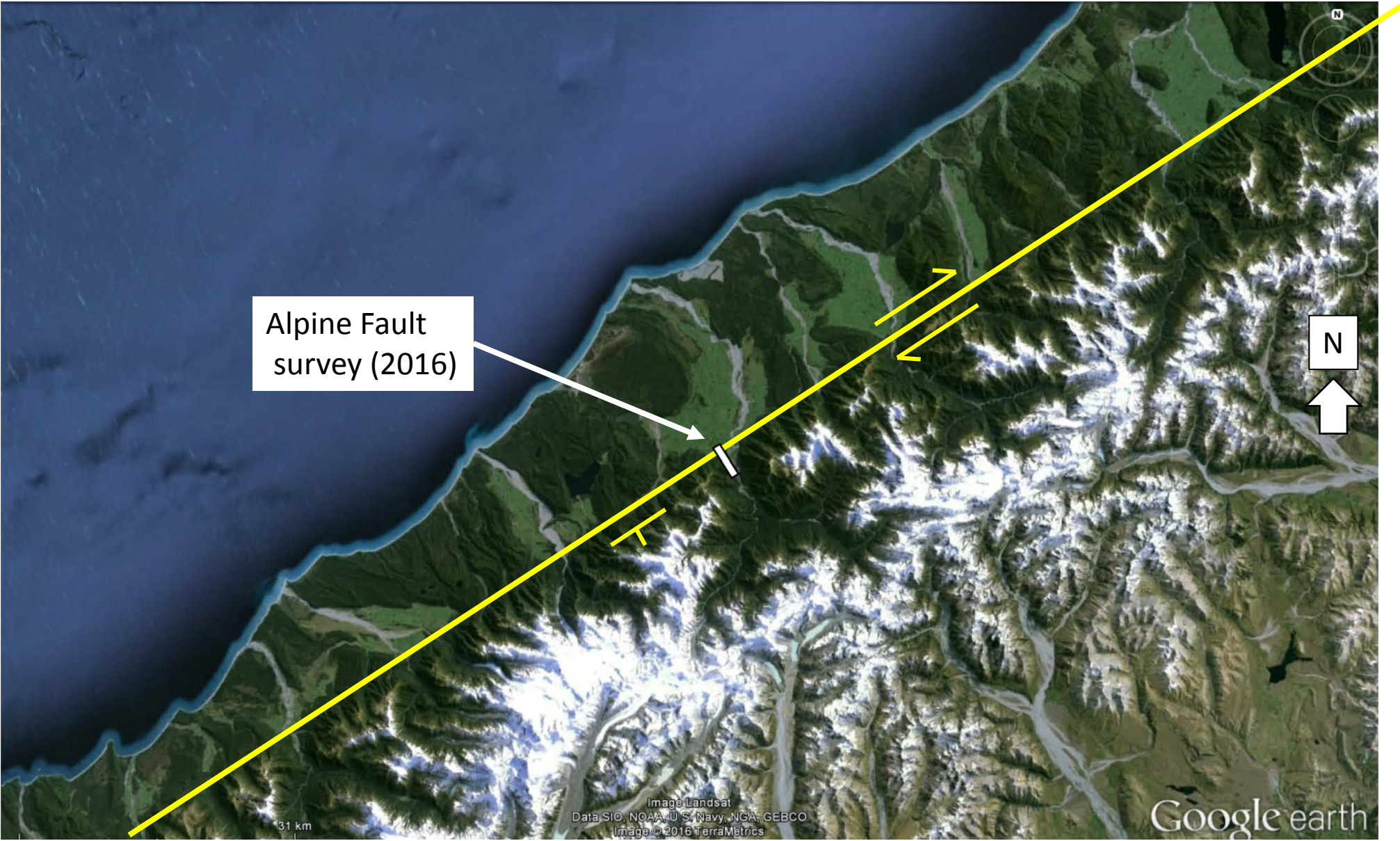


<http://ncbarth.com/Fig1.1NZTectonics.jpg>

[http://all-geo.org/highlyallochthonous/wp-content/uploads/2010/09/NZ\\_Shallow\\_seismicity.jpg](http://all-geo.org/highlyallochthonous/wp-content/uploads/2010/09/NZ_Shallow_seismicity.jpg)

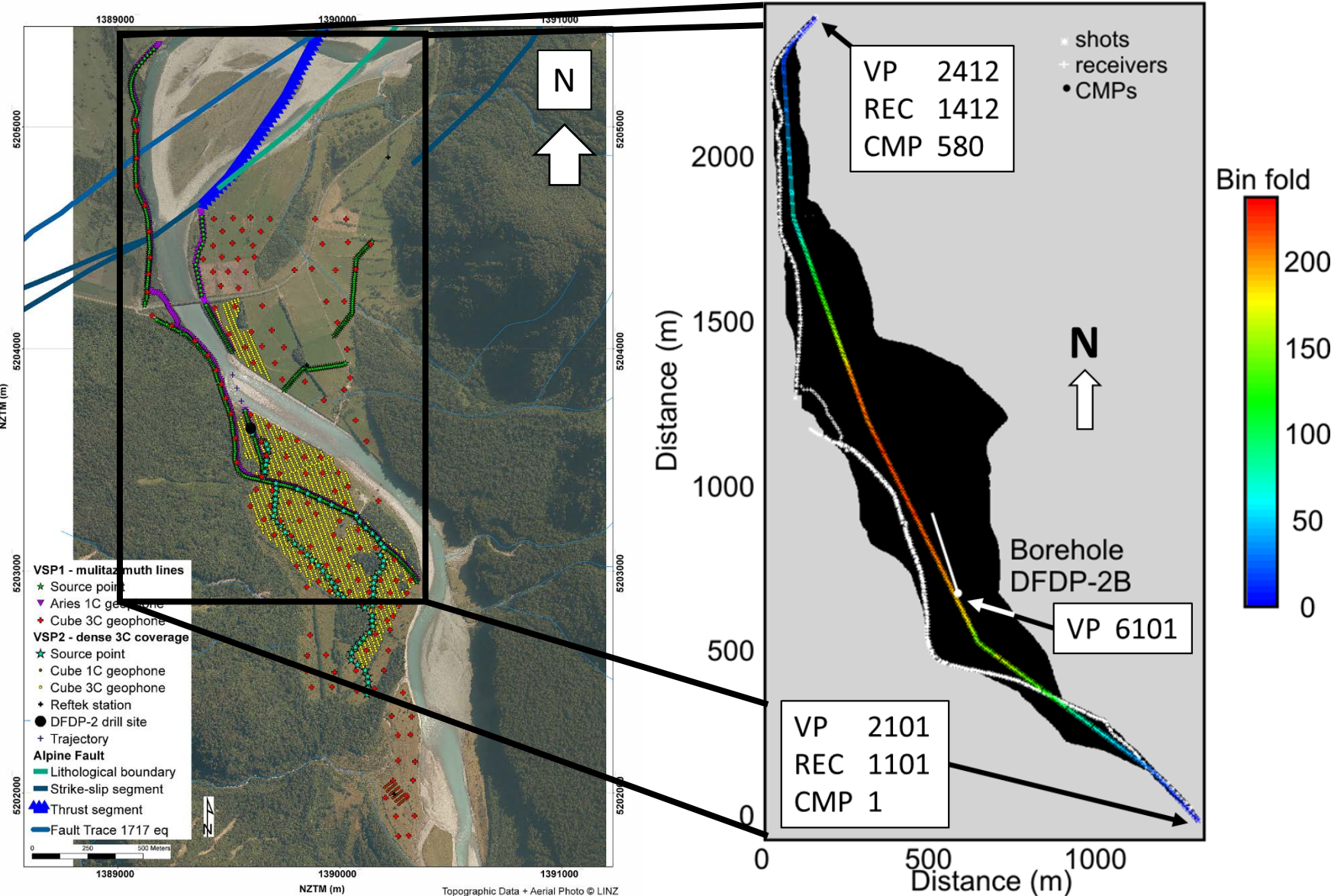


# Alpine Fault: Whataroa Valley Location





# Alpine Fault: Line 1 location and binning



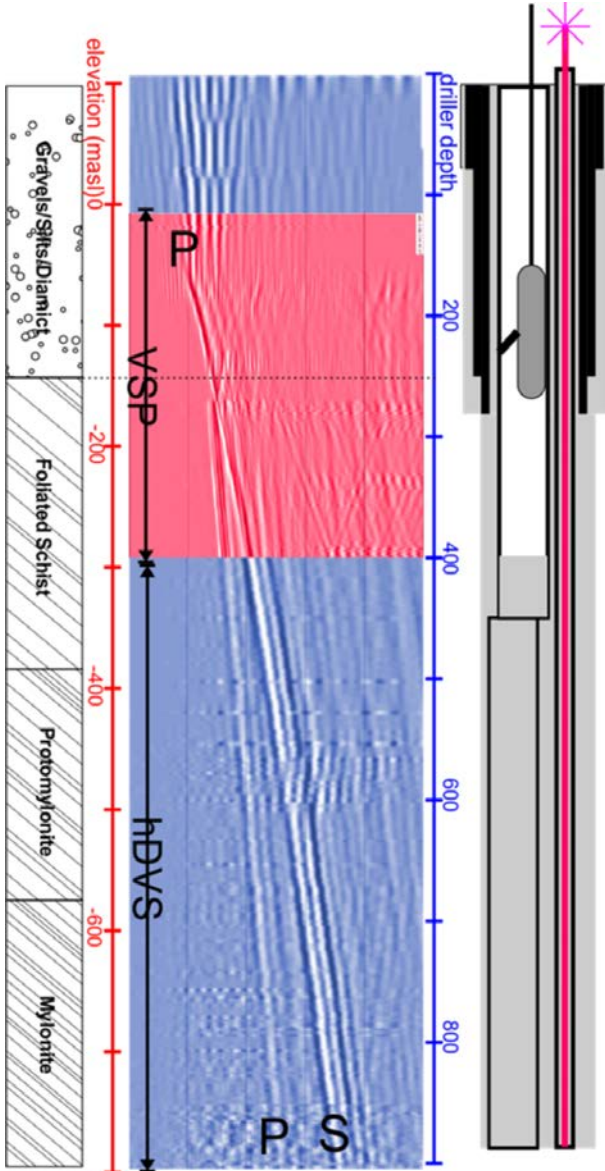


# Alpine Fault: Line 1 Field Pictures



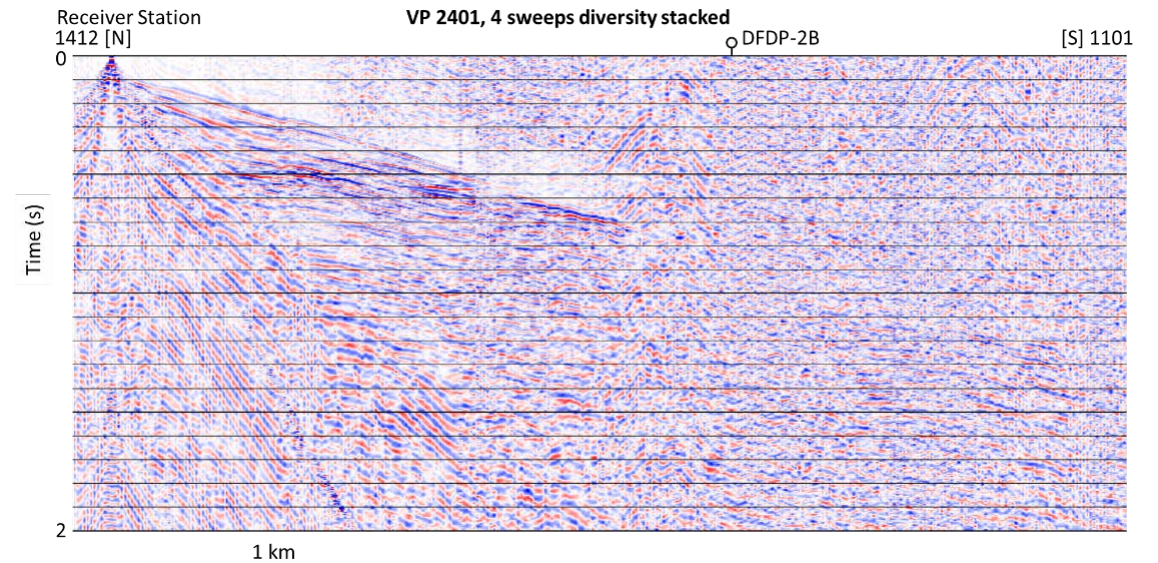
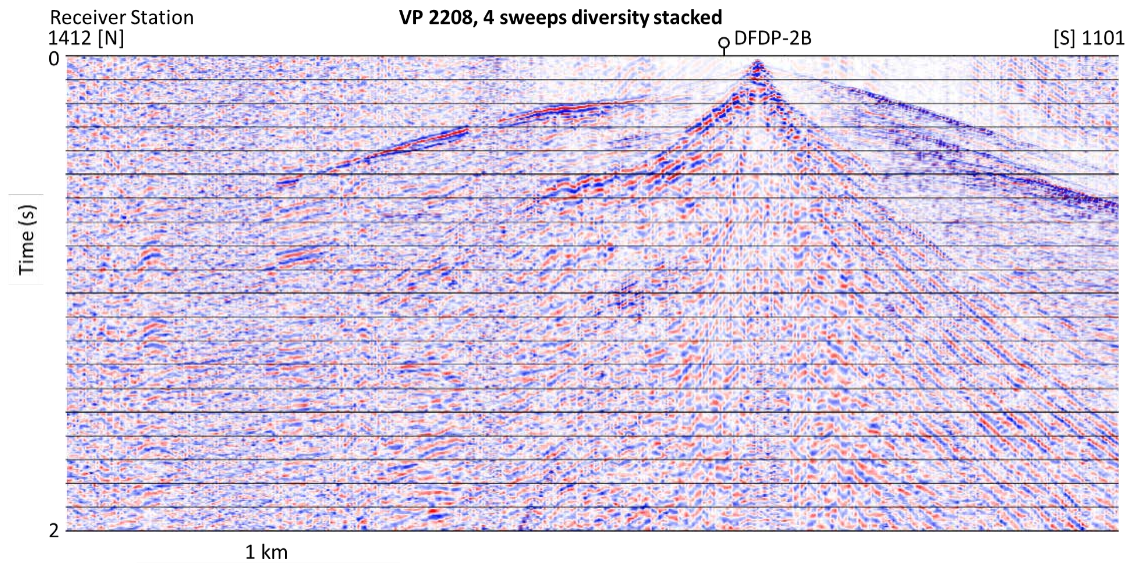
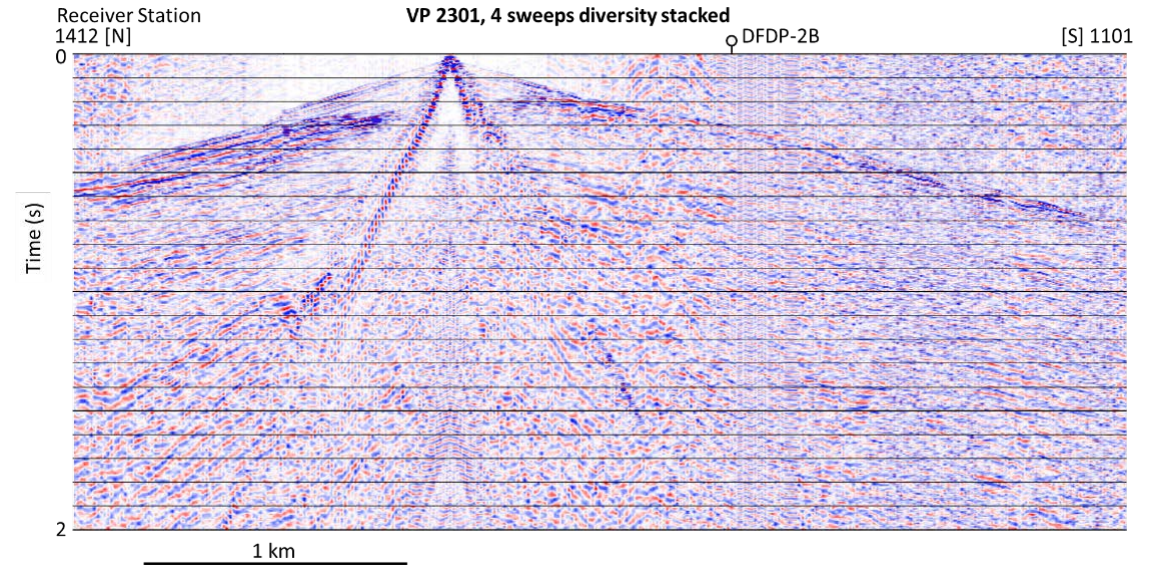
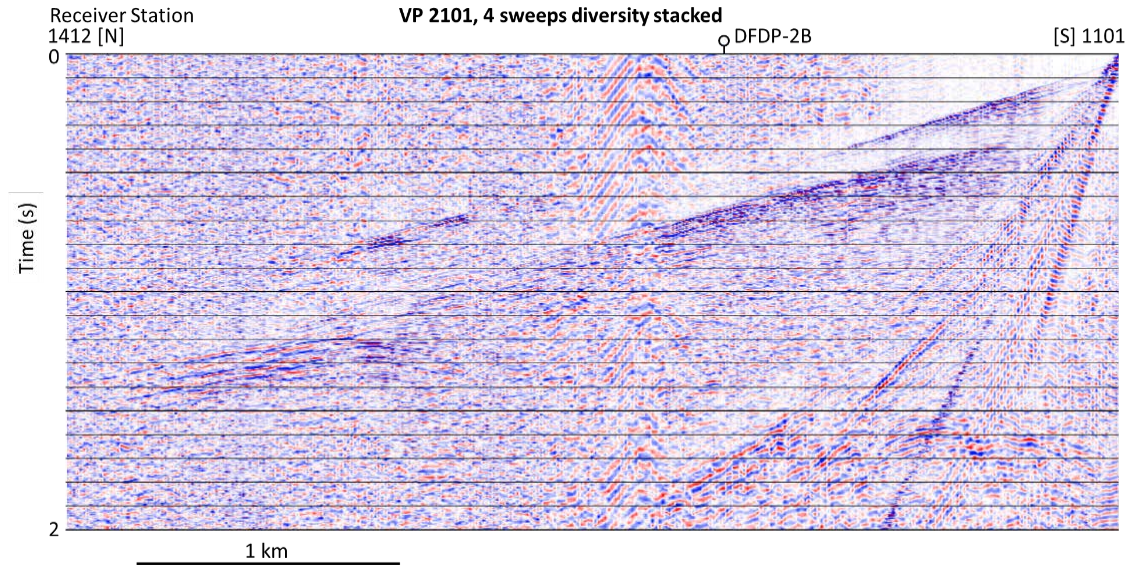


# Alpine Fault: DFDP-2B



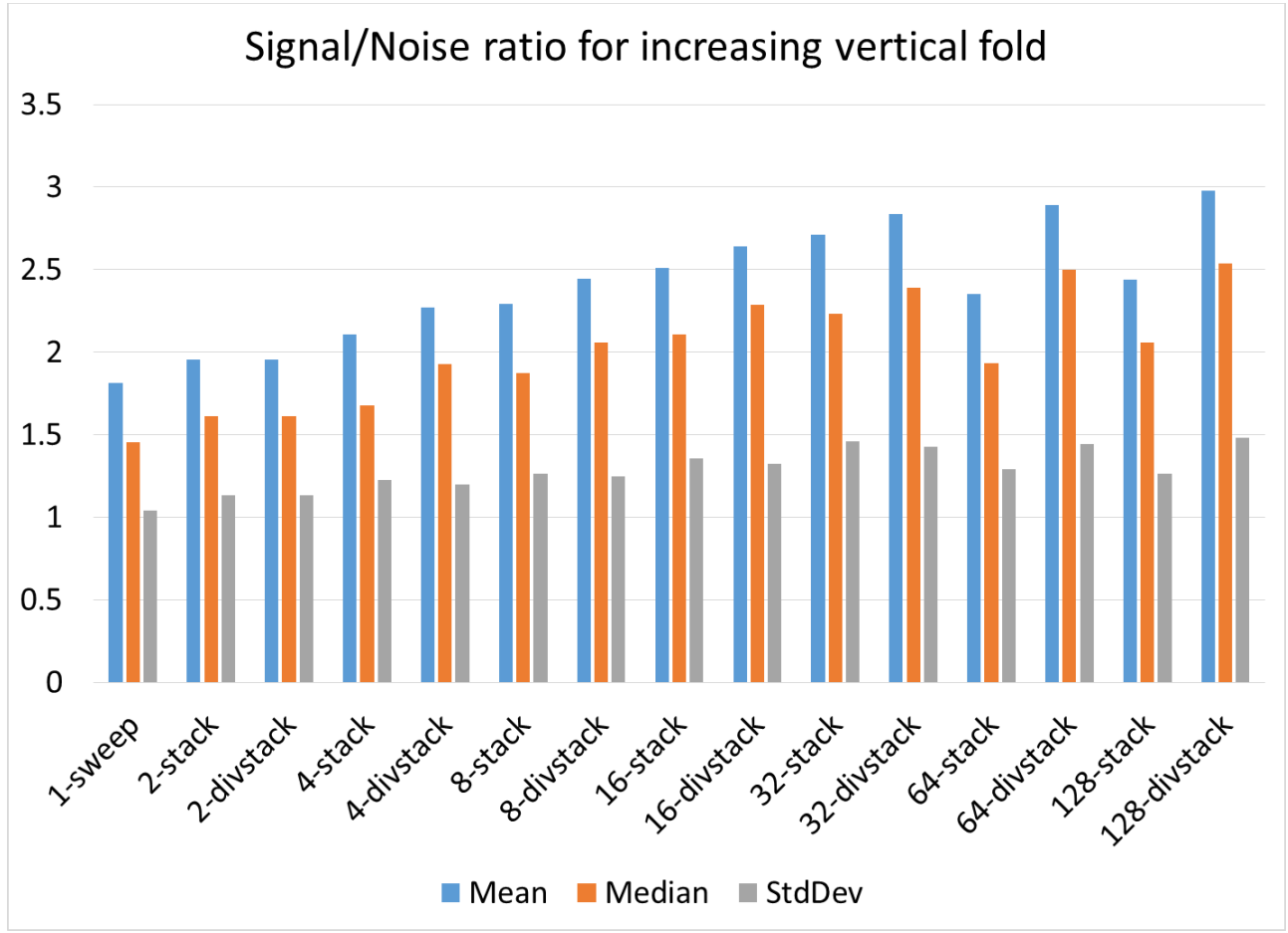
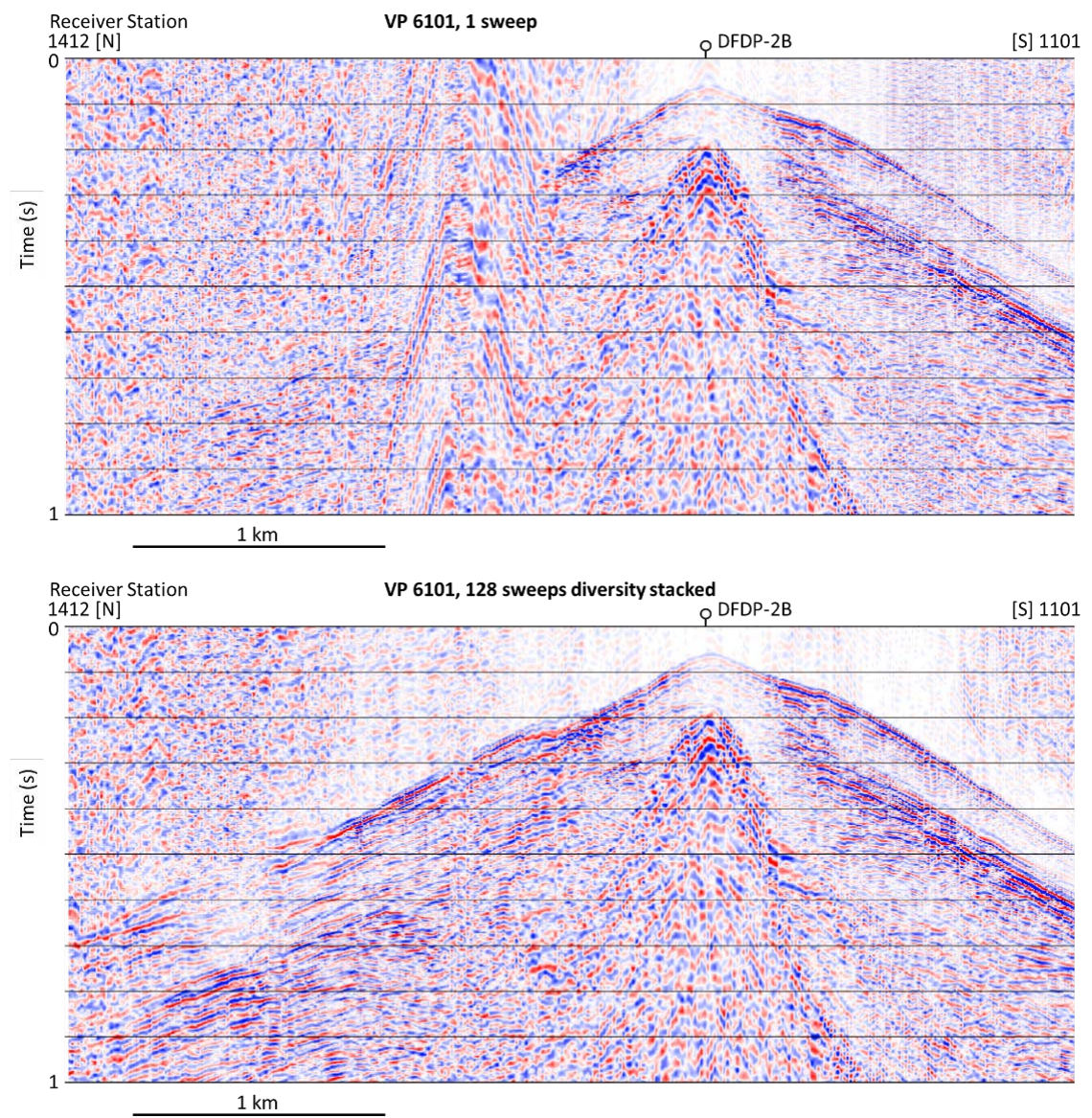


# Alpine Fault: Source Gather Comparison



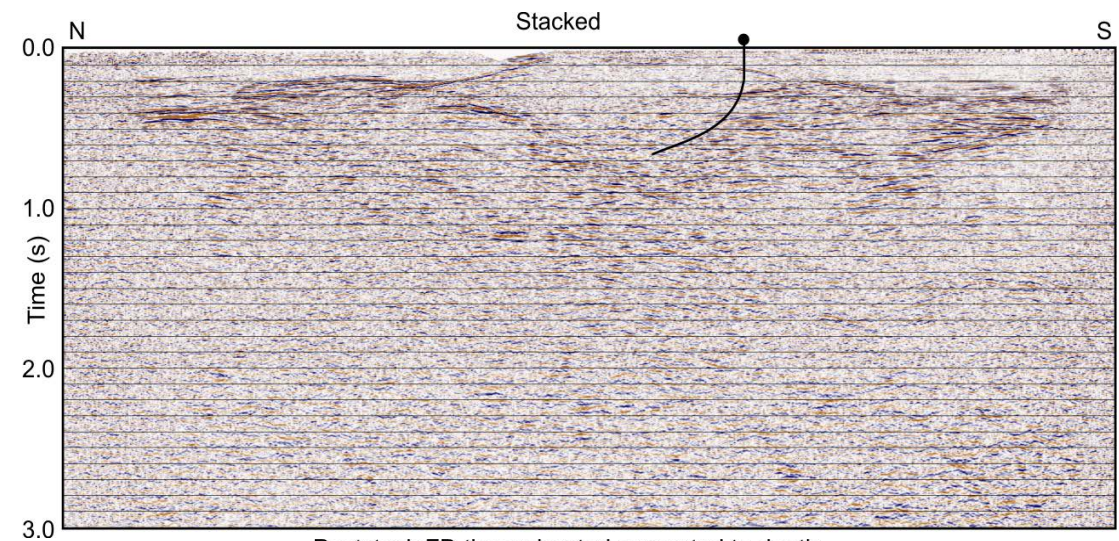
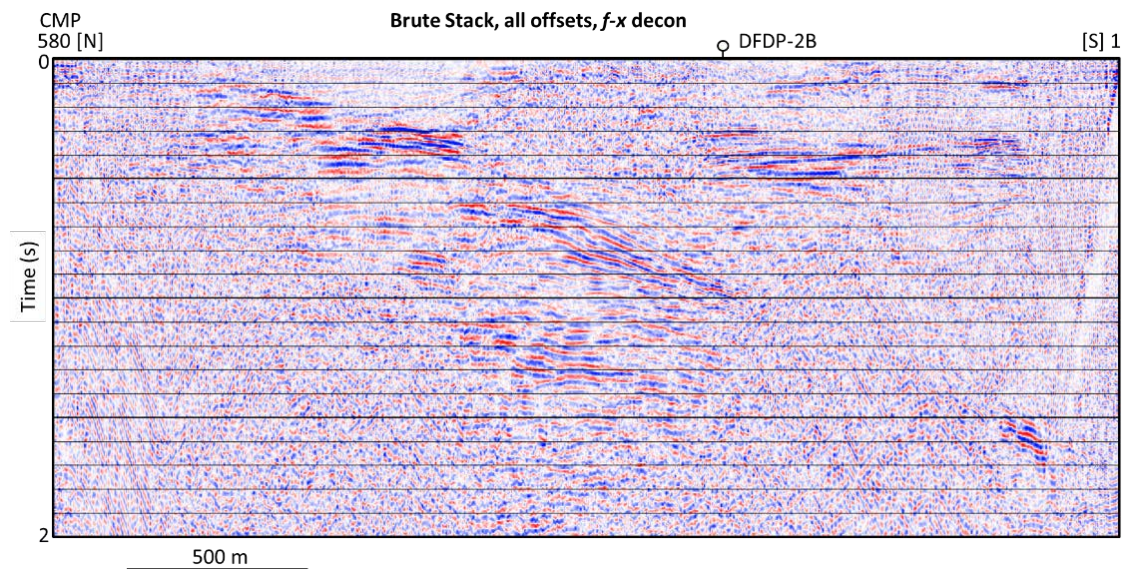
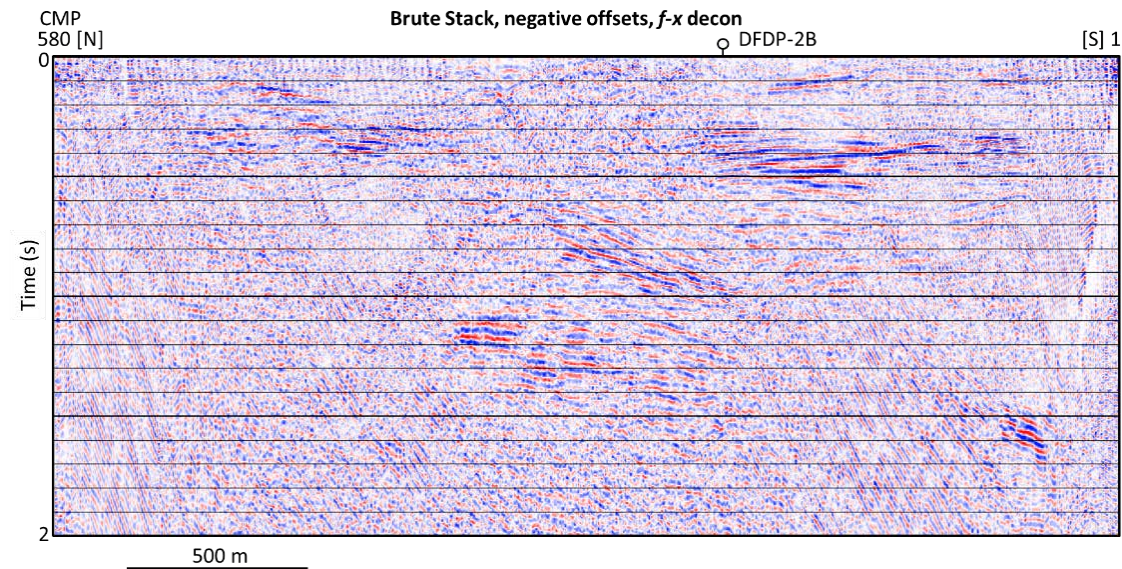


# Alpine Fault: Signal/Noise

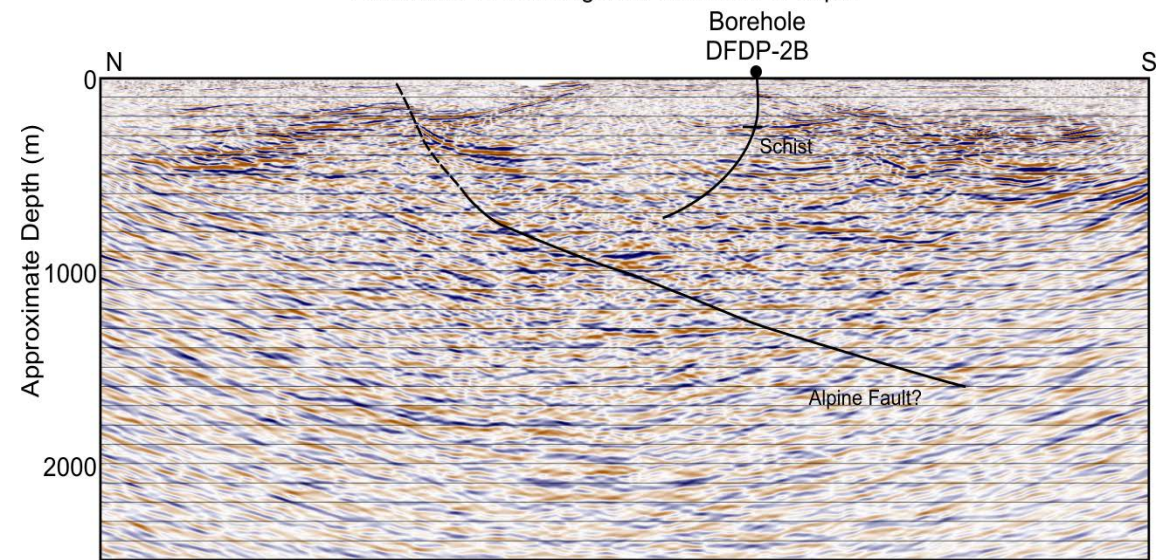




# Alpine Fault: Brute Stacks and Final Stacks



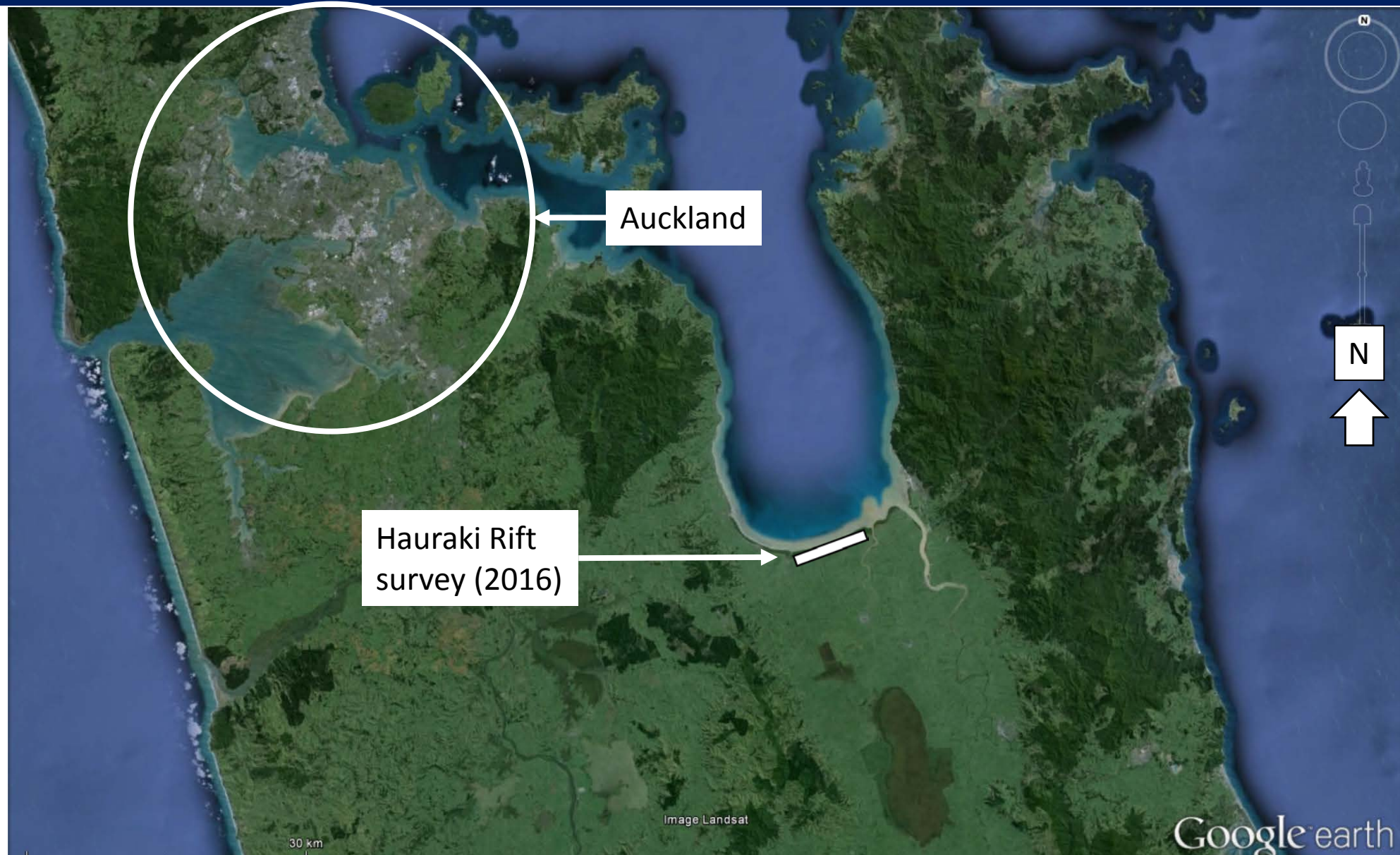
Poststack FD time migrated converted to depth



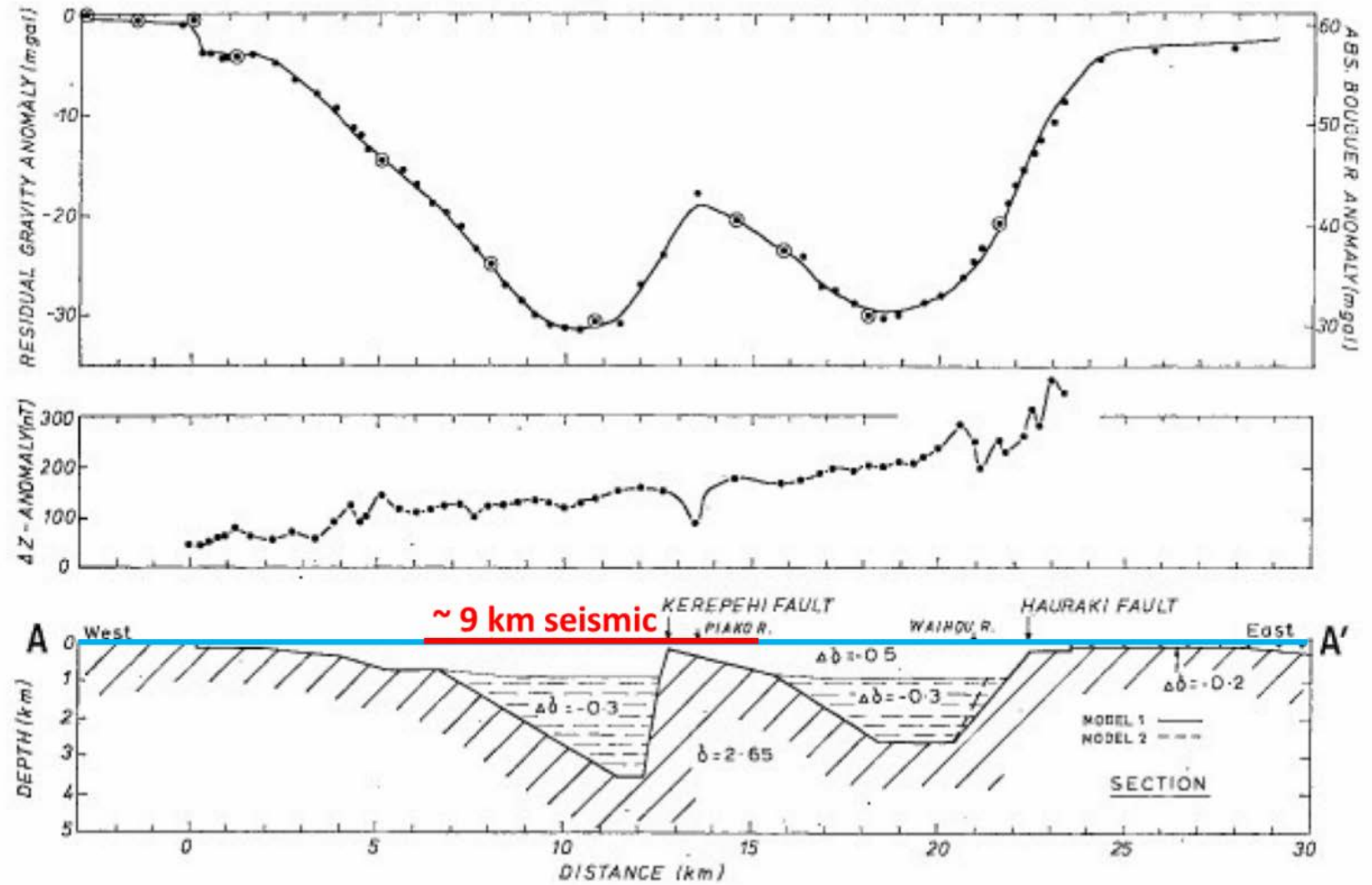
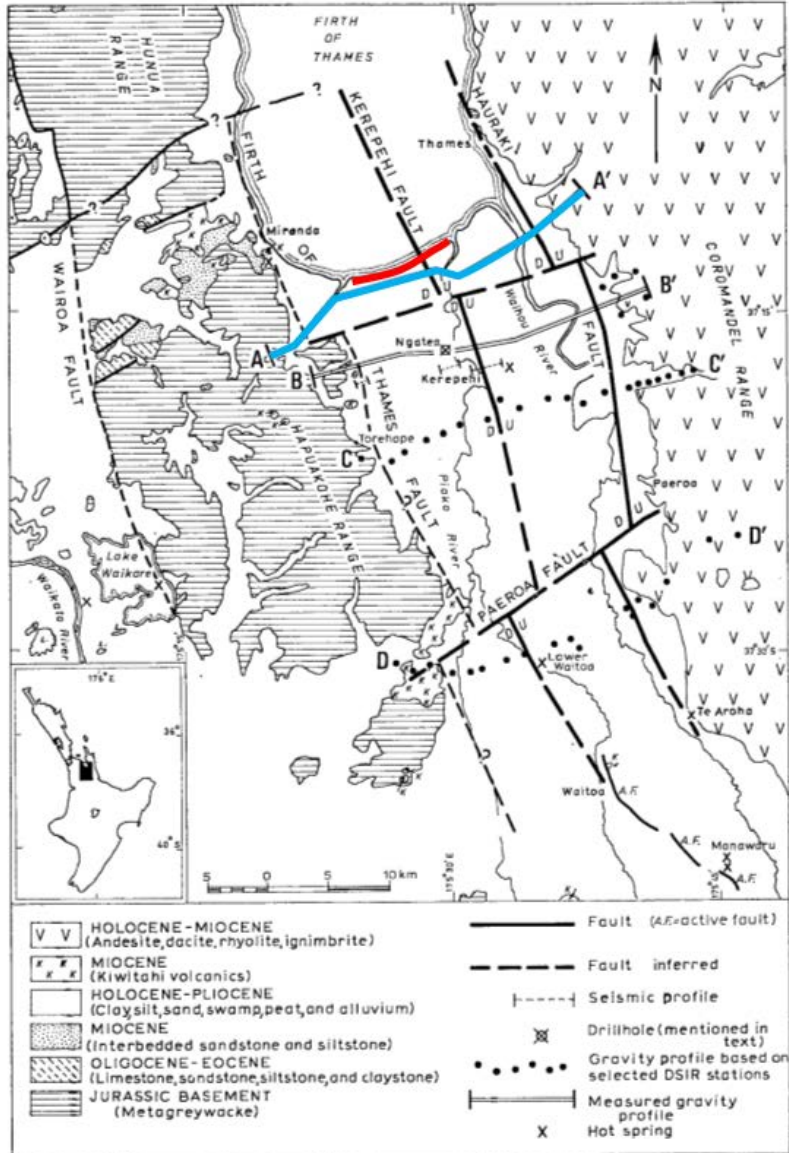
Horizontal scale = 2 x Vertical scale



# Hauraki Rift: Location



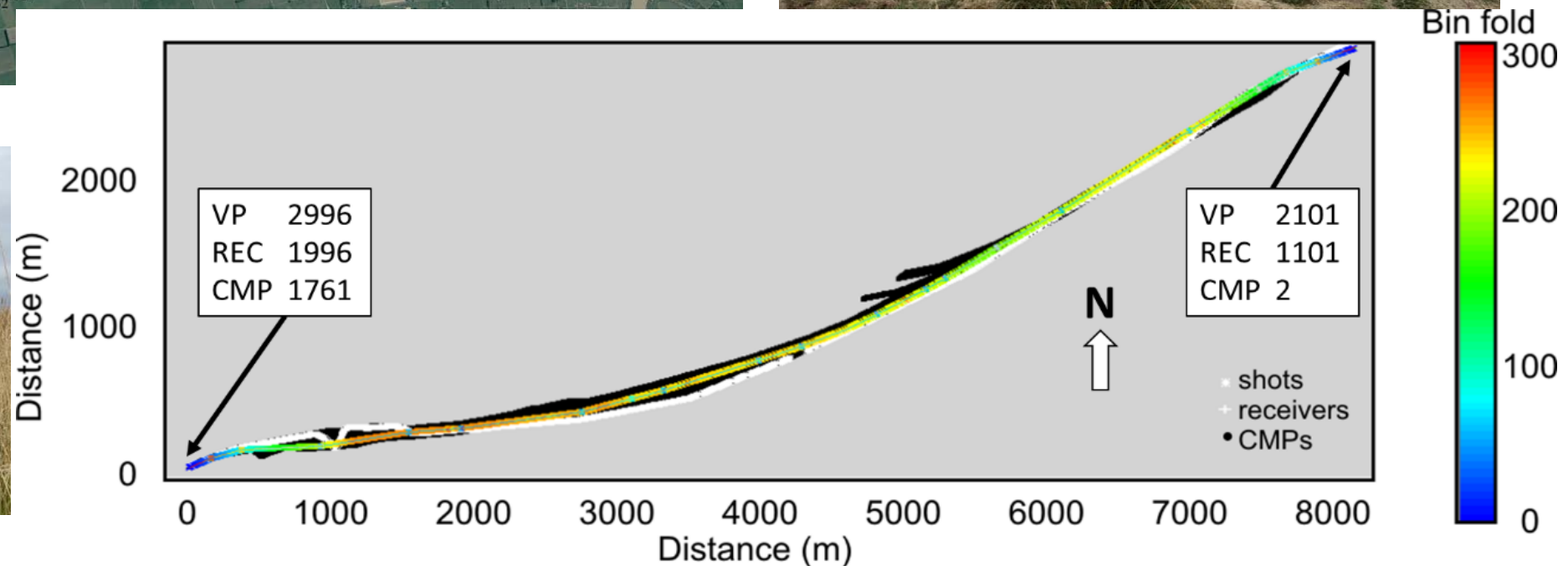
# Hauraki Rift: Geology, Gravity and Magnetic Data



Hochstein and Nixon (1979)



# Hauraki Rift: Line 1 Location and Binning



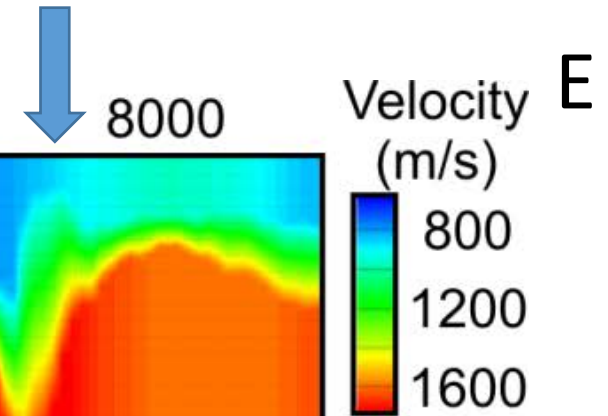
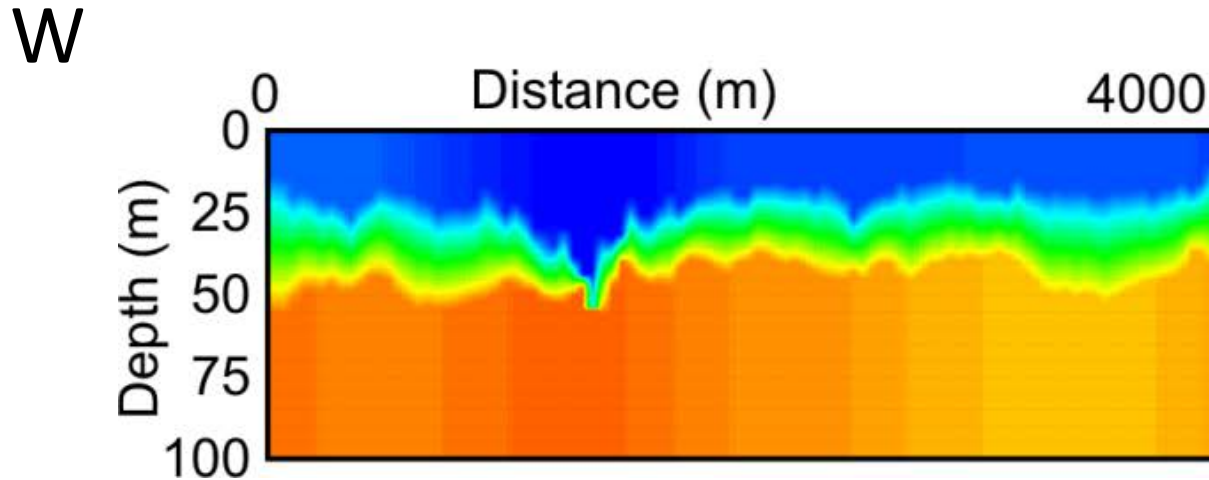
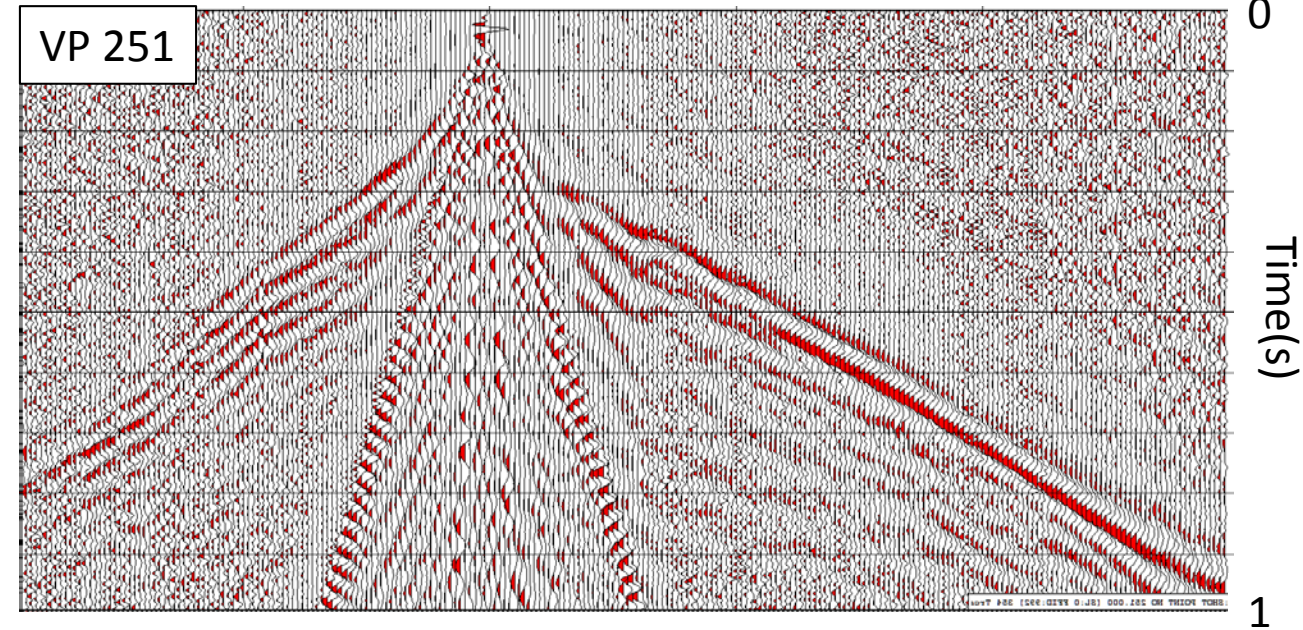
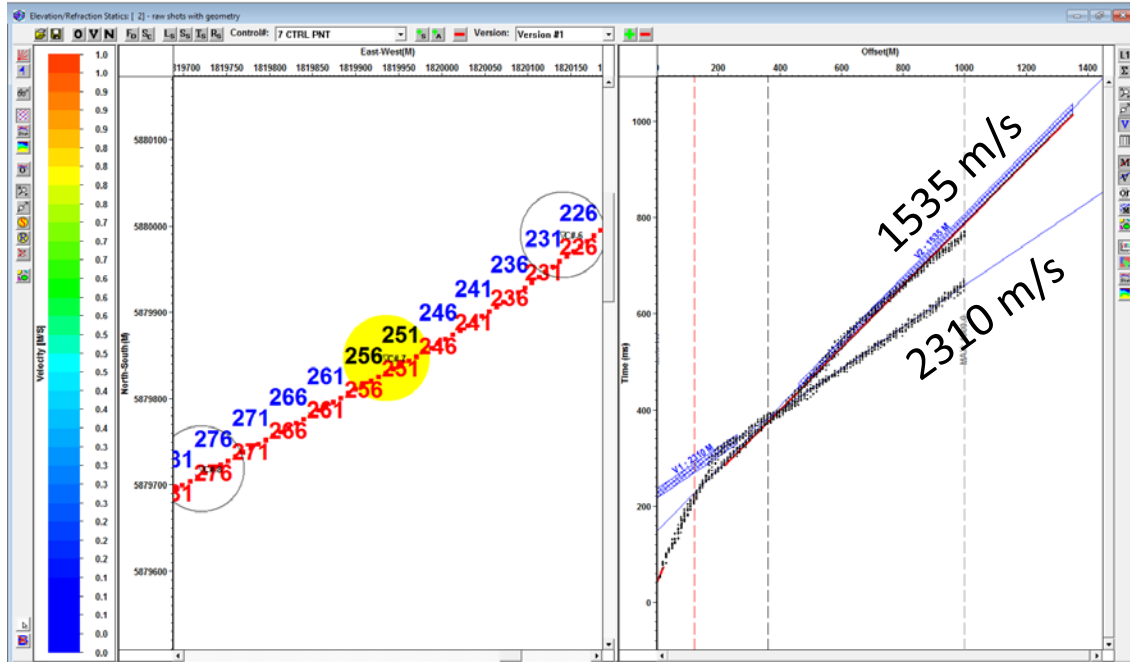


# Hauraki Rift: Field Pictures





# Velocity Analysis: VPs 2246-2256, Refraction Velocities, Model

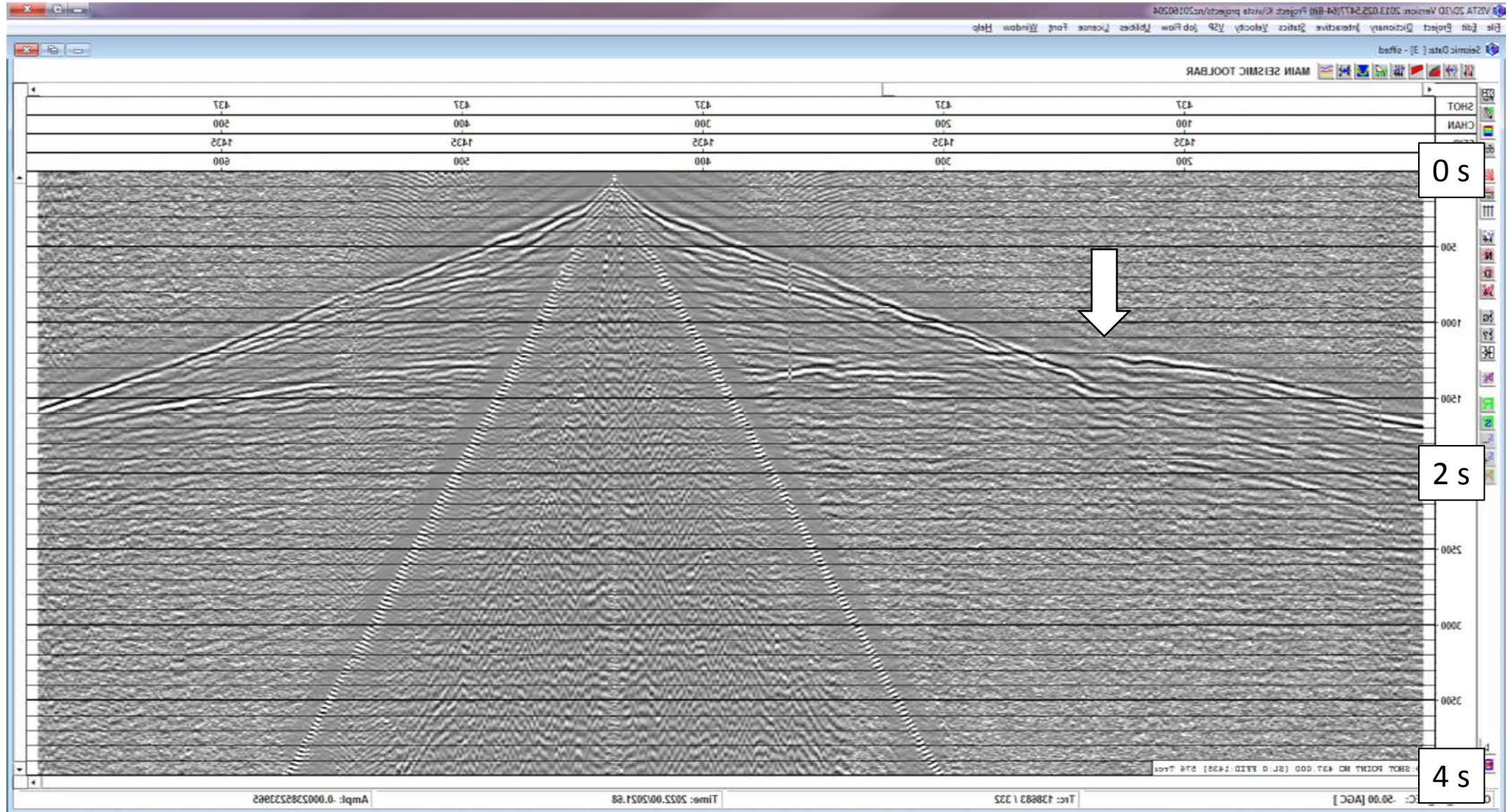




# Hauraki Rift: VP 2437, The Wart

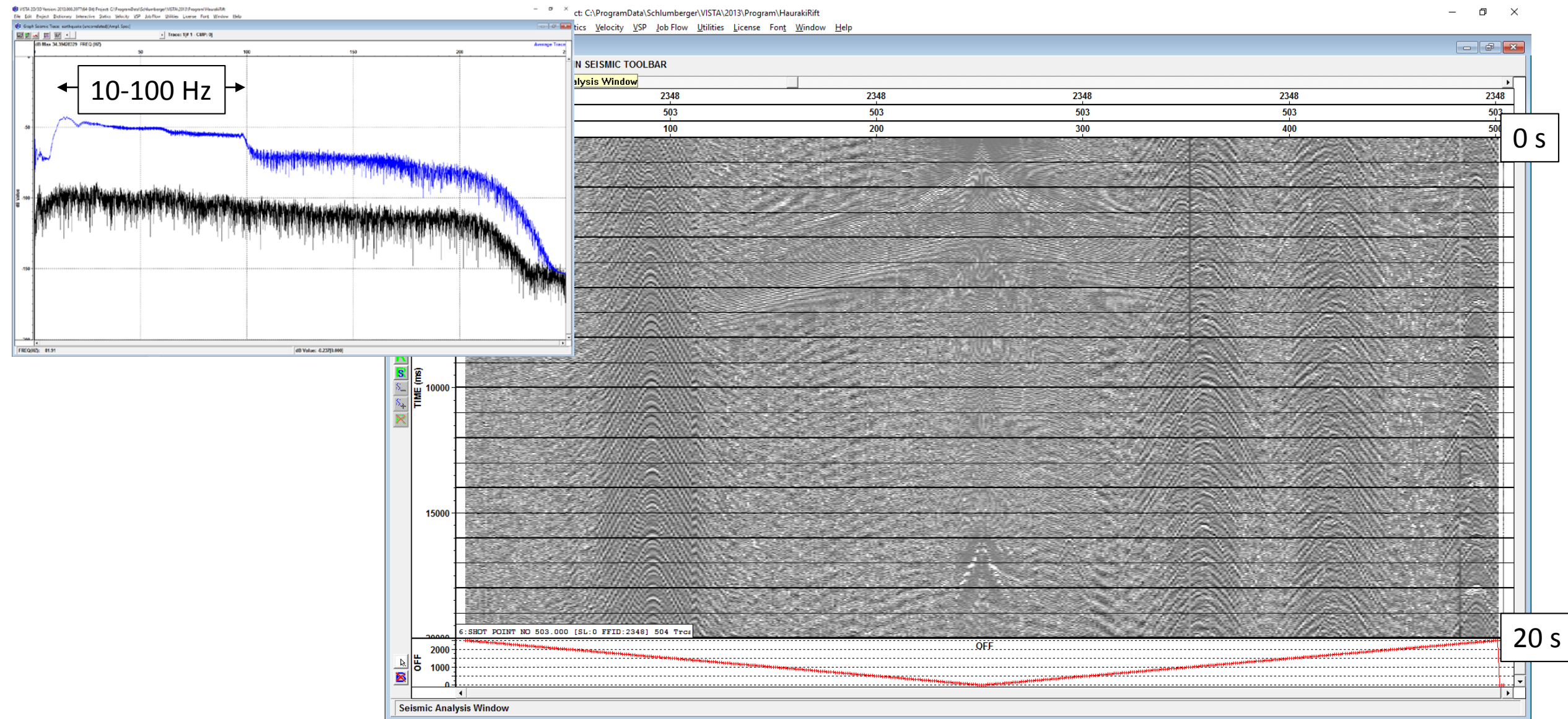
W

E



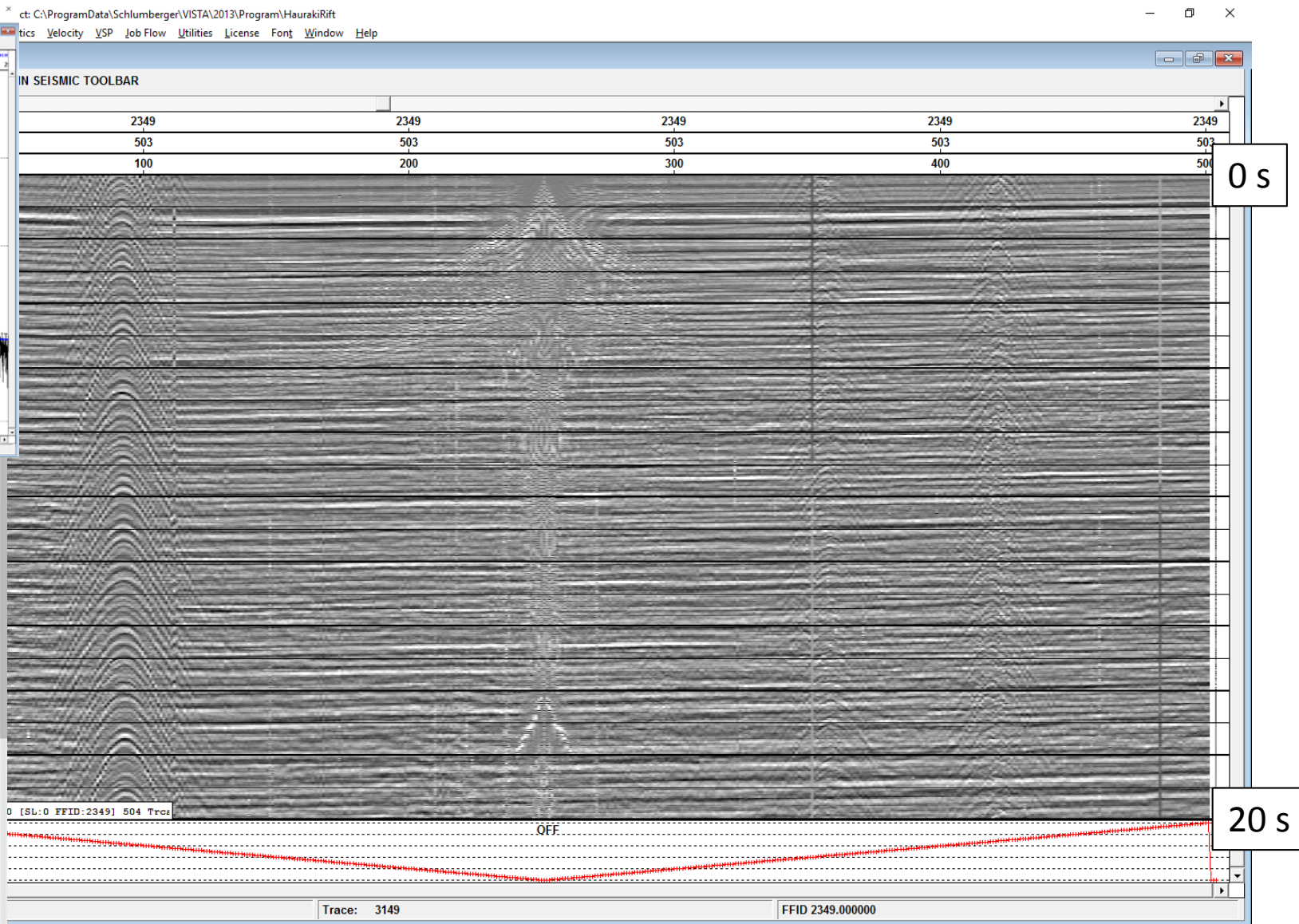
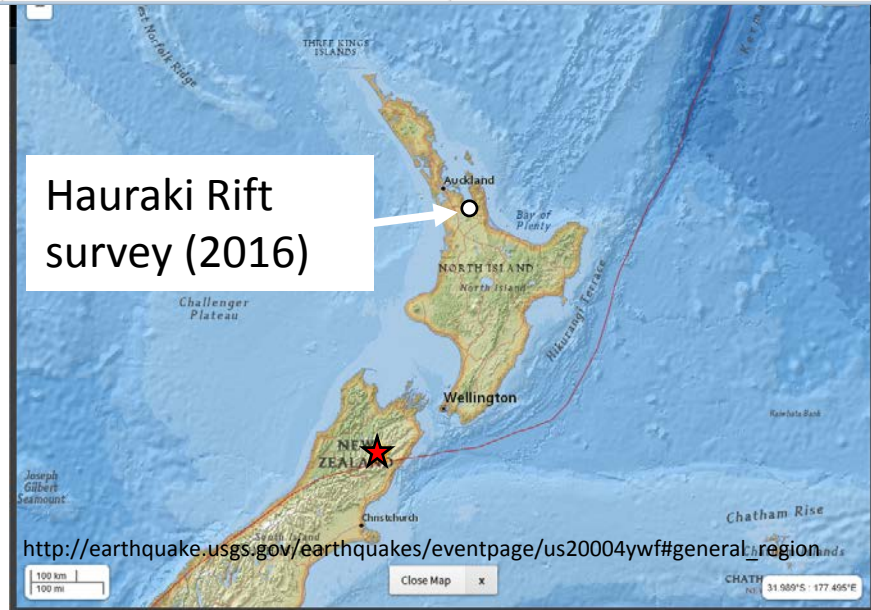
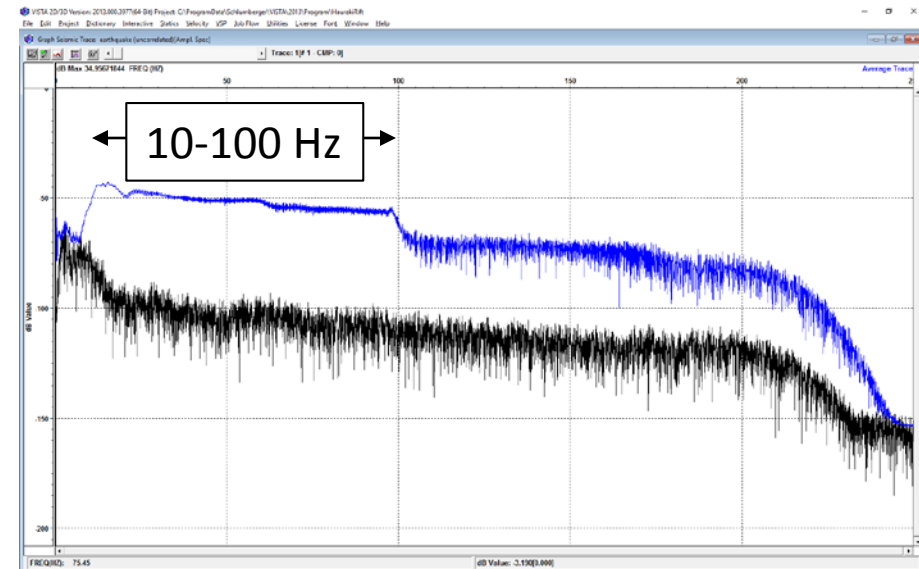


# FFID 2348 Uncorrelated



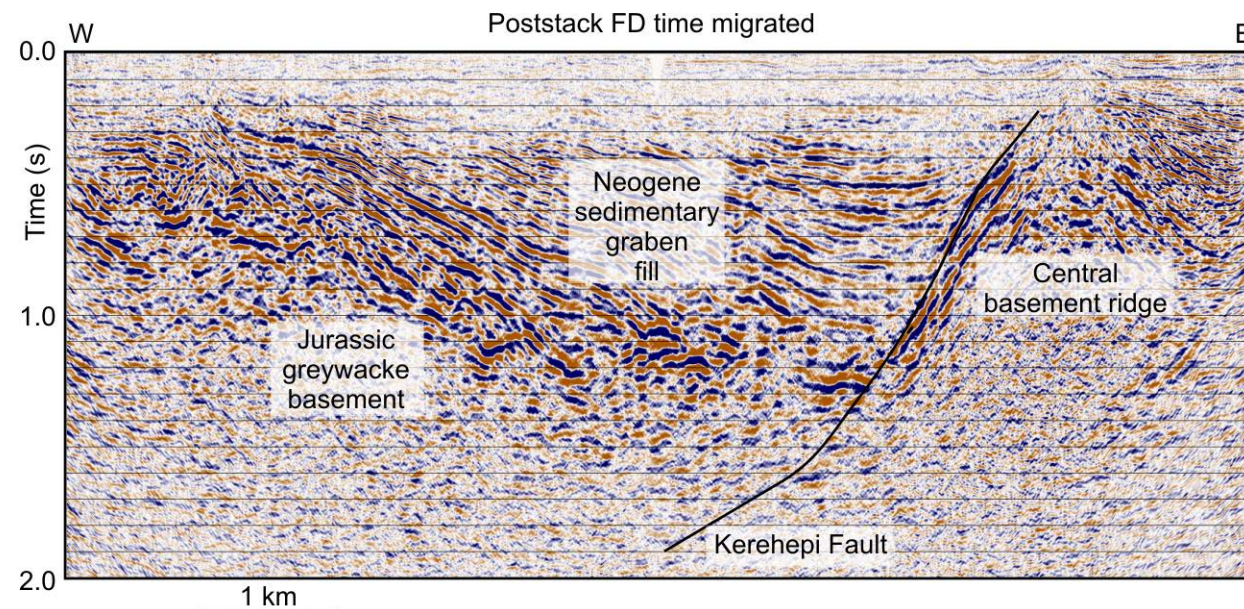
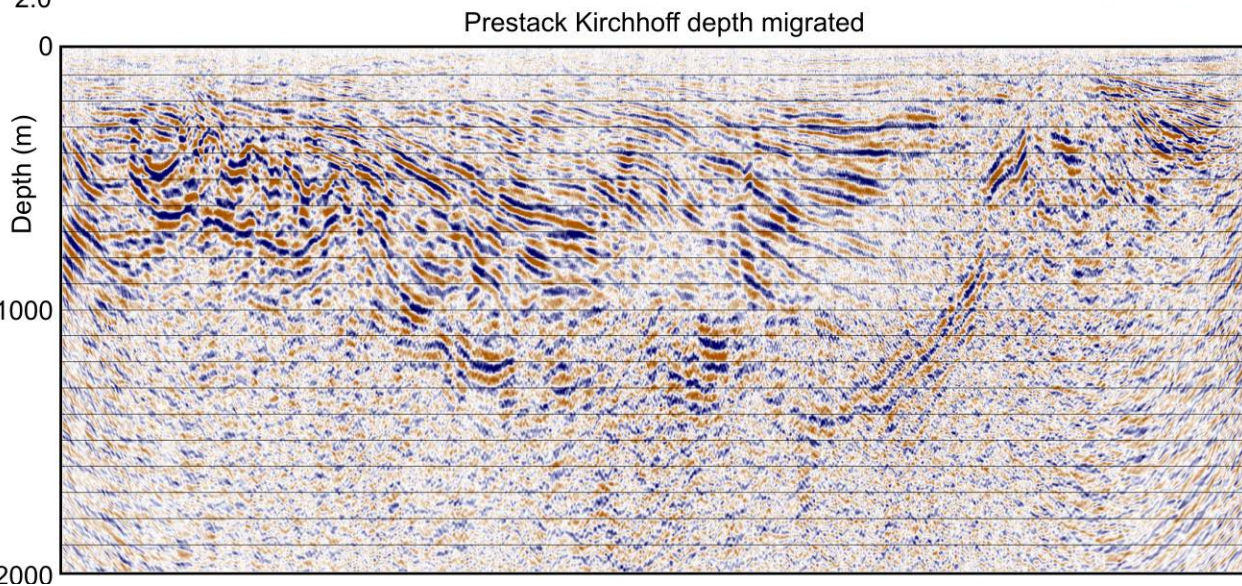
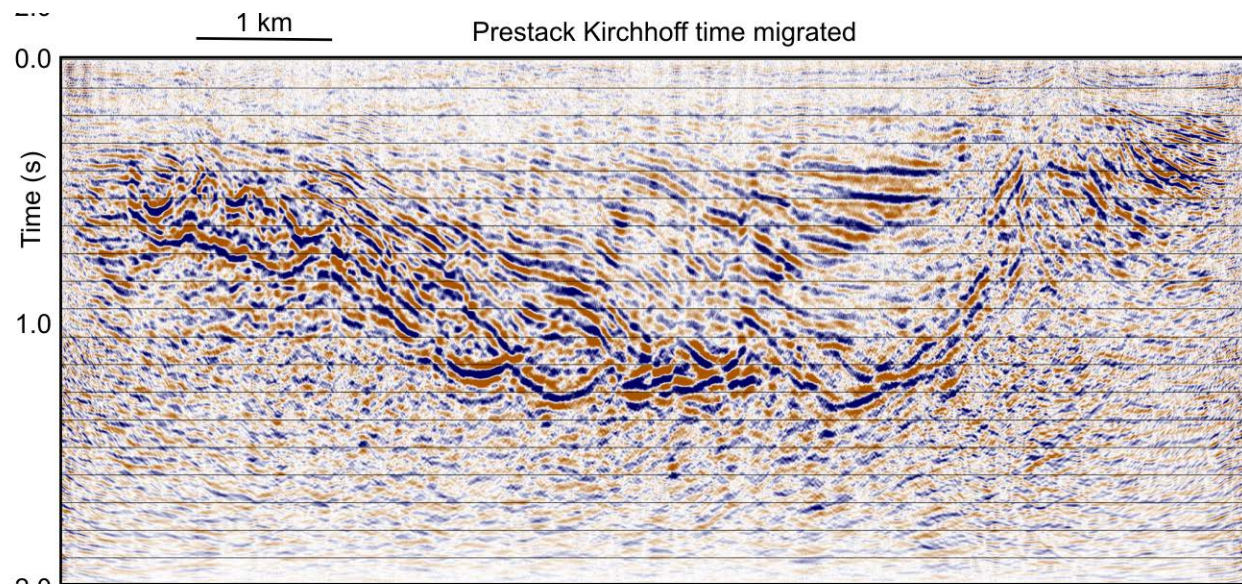


# FFID 2349 Uncorrelated [Earthquake, M5.2, 53.7 km deep]





# Hauraki Rift: Final stacks





# Conclusions

- Good initial results were obtained for the zero-offset VSP in borehole DFDP-2b. There is a good match between the vertical component geophone data (velocity) and the DAS data (strain).
- We obtained fairly good images of the base of sediments and, we believe, of the Alpine Fault. Further processing to see if clearer images can be obtained should be conducted. The stacked and migrated sections shown in this report can be interpreted in greater detail.
- The North Island survey has produced decent images of structure within the Hauraki Rift, particularly of the base of sediments and of sediments deposited in the hanging wall of the active Kerepehi fault.



# Future Work

- Process all available datasets, combined interpretation
  - Seismometers
  - Cubes
  - Multi-azimuth and Multi-offset VSPs
  - Geology
  - Gravity and Magnetics
  - Etc.



# Acknowledgements

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# The End

- Thanks for your attention

