

Te Hiranga Rū QuakeCoRE: DT1 Integrated Seismic Geohazards



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Technology Megatrend

Capability Areas

coordination mechanism

TM1 Computational Science

TM2 Machine Learning

TM3 Sensing and Monitoring

TM4 Materials Science and Manufacturing

Regional Network Areas

coordination mechanism

RN1 Alpine Fault
South Island-wide

RN2 Wellington

RN3 Hikurangi subduction zone
North Island-wide

Inter-disciplinary Programmes

IP1 Functional Recovery with Repairable Multi-storey Buildings

IP2 Thriving Residential Communities

IP3 A Resilient Aotearoa New Zealand Transport System

IP4 Harnessing Disruptive Technologies for Seismic Resilience

Disciplinary Themes

DT1 Integrated Seismic Geohazards

DT2 Whole-of-Building Seismic Performance

DT3 Law, Planning, Economics

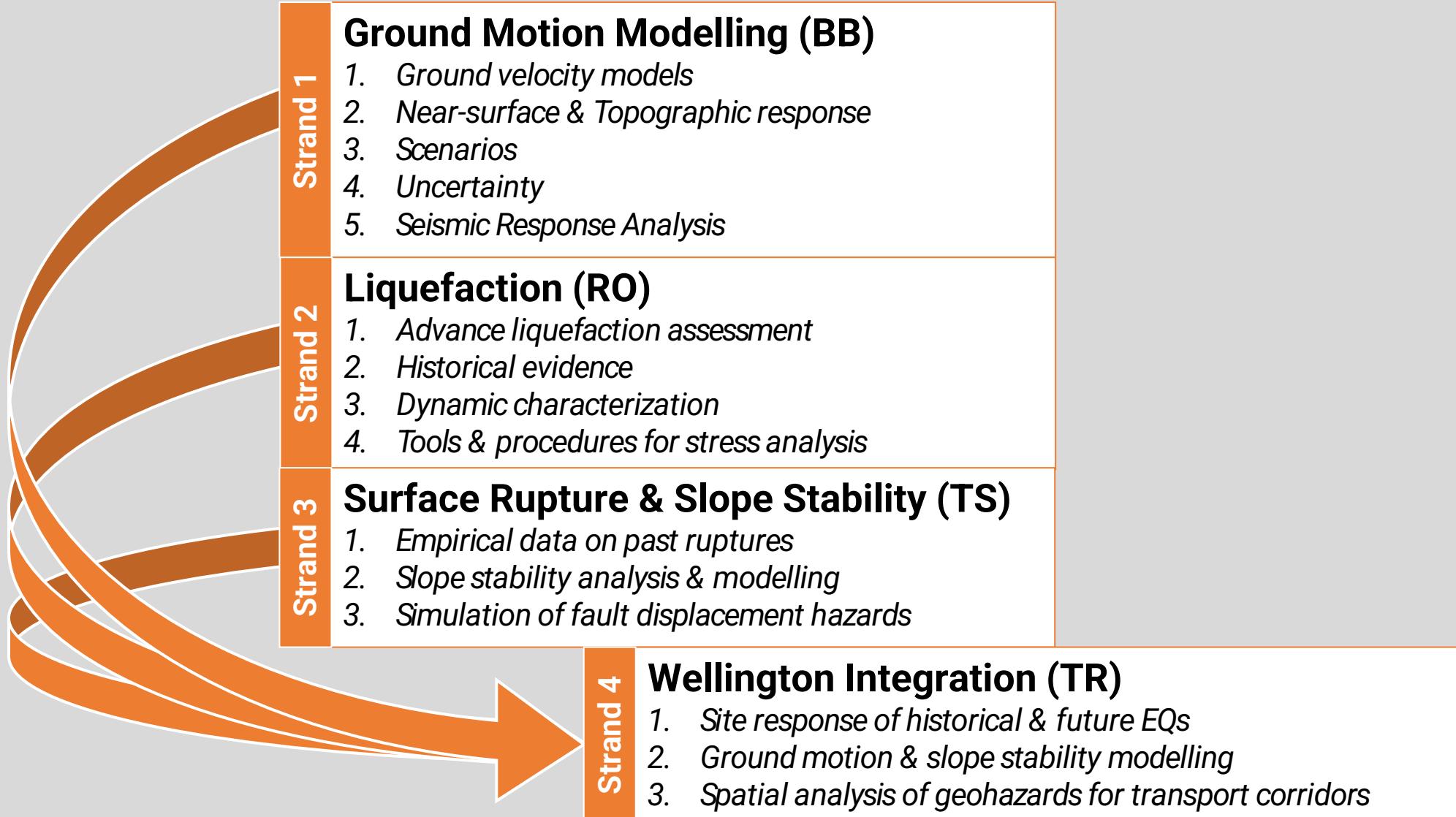
DT4 Cultural and Social Factors Shaping Resilience

DT5 Mātauranga Māori and Earthquake Resilience

RN4 Auckland

RN5 South Pacific

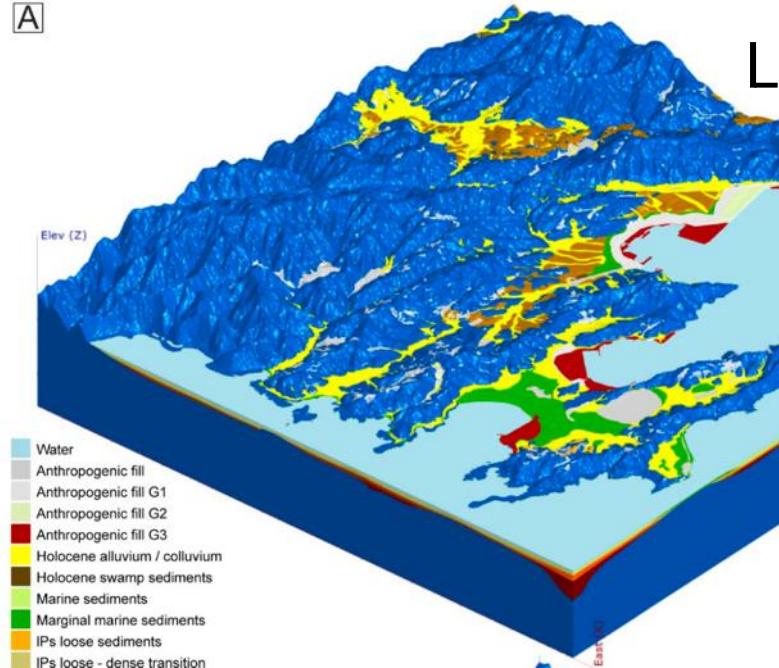
DT1 Integrated Seismic Geohazards



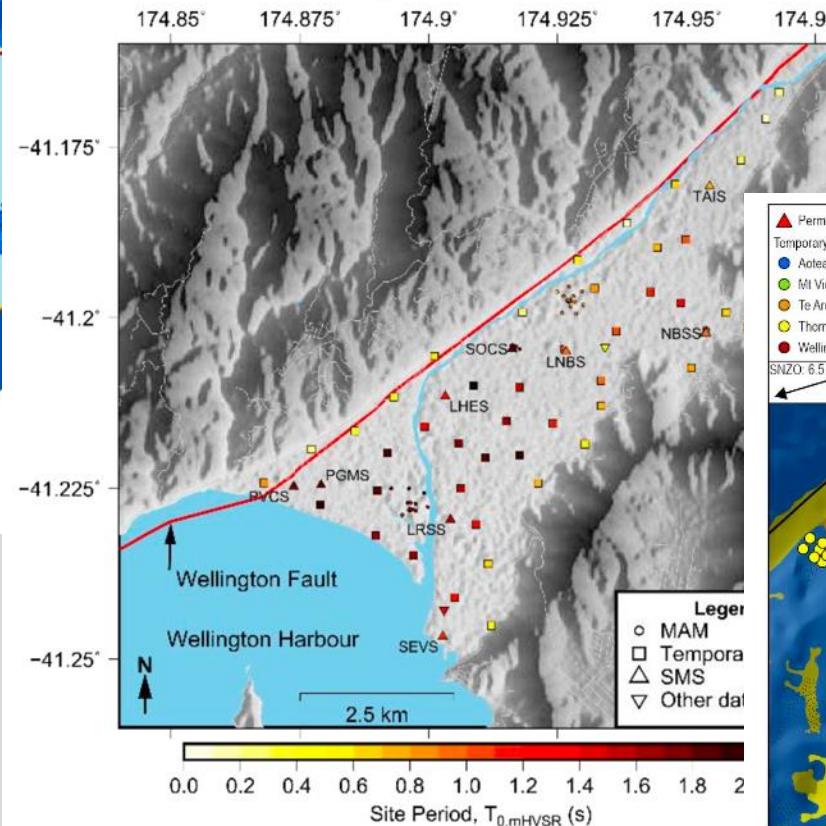
Strand 1: Ground Motion Modelling

Wellington basin update

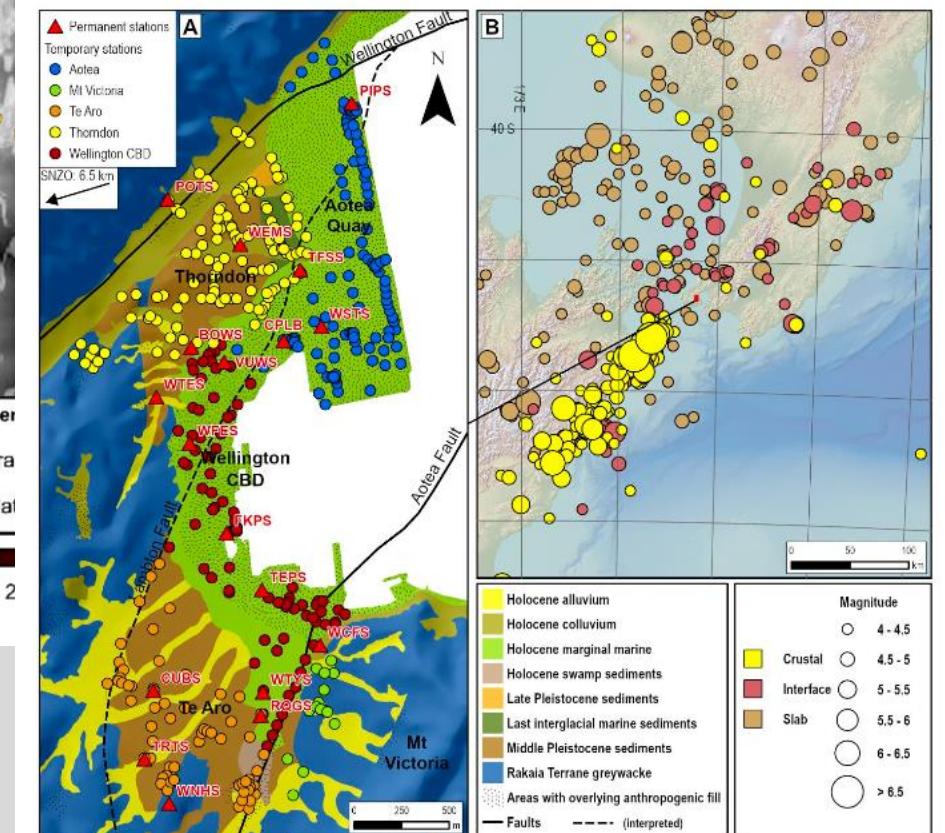
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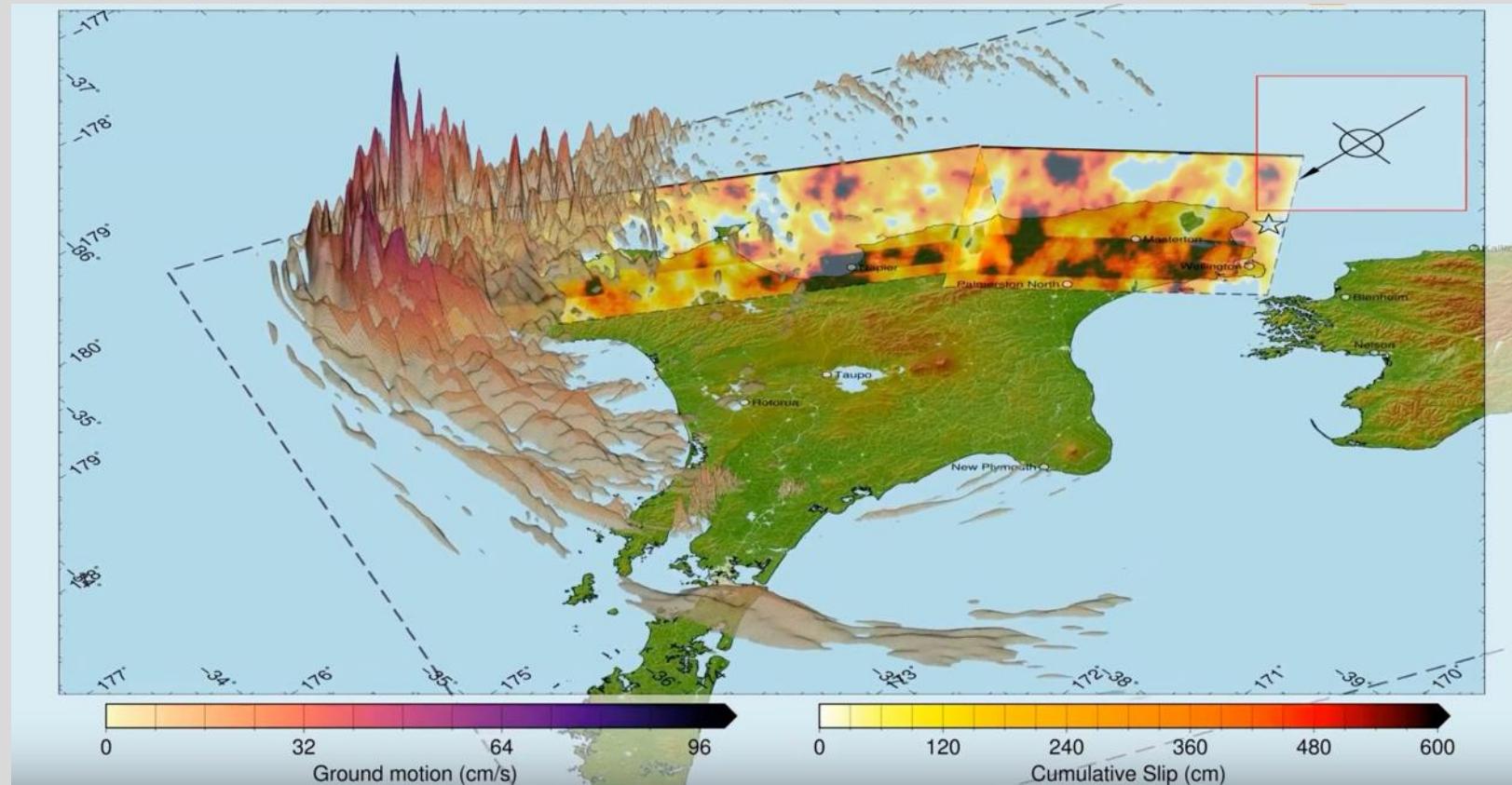
Lower Hutt basin characterization



Wellington HSVR Analysis



Strand 1: Ground Motion Modelling



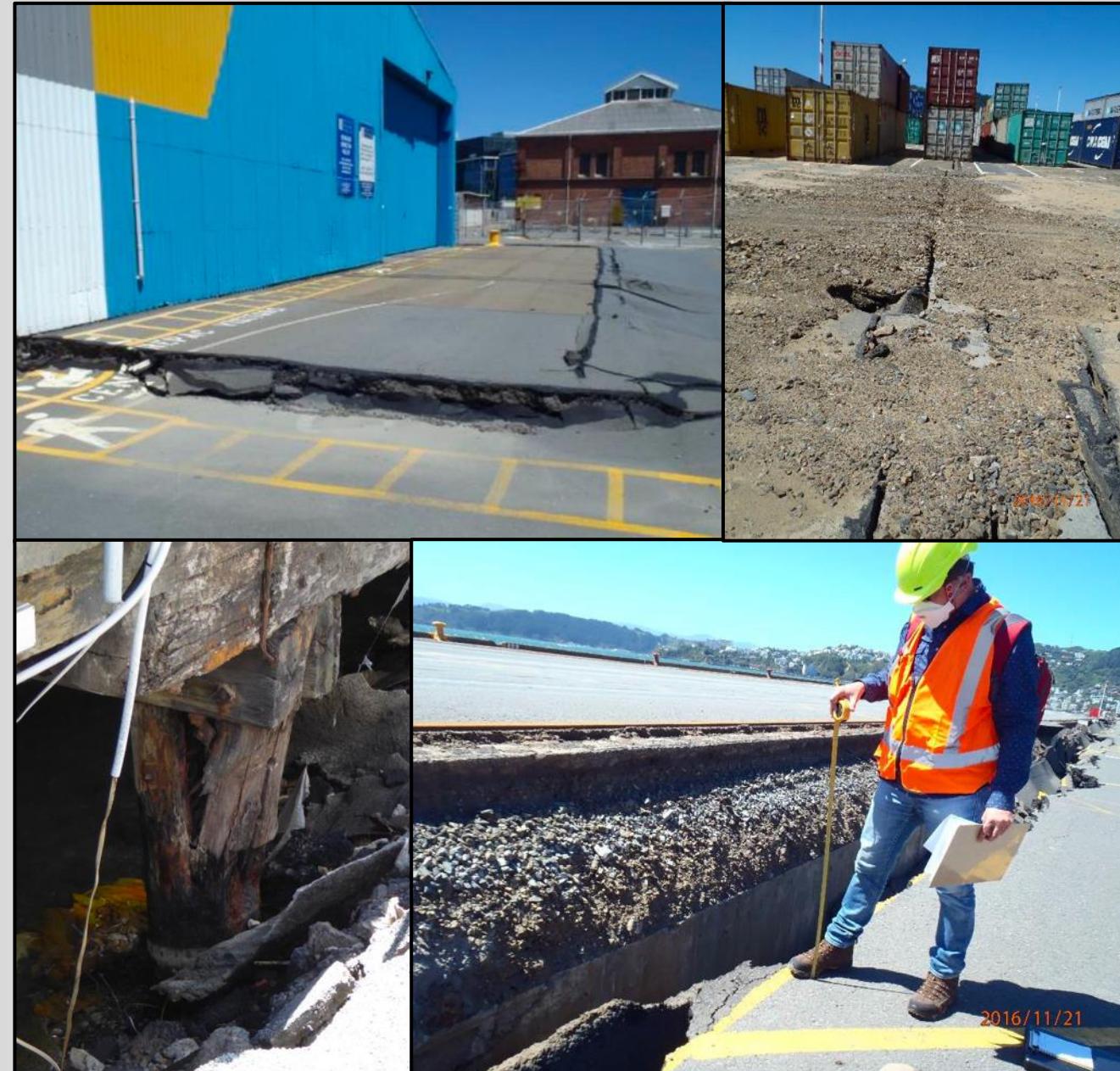
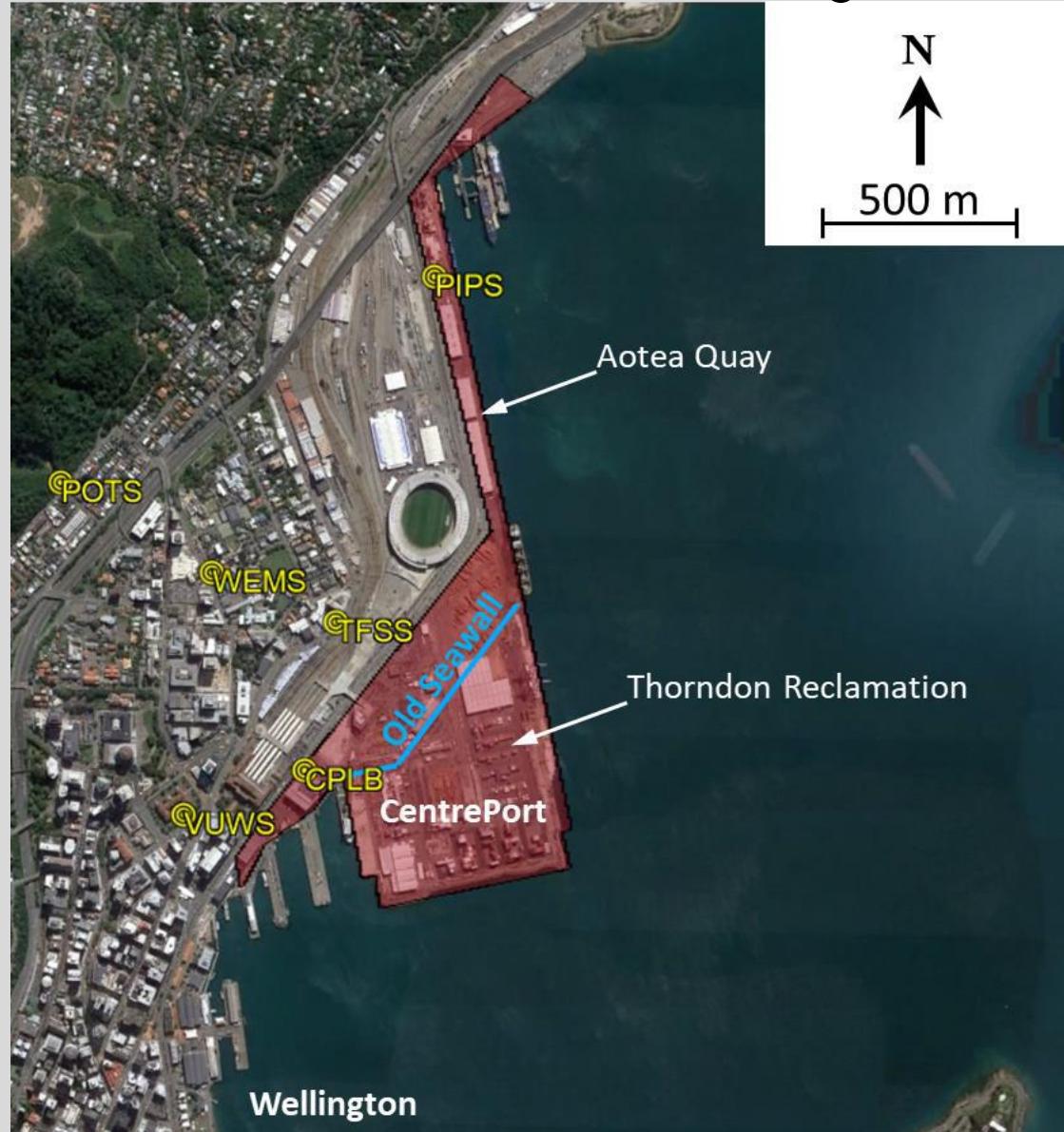
Hikurangi subduction ground-motion simulations

	Property	Median	Lower Limit	Upper Limit
Subevents	Along-strike position	Mid-strike	-10% L	+10% L
	Along-dip depth	75% W	65% W	85% W
	Magnitude, M_w	7.9	7.7	8.1
Hypocentre	Along-strike position	Mid-strike	-50% AS	+50% AS
	Along-dip depth	60% W	0% W	100% W
Rupture	Rupture velocity (% of V_s)	75%	60%	90%
	Stress parameter (bar)	10+1.25D	5+0.625D	15+1.875D

Currently considering up to ~2000 model combinations for rupture scenarios

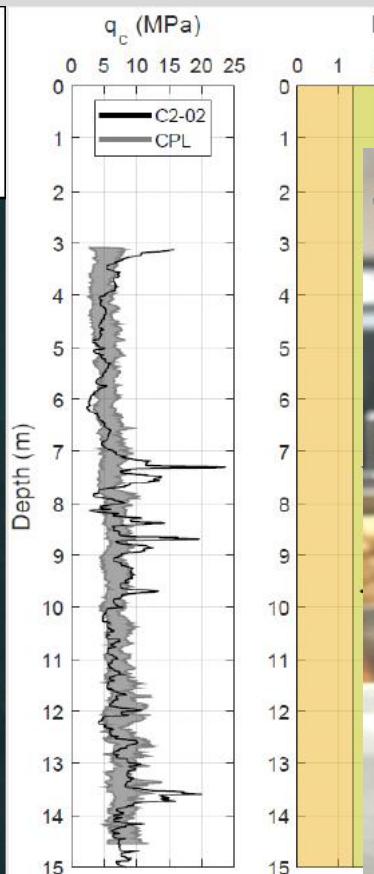
Strand 2: Liquefaction Modelling

2016 Kaikōura Port Damage

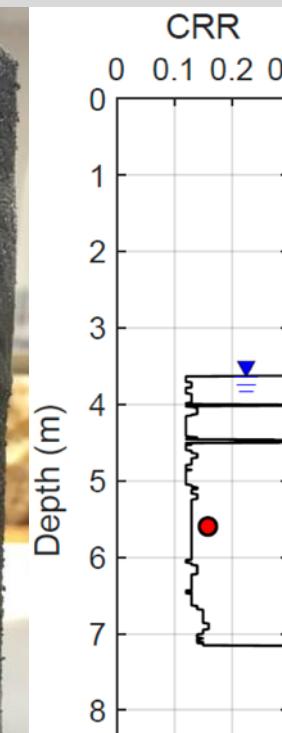


Strand 2: Liquefaction Modelling

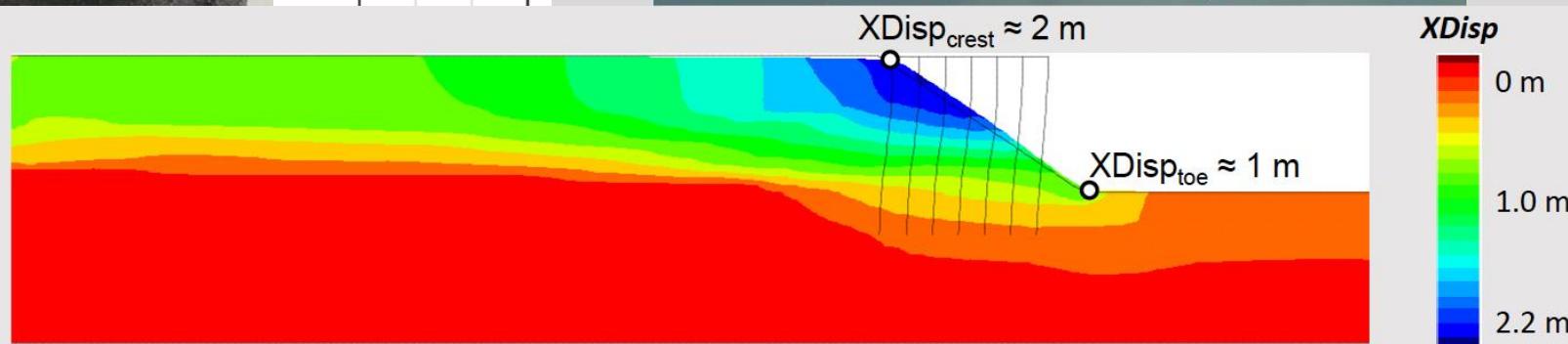
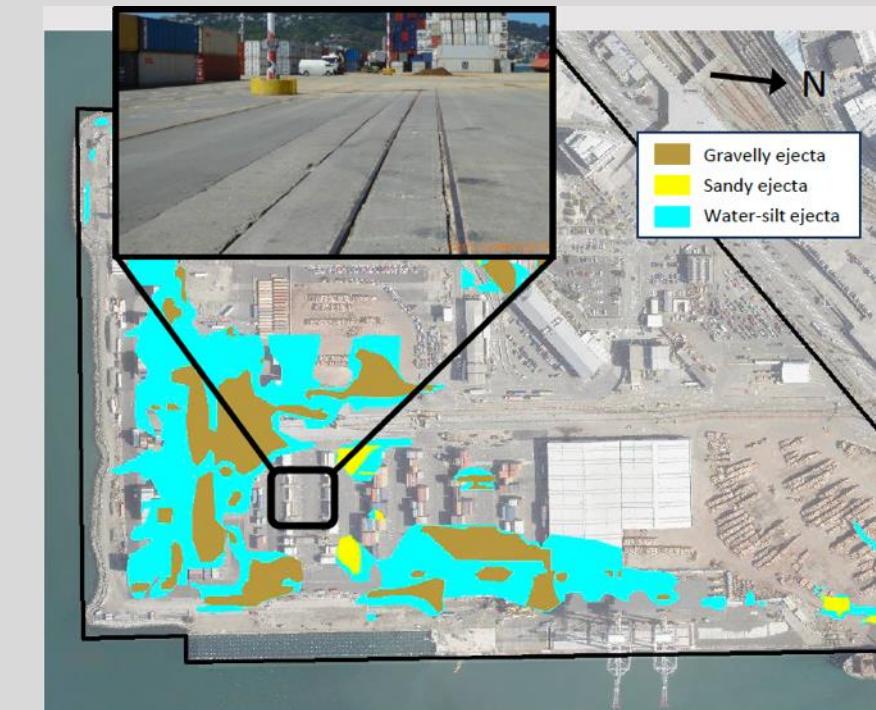
Site Characterisation



Laboratory Modelling



Numerical Modelling

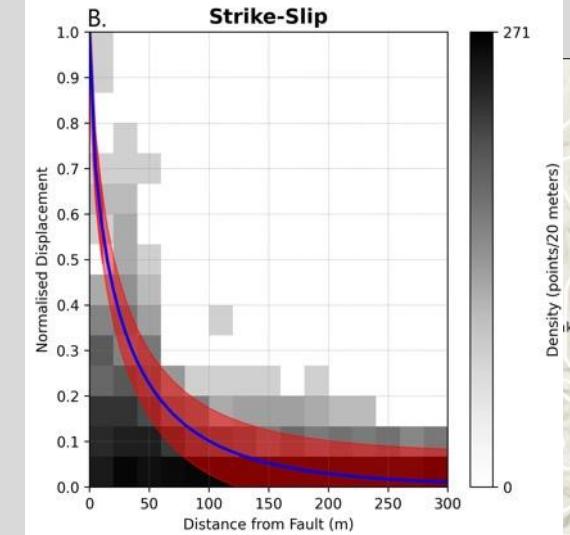


Strand 3: Surface Rupture & Landslides

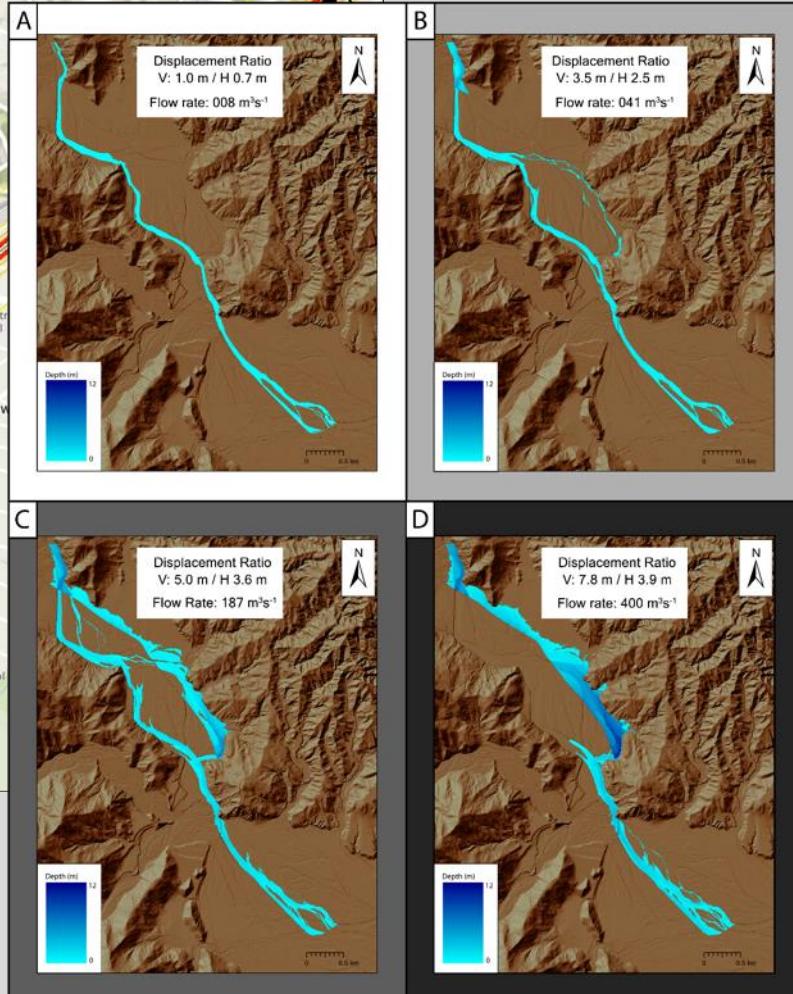


Strand 3: Surface Rupture & Landslides

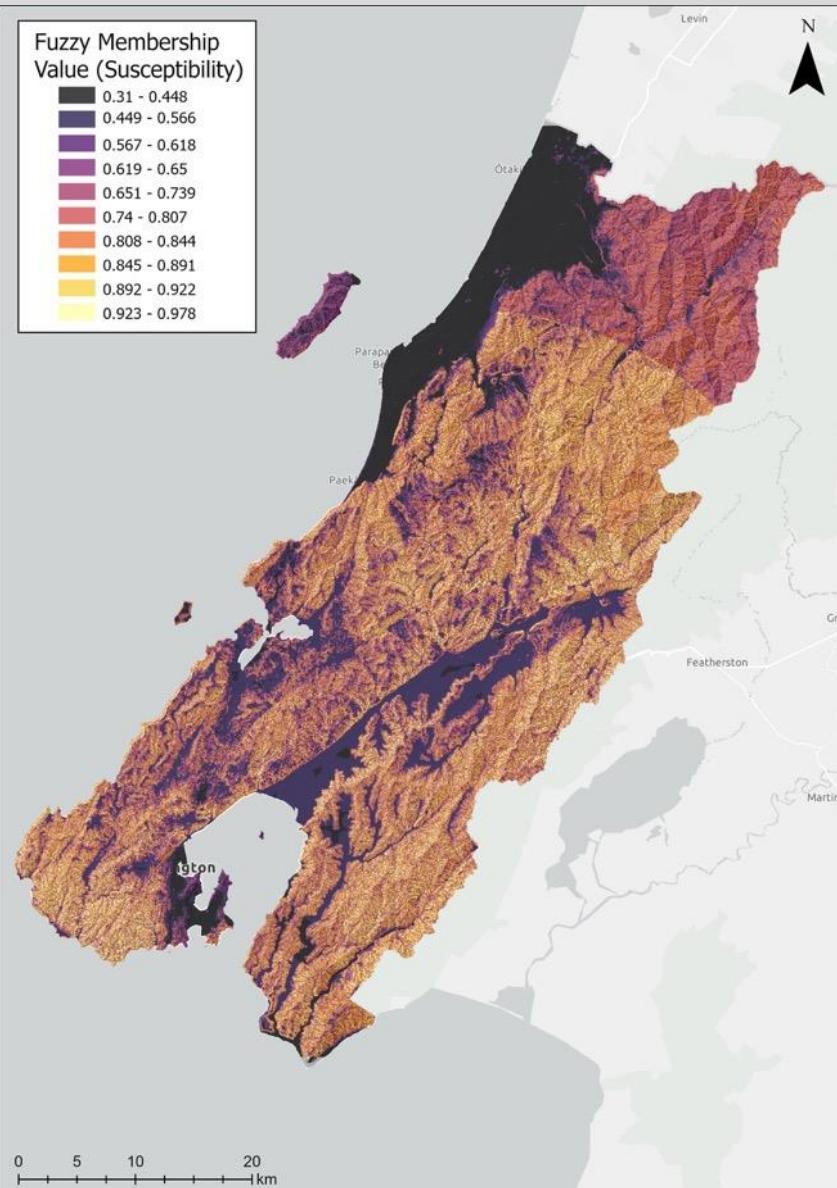
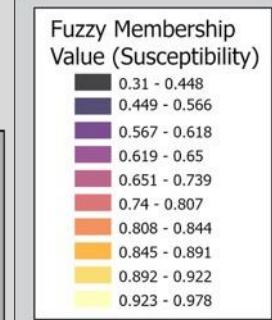
Fault Rupture Modelling



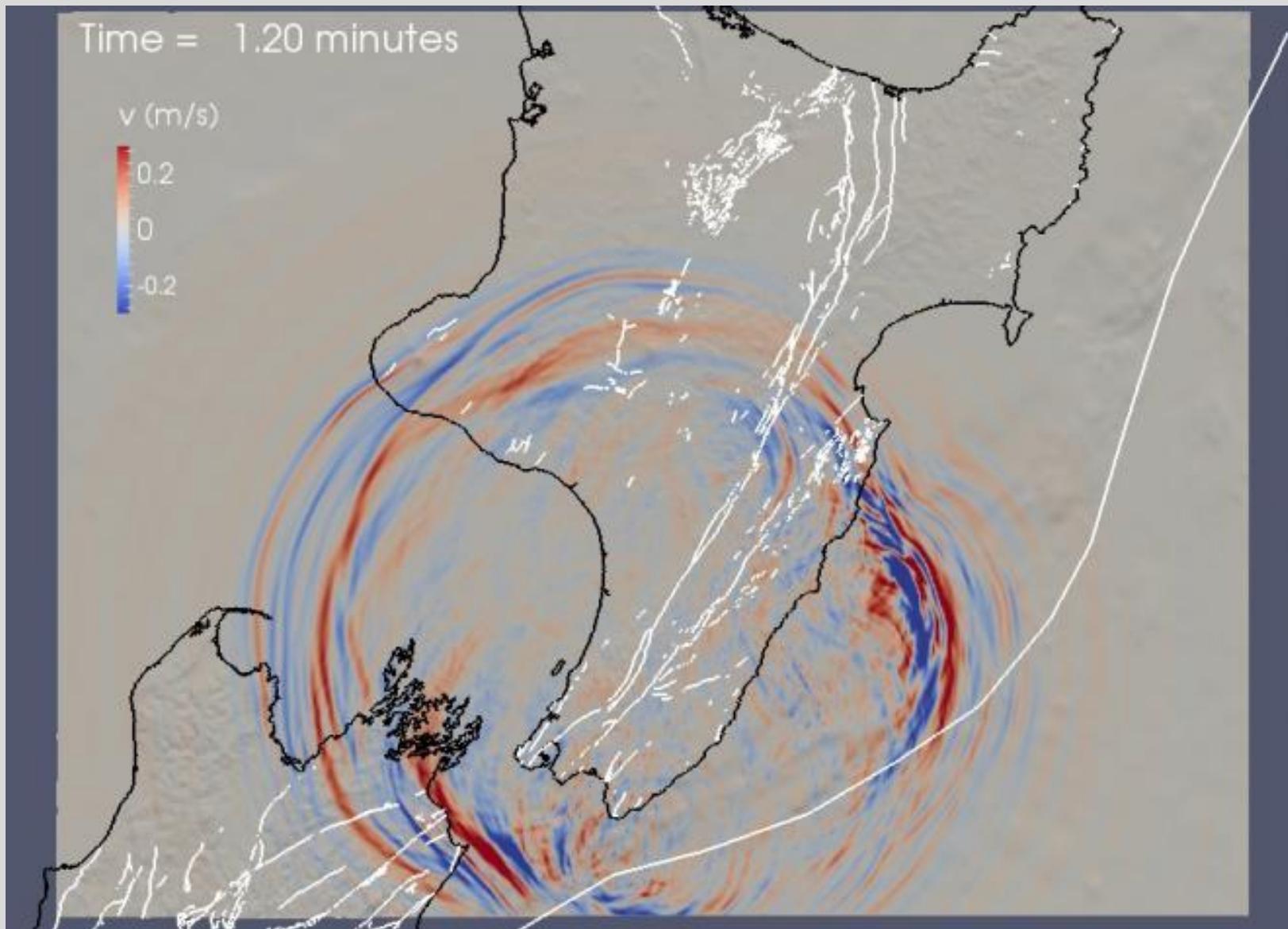
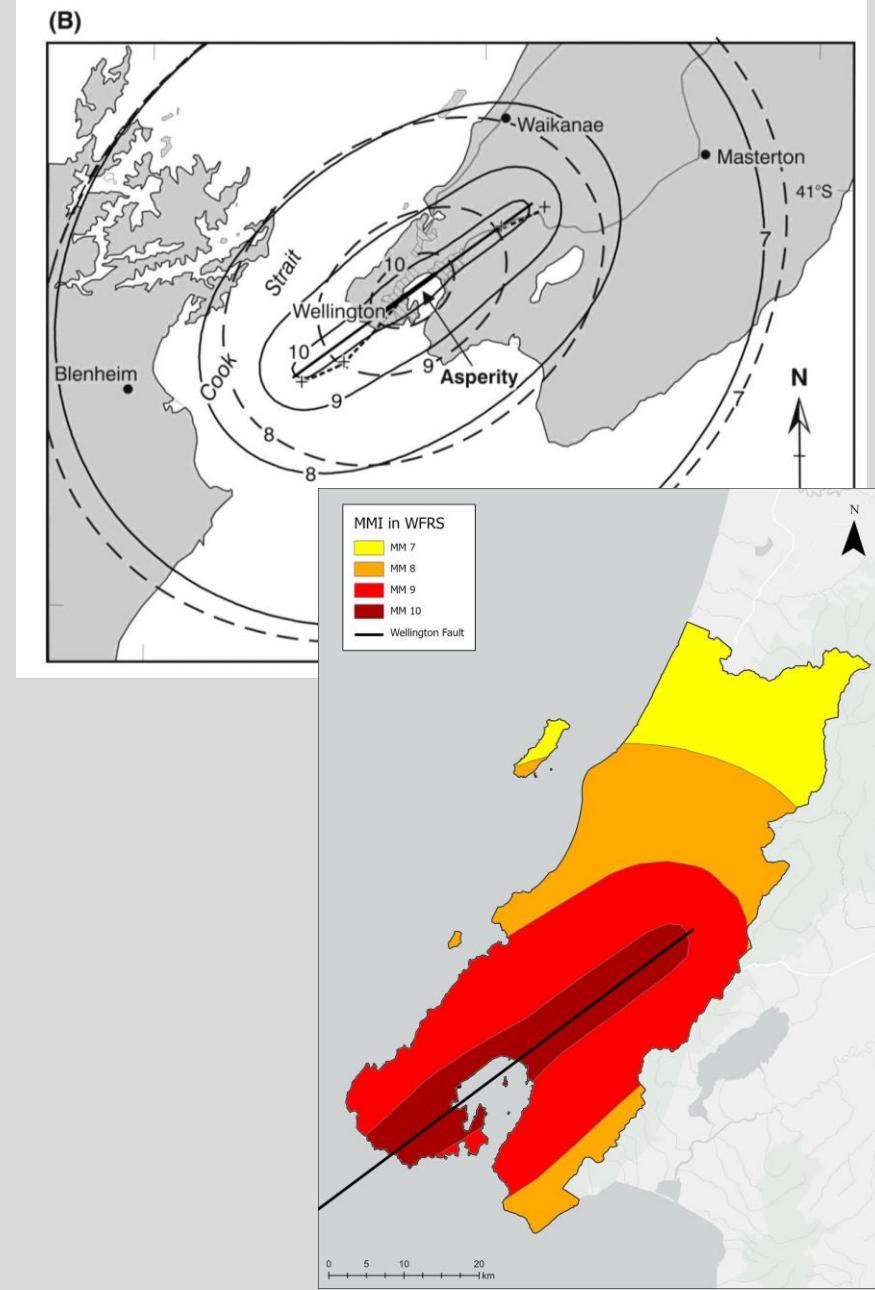
River Displacement



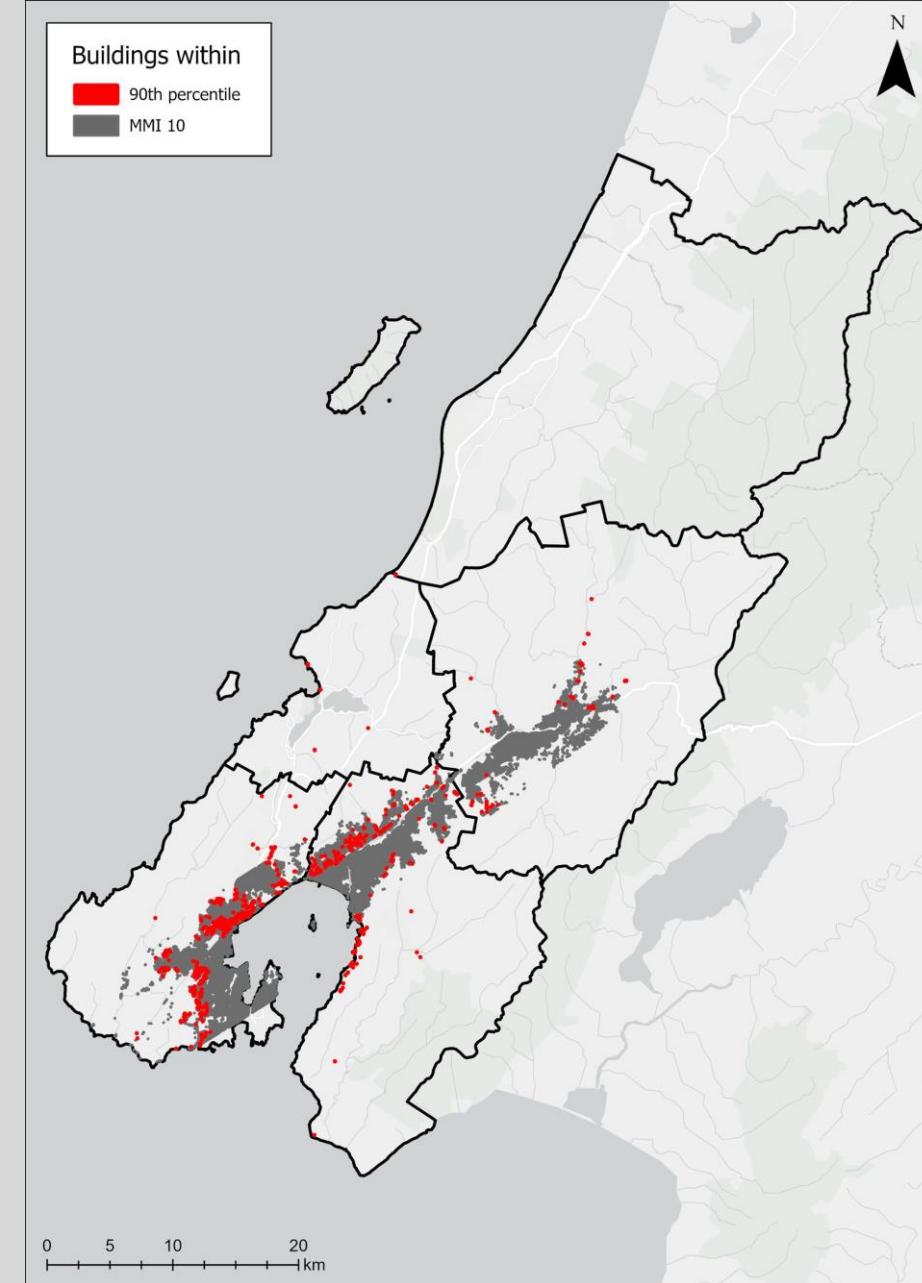
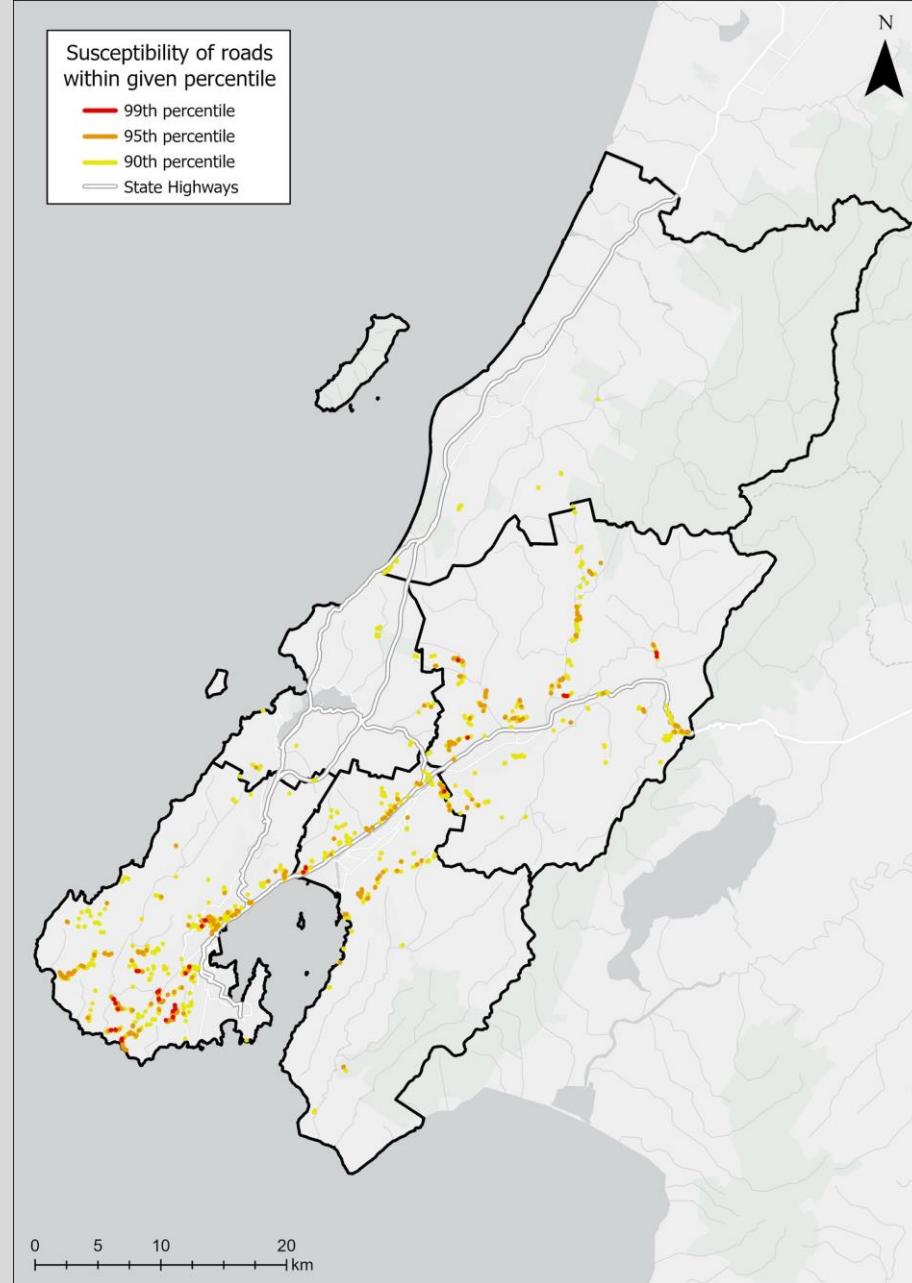
Coseismic Landslides



Strand 4: Wellington Integration



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Questions / comments



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