

Geological Hazards Theme

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NHRP

Natural Hazards Research Platform

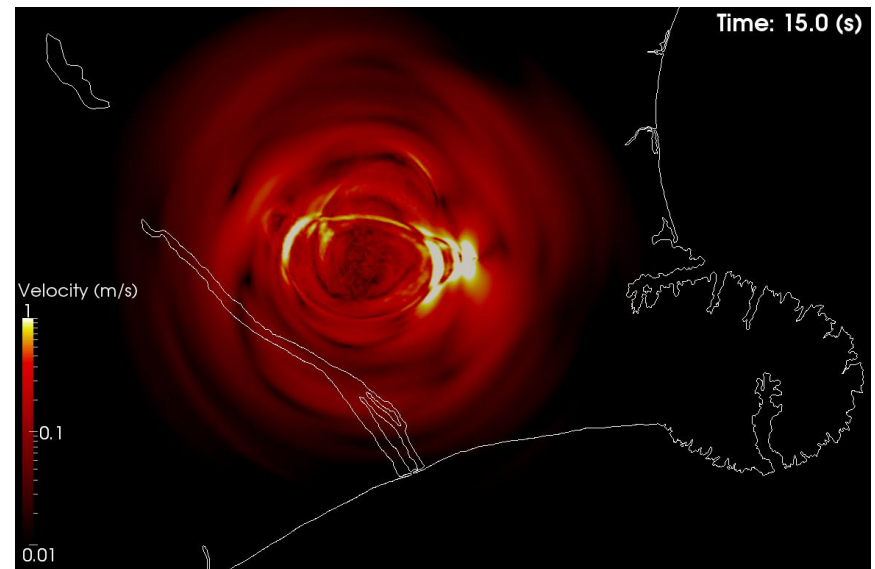


Geological Hazards

- Very broad portfolio, includes:
 - Earthquakes
 - Volcanoes
 - Tsunami
 - Mass movement
- Key events over the last 4 years
 - Canterbury earthquakes
 - Tongariro and White Island eruptions
 - Distant tsunamis
- Critical outputs
 - What processes drive different hazards?
 - How big and how often?
 - What effects from different hazards eg ground shaking, ash impacts, inundation models

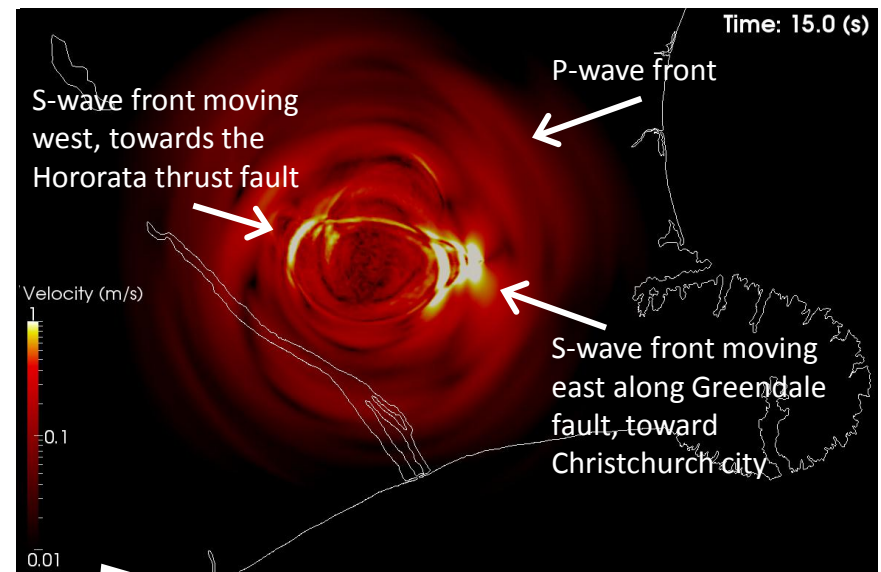
Earthquakes – science highlights

- Canterbury earthquakes
 - Rupture mechanisms
 - Strong motion analysis
 - Ground deformation (liquefaction and fault rupture)
- We haven't forgotten other areas:
 - Wellington
 - Alpine Fault



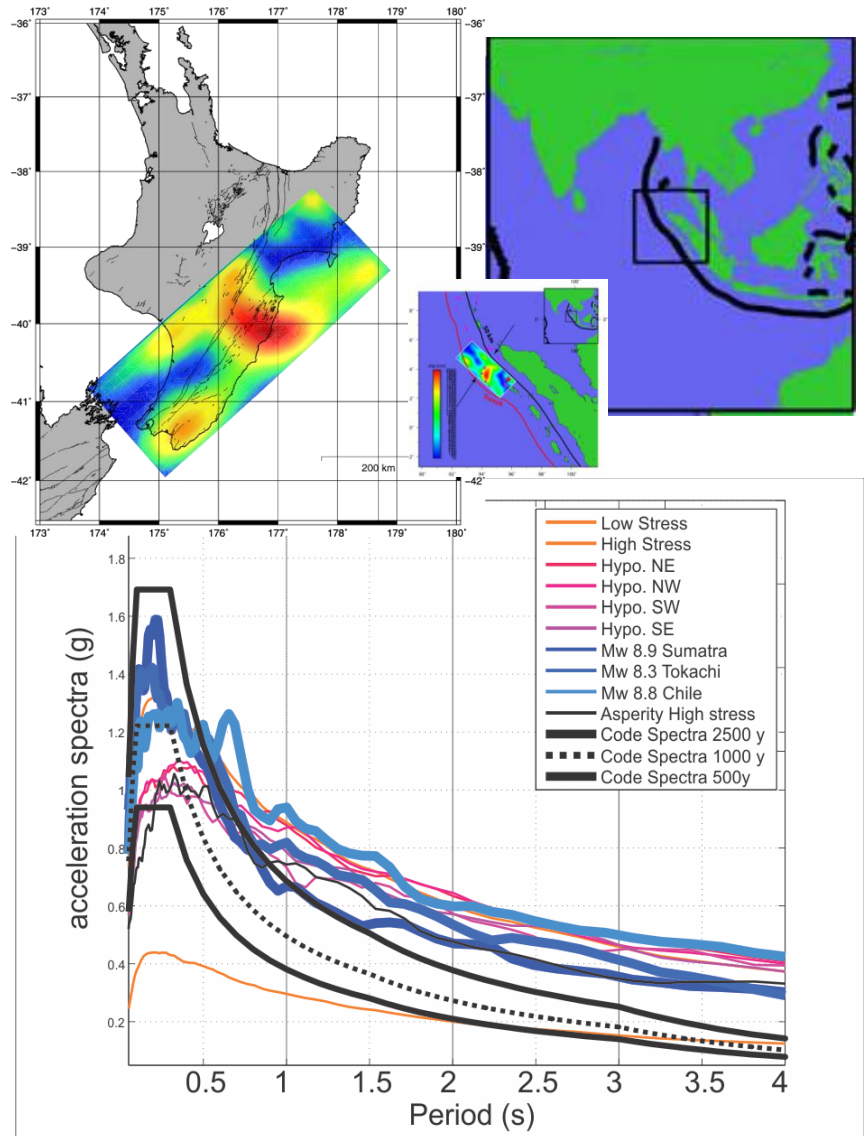
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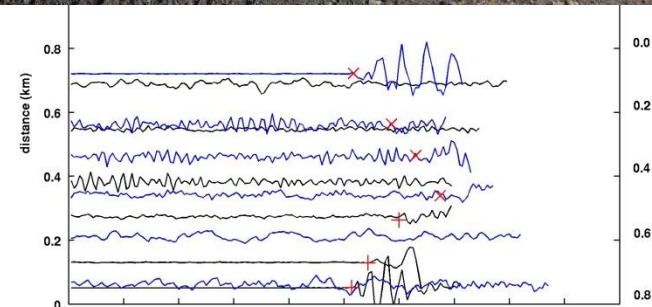
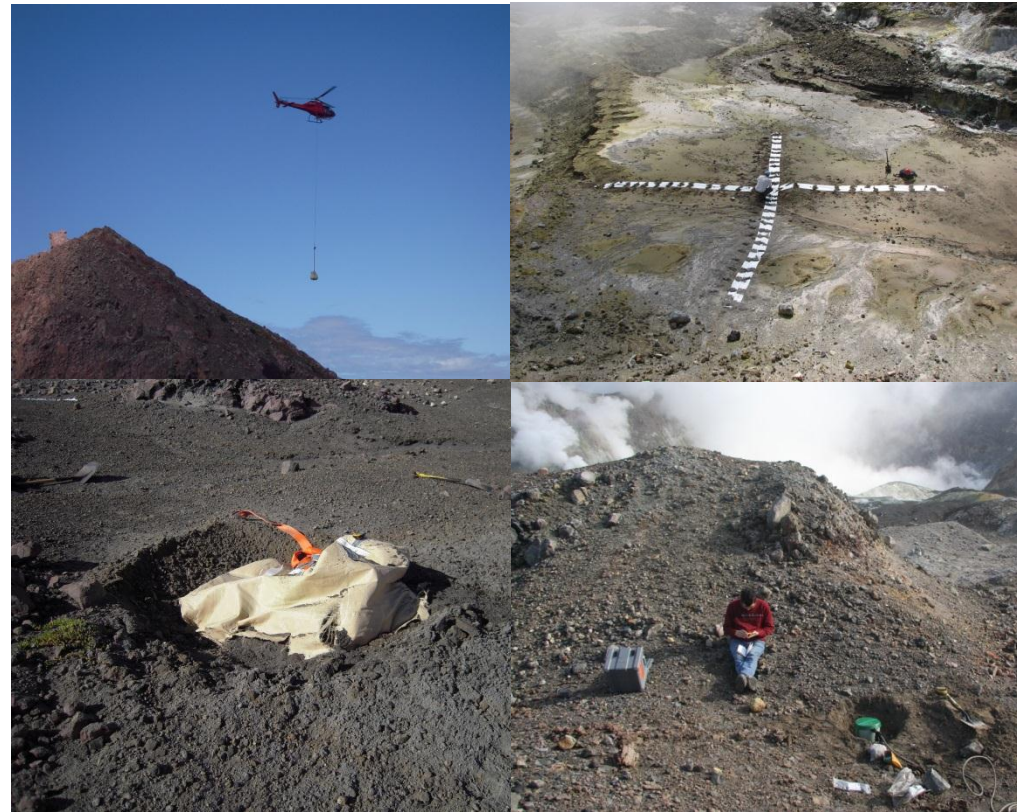
Earthquakes – relevance to society

- Strong motion
 - Update to building code
- Earthquake forecasts
- Wellington It's Our Fault
 - Likely ground motion from a subduction zone earthquake
- National Seismic Hazard Model
 - 2012 update



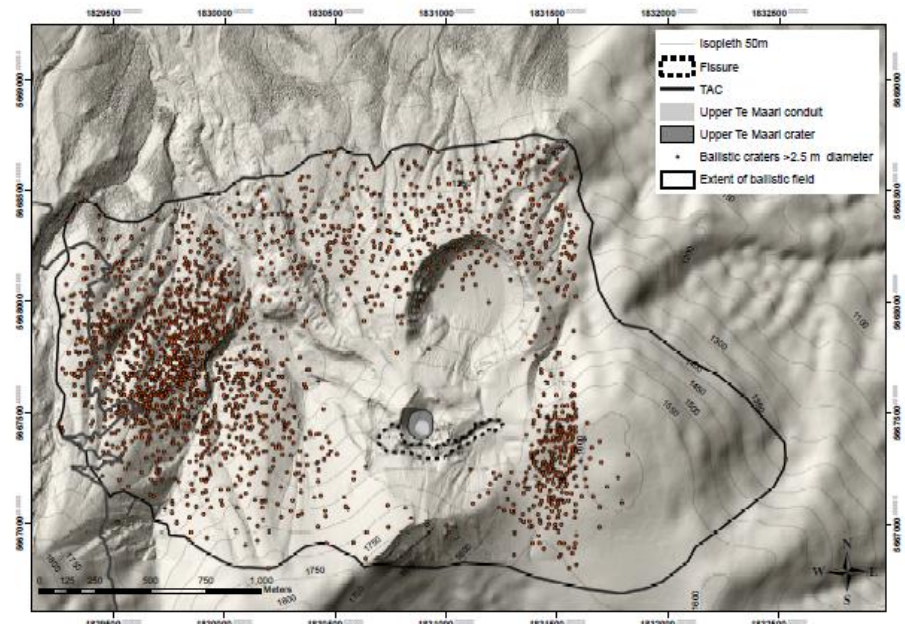
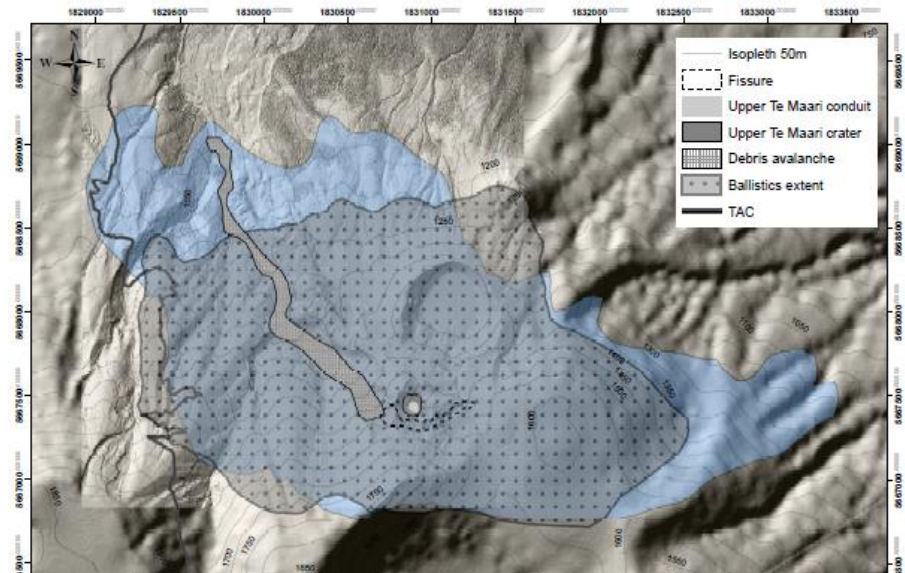
Volcanoes – science highlights

- White Island
 - Better seismic velocity structure
- Tongariro
 - Understanding the 2012 eruptions
- We haven't forgotten the other volcanoes
 - Taupo unrest
 - Taranaki frequency of eruptions
 - Ruapehu lahar models
 - Auckland: DEVORA



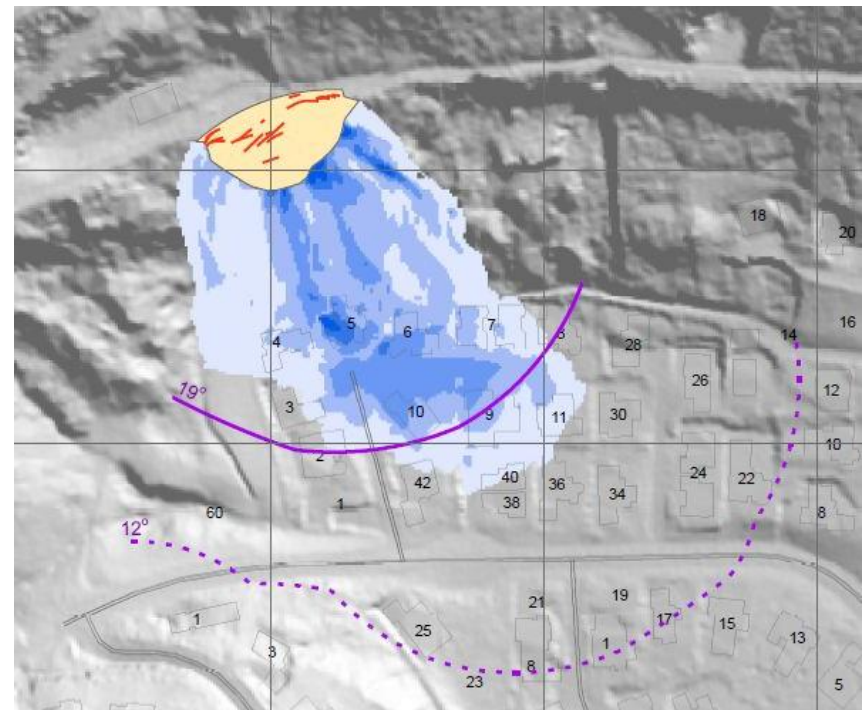
Volcanoes – relevance to society

- Tongariro
 - Local community
 - Risk assessments using detailed impacts maps
 - CDEM sector
 - MetService for aviation
- Calderas
 - Understanding unrest
 - Potentially all-of-government response



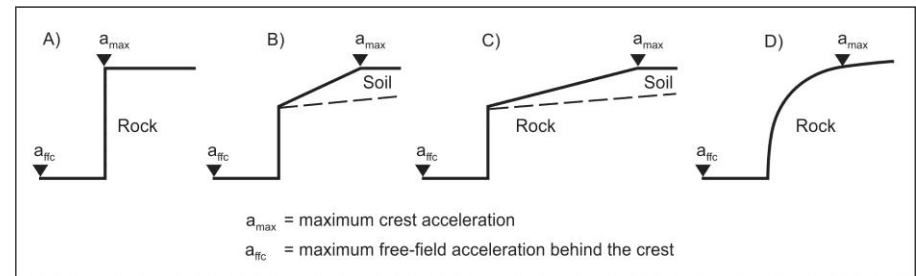
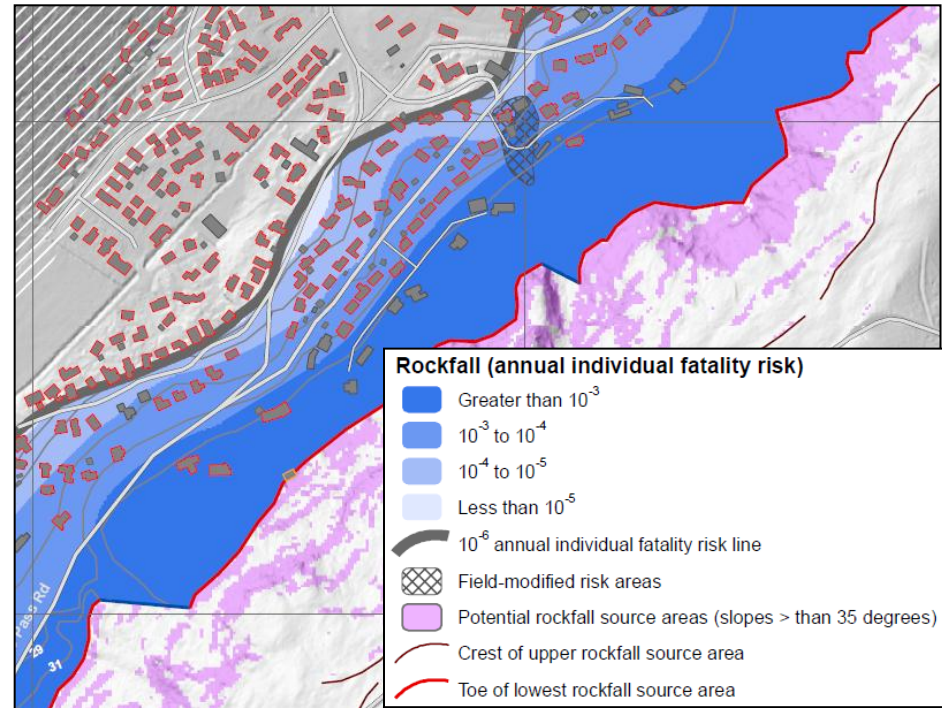
Mass movement – science highlights

- Landslide dam failure
 - Young River
- Earthquake induced landslides
 - South Island earthquakes
- Modelling of debris flow runout
 - Design of mitigation methods



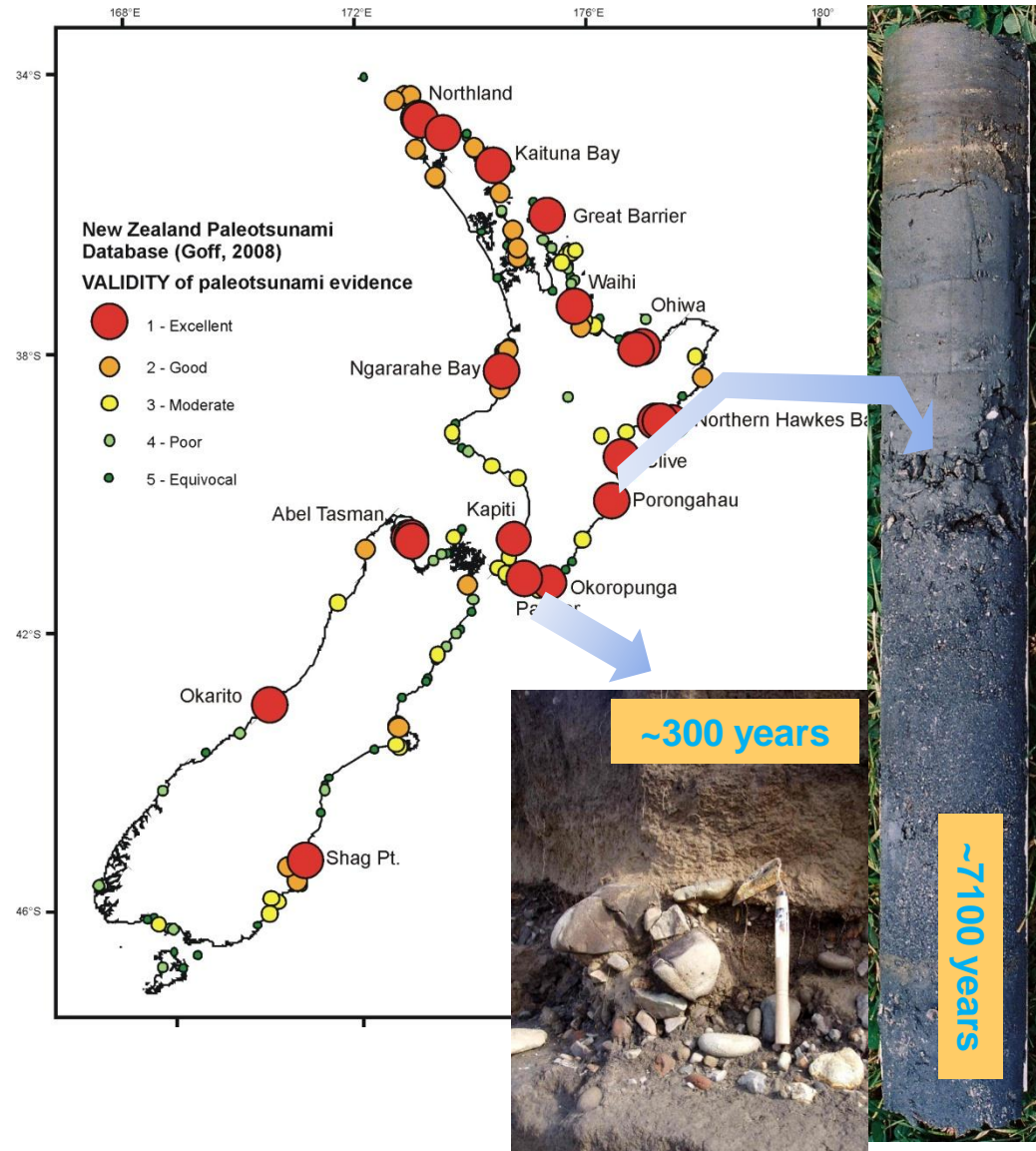
Mass movement – relevance to society

- Port Hills rockfall risk assessments
 - Determine future planning zones
- Taihape
 - Monitoring slow landslides
- Cliff stability
 - Different earthquake ground motions
 - Transmission Gully



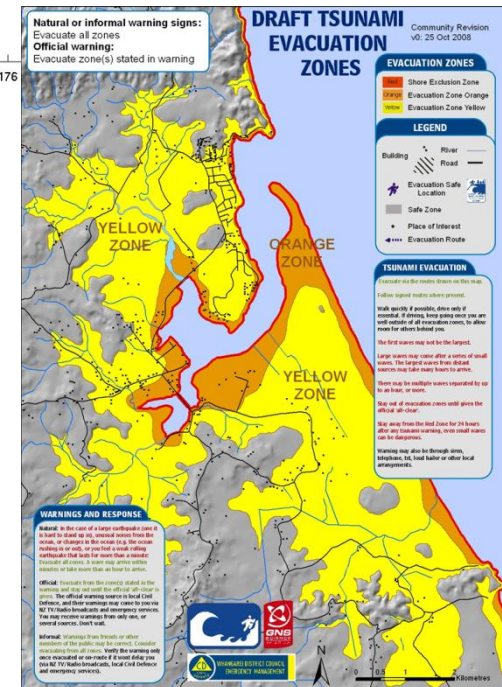
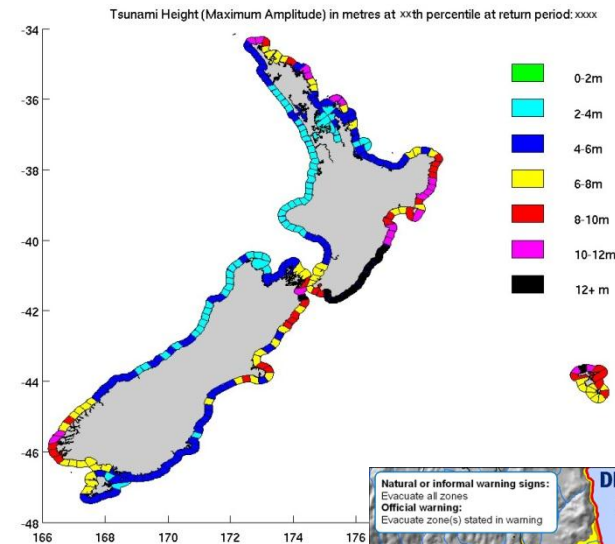
Tsunami – science highlights

- Modelling of different sources
- Historic database
 - When and where?
- Palaeotsunami
 - Understanding the geological record of tsunami
- Landslides in Cook Strait
 - Evidence of past events
 - Triggered by earthquakes?



Tsunami – relevance to society

- Probabilistic models
 - What magnitude of wave heights might we experience from different sources
- Threat maps
 - Initial estimates then informed by modelling
- Inundation models
 - Feeds into risk and societal themes



Future work – key areas

Critical research to provide models for evidence-based decision-making

- Ground motion effects from large subduction zone rupture (M8-9)
 - All of the east coast
- Probabilistic forecasting of volcanic activity
 - Long and short term
- Effects of different earthquakes on slope stability
 - e.g. Wellington
- Real-time detection of near field tsunami
 - East coast subduction zone

Geological Hazards Theme

- Very diverse portfolio
- Capturing key learnings from events, but also continuing underpinning science
- Critical linkages to
 - Government eg MCDEM, EQC, CDEM groups, DOC, MPI (Ag), MBIE (DBH), MoH
 - Communities eg iwi on Tongariro
 - Other research programs eg RiskScape, hazard warnings
- Key aim is to create comparative hazard models