Overview of new tsunami detection and monitoring

Bill Fry
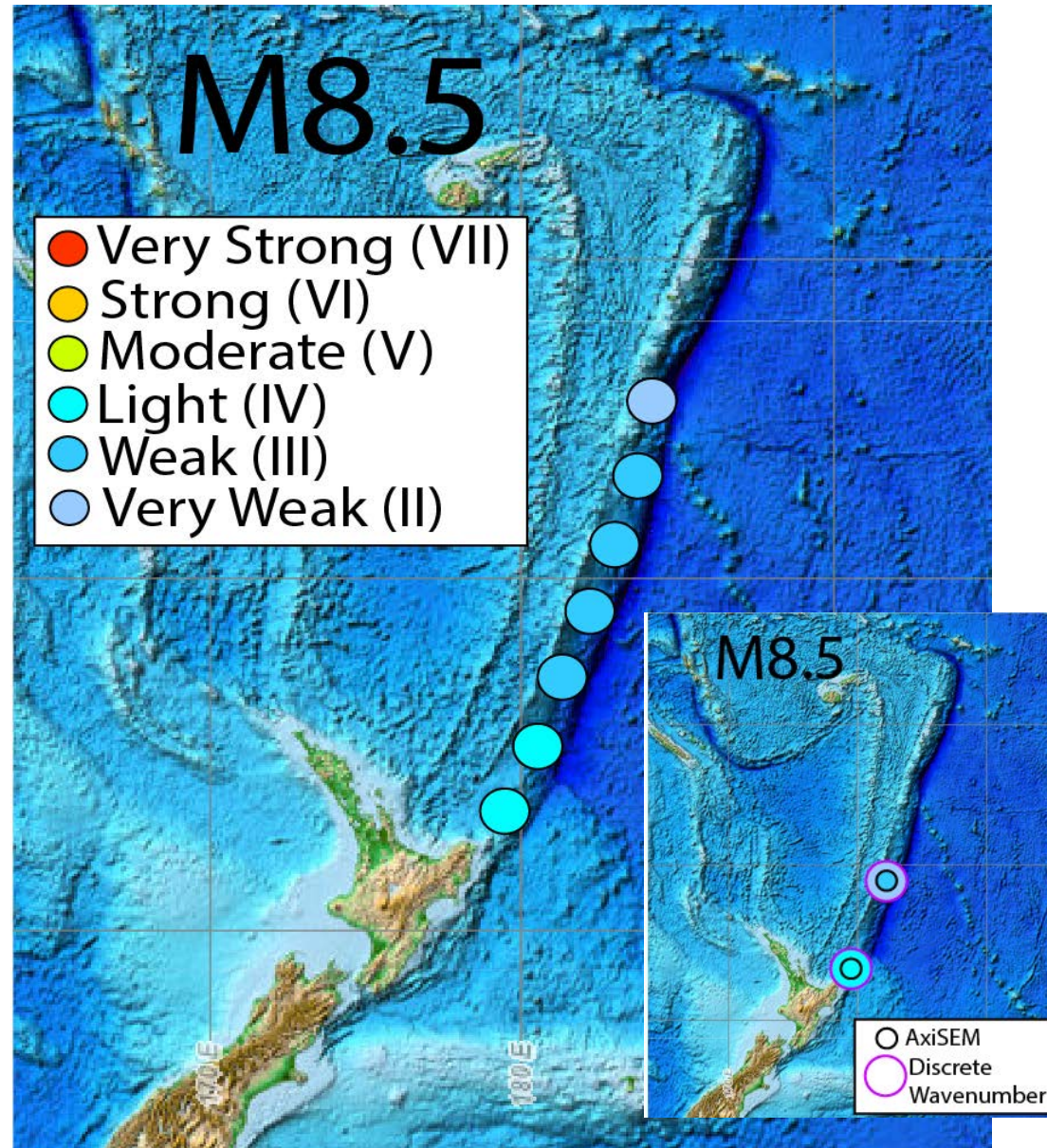
BoP CDEM Meeting

Rotorua, 26 June, 2020
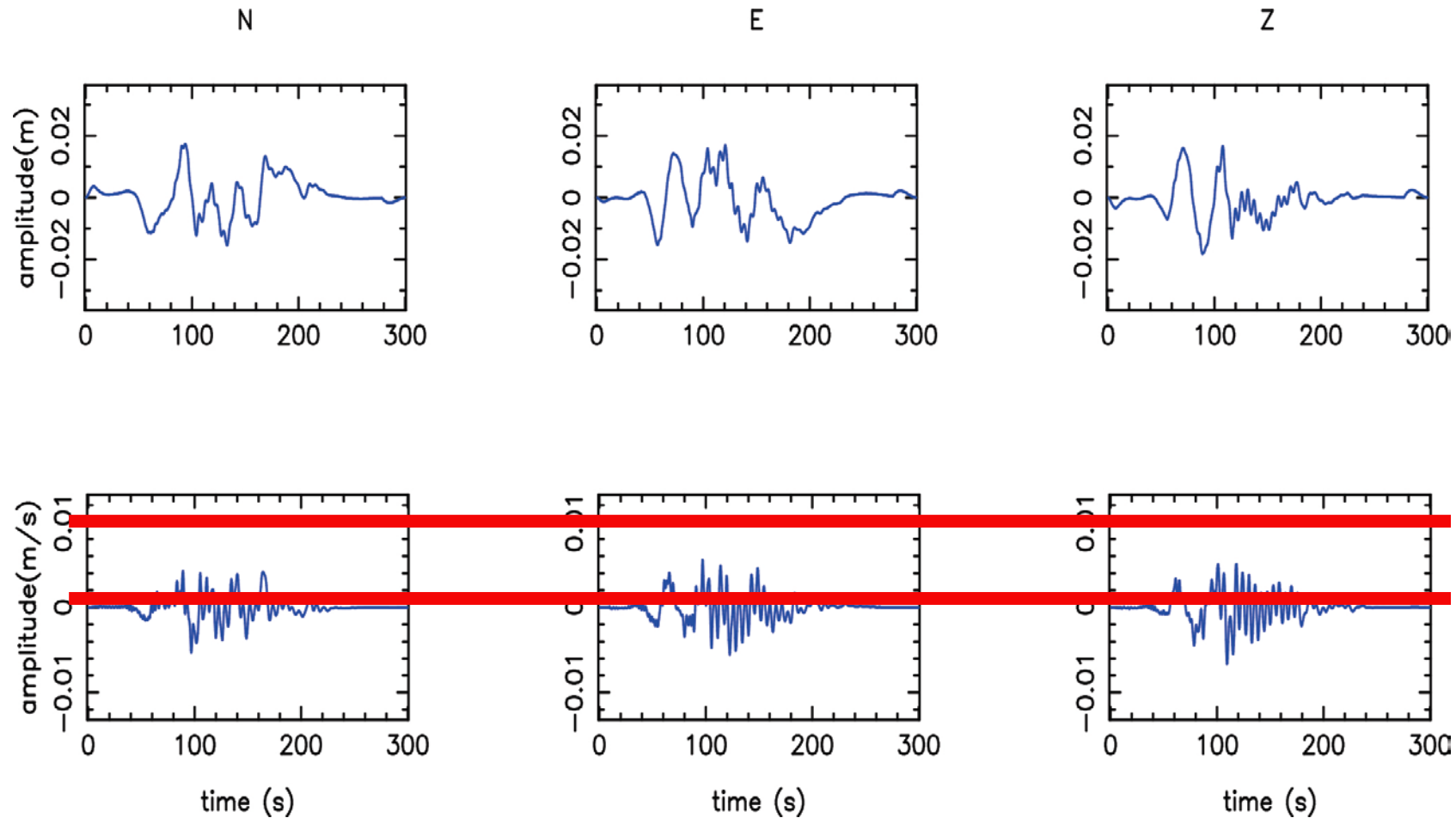
GNS SCIENCE
TE PŪ AO

UNESCO
United Nations
Educational, Scientific and
Cultural Organization

Intergovernmental
Oceanographic
Commission

The Problem:
Lack of strong shaking limits natural warning self evacuation

Fry, Gledhill and Benites, 2018

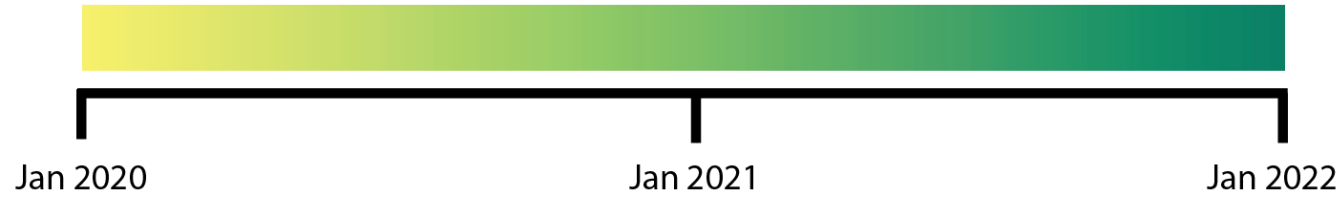# Revised education: Expectations of "Long or Strong" shaking need to be lowered

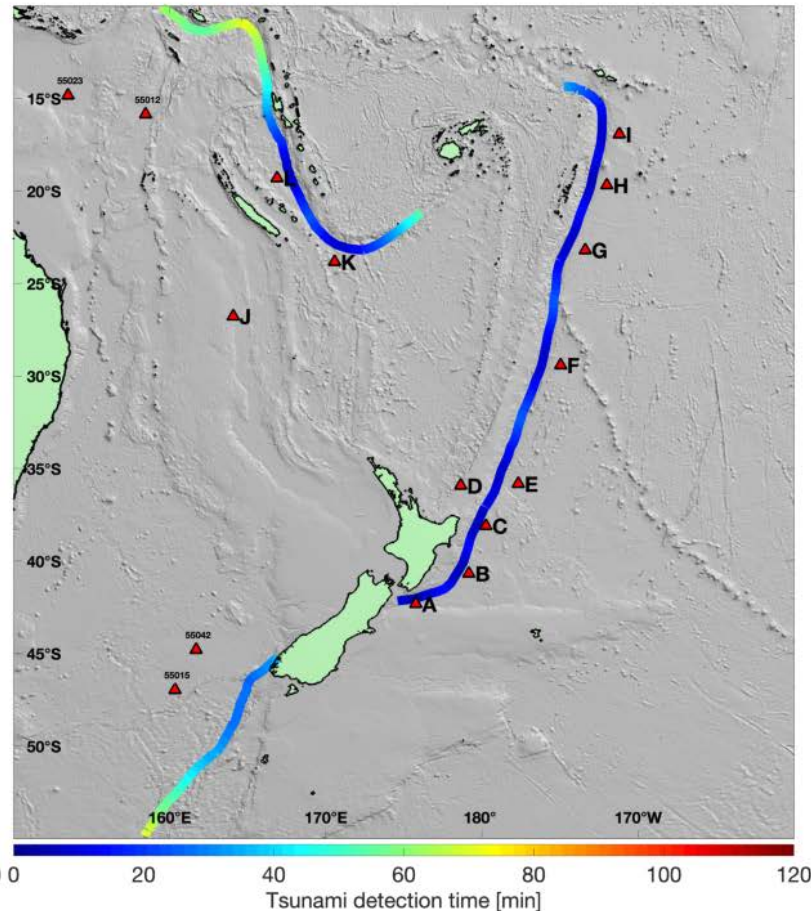Stage 1: Detection and Confirmation
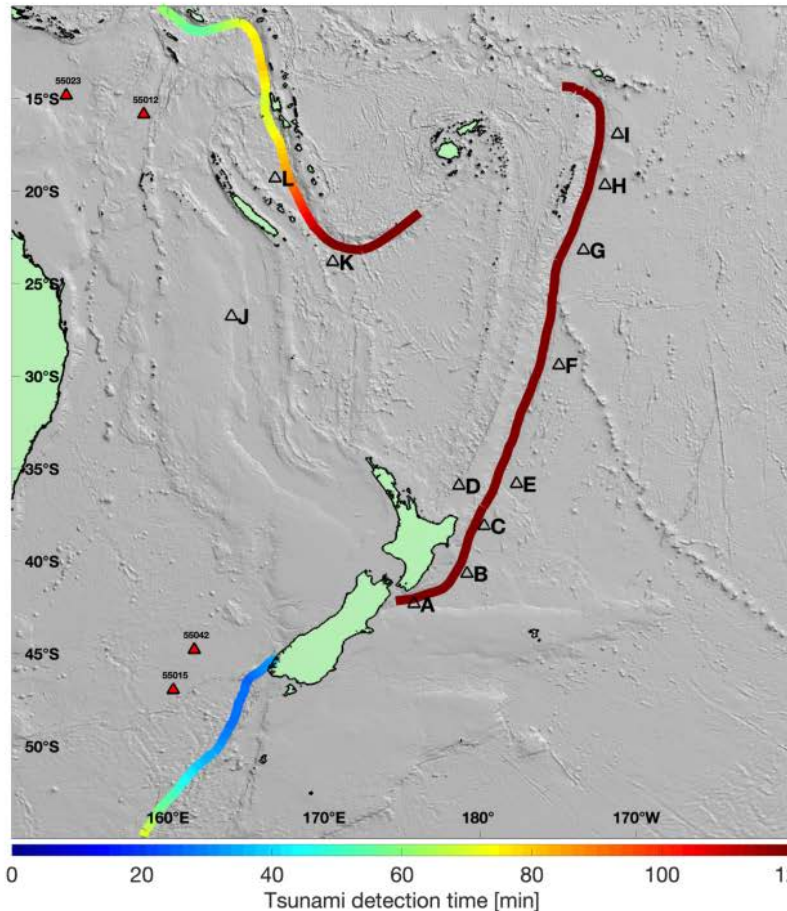
Stage 2: Upward scaling of forecast

Stage 3: Time, wave height and duration

Jan 2020

Jan 2021

Jan 2022

Tsunami detection time [min]

The Solution Part 1:

- Joint MFAT/NEMA led initiative

- 12 in the water, 3 on land for servicing

- Targeted 20-minute maximum detection around NZ, 30-minute at regional distances

- Sit on ocean floor and are tethered to a telecommunications buoy at the surface for direct feed to GNS + PTWC
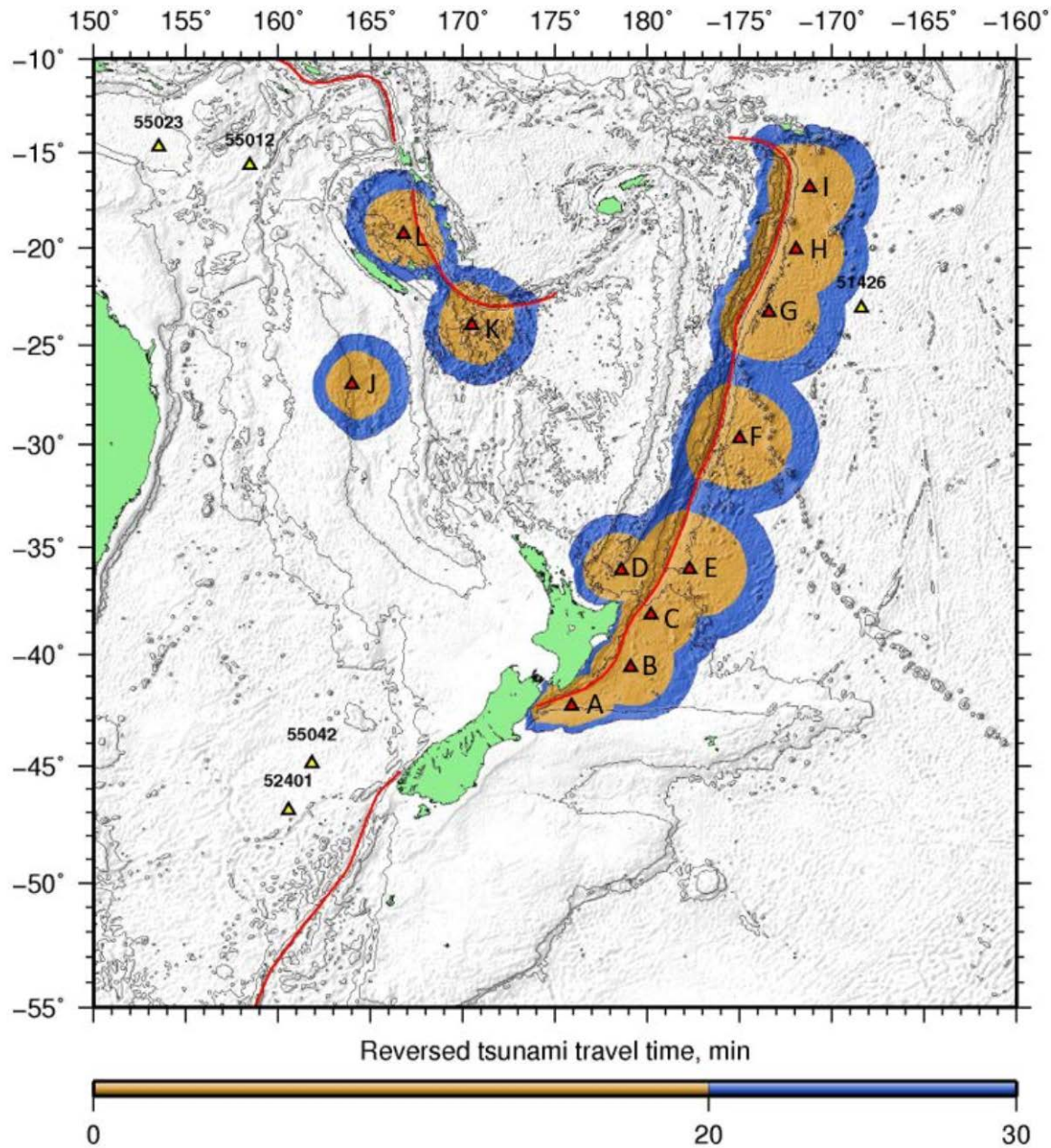
Stage 1: Detection and Confirmation

Stage 2: Upward scaling of forecast

Stage 3: Time, wave height and duration

Jan 2020

Jan 2021

Jan 2022
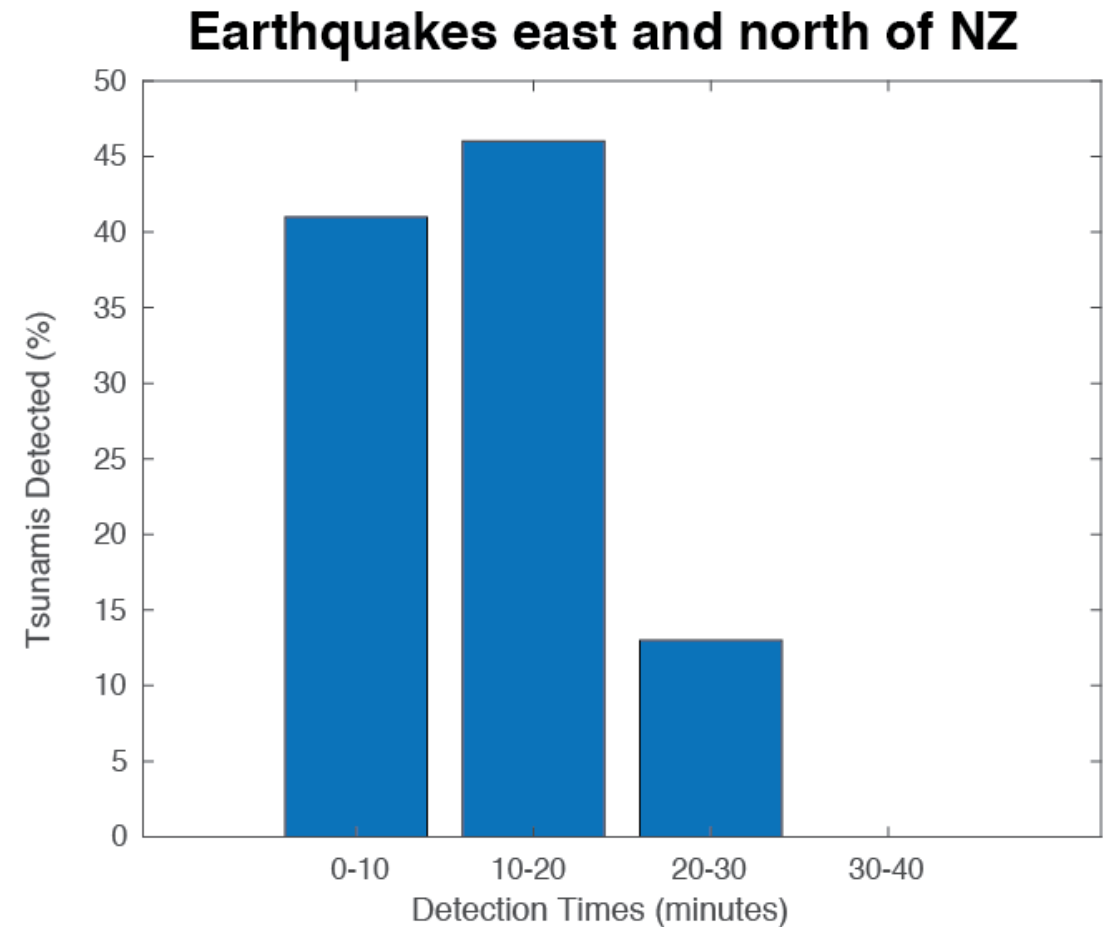
Tsunami detection time [min]
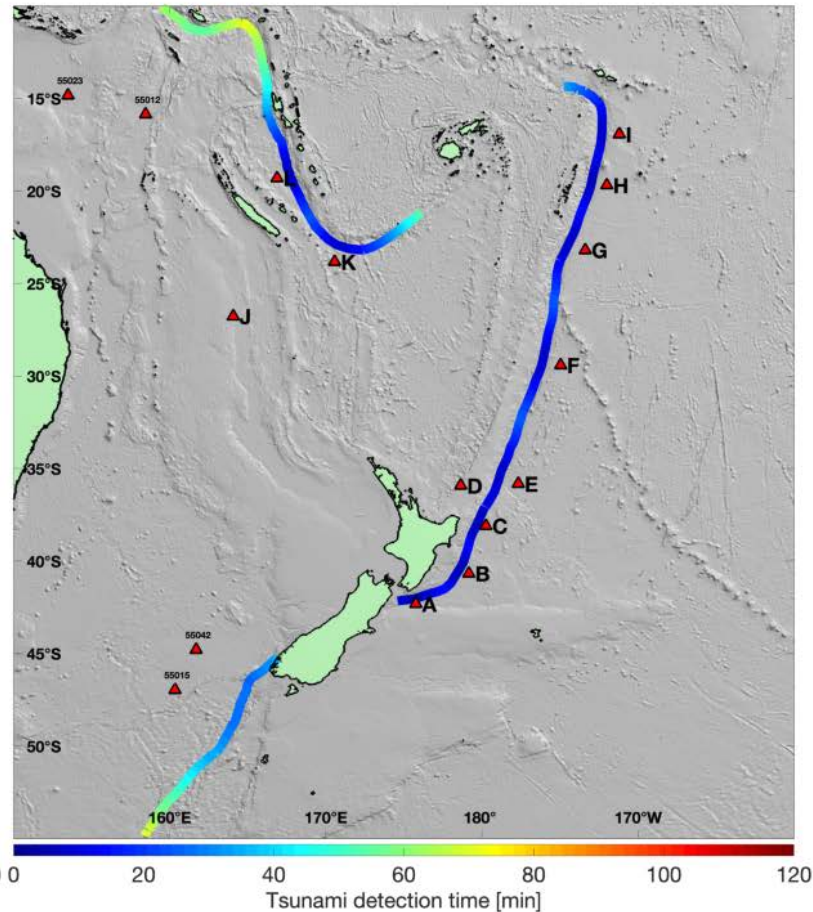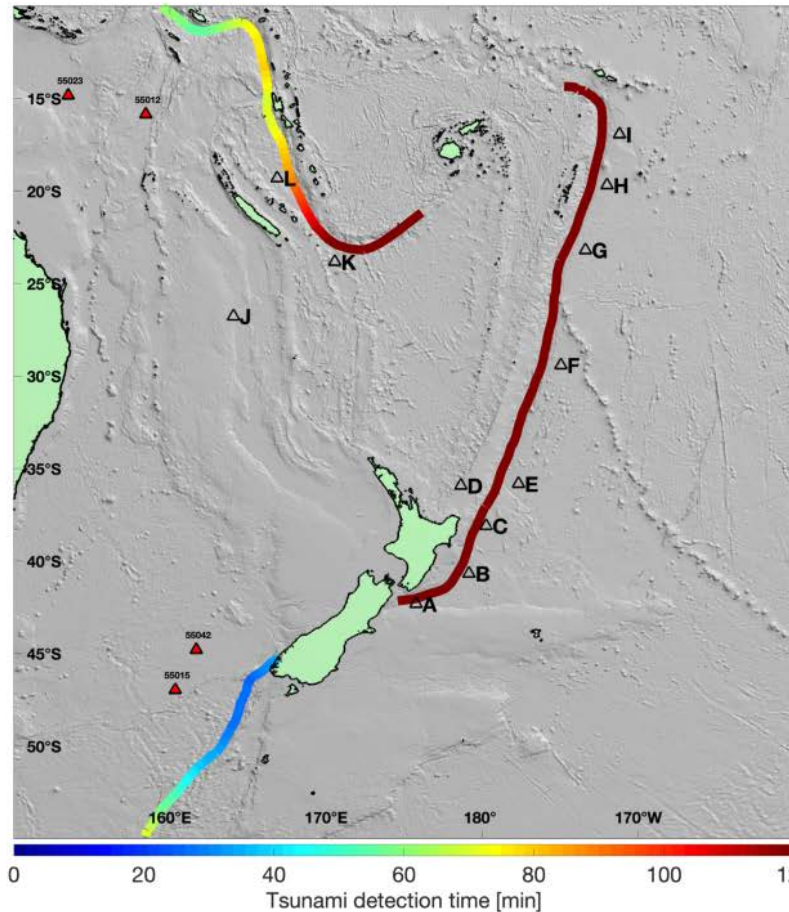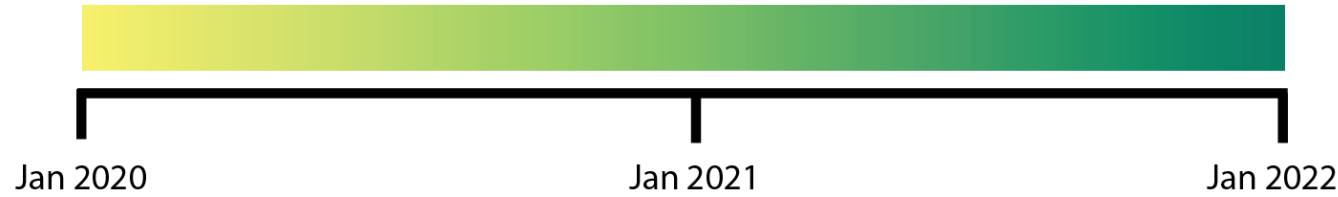
- Top, capability timeline

- We want to have forecasts including timing, height and duration (helping cancellations) by 2022
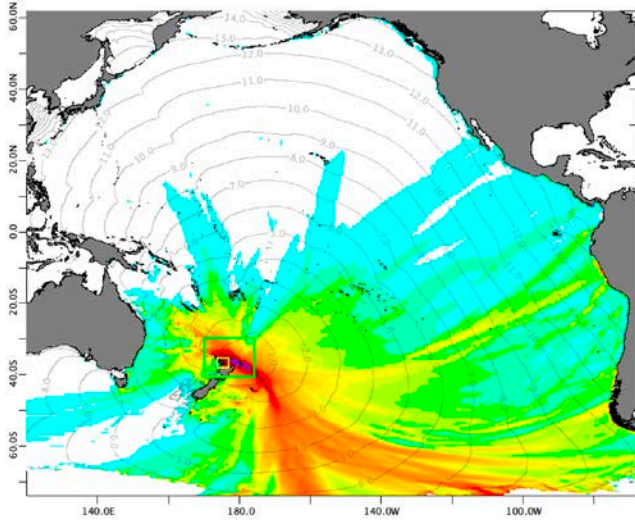
- Network should reduce the potential for "false alarms"

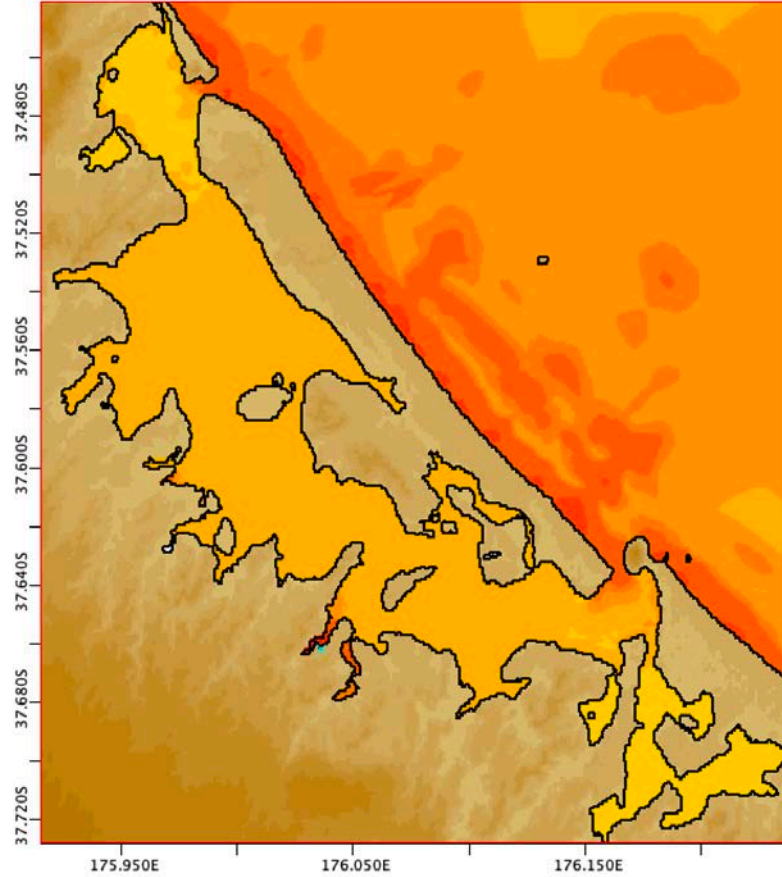# DART Network Design targets detection within 20-30 minutes

Earthquakes east and north of NZ

Utilisation and Next Generation TEW (think 2 years out)
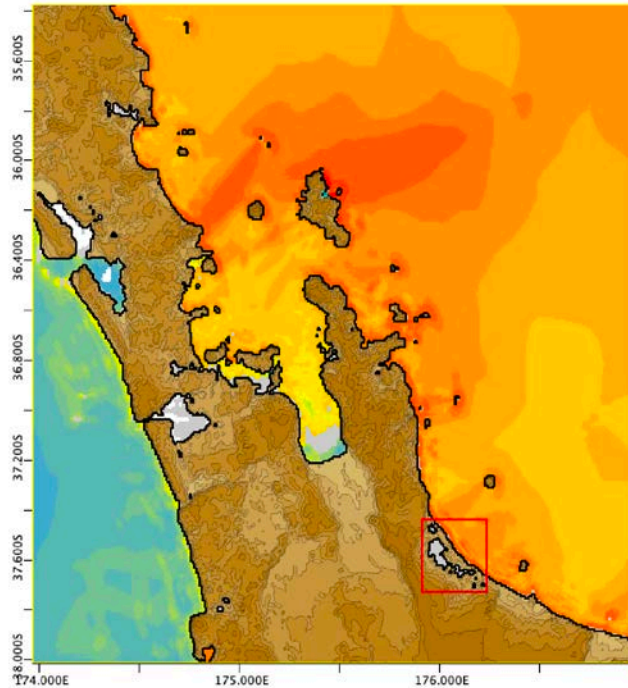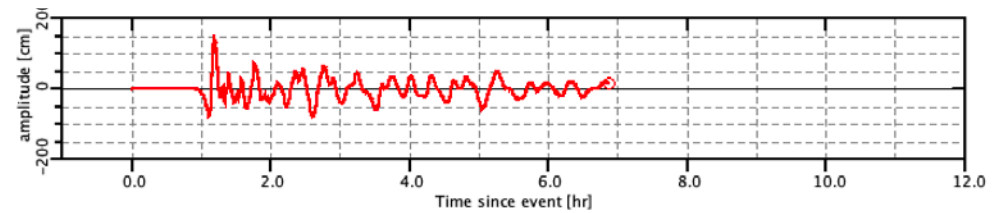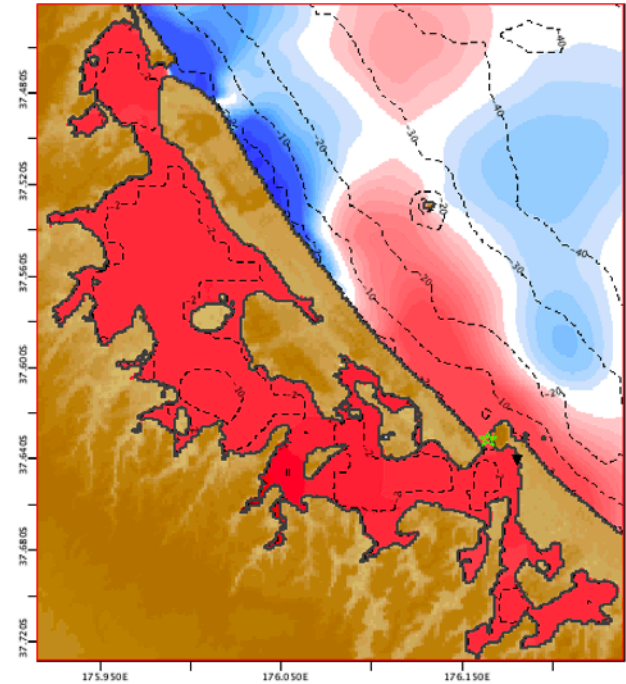
Current activity, ~2-4 year plan

- Refining probabilistic tsunami risk assessment approaches (GNS SSIF, EQC)

- Testing existing EEW and TEW algorithms based on NZ and DART data (RNC2)

- Implementing real-time DART-based coastal forecasting with smaller wave height windows and better timing/duration information (GNS + UNESCO-IOC)

- Local inundation/flooding forecasting in real-time (viable MBIE Endeavour Programme Bid) – Think 100s meters spatial resolution
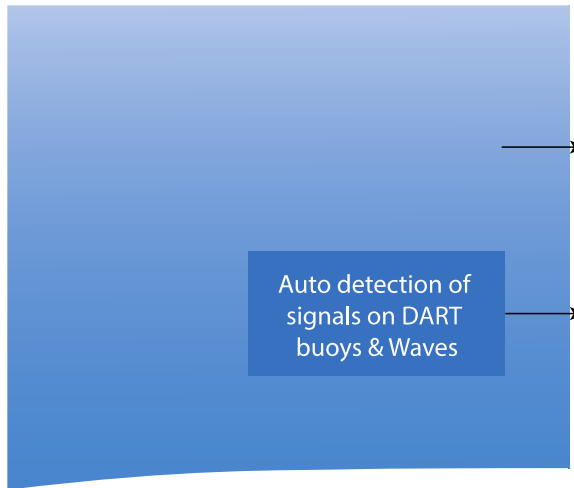
Thank you for your time!

Bill Fry

B.fry@gns.cri.nz

- Paves the way for near real-time inundation mapping

- Benefits will be
  - More targeted evacuation
  - Quicker warnings
  - Quicker cancellations
  -

Dissemination of model results & threat maps to website

Auto detection of signals on DART buoys & Waves

WHEN?
- DART is poorly located.
- Unusual events with DART.
- Slow ruptures.