New Zealand GeoNet: Impacts on geological hazards monitoring and research in New Zealand

EQC
EARTHQUAKE COMMISSION
Kōmihana Rūwhenua

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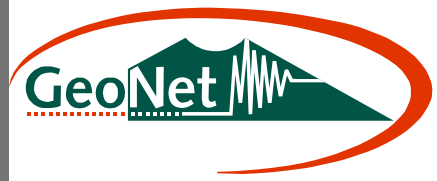
GNS SCIENCE
TE PŪ AO

Example: New Zealand GeoNet



Is an integrated geological hazards monitoring and data collection system. All data are freely available to facilitate research and emergency response

⇒ **Stronger research capabilities**

⇒ **Enhanced community resilience**

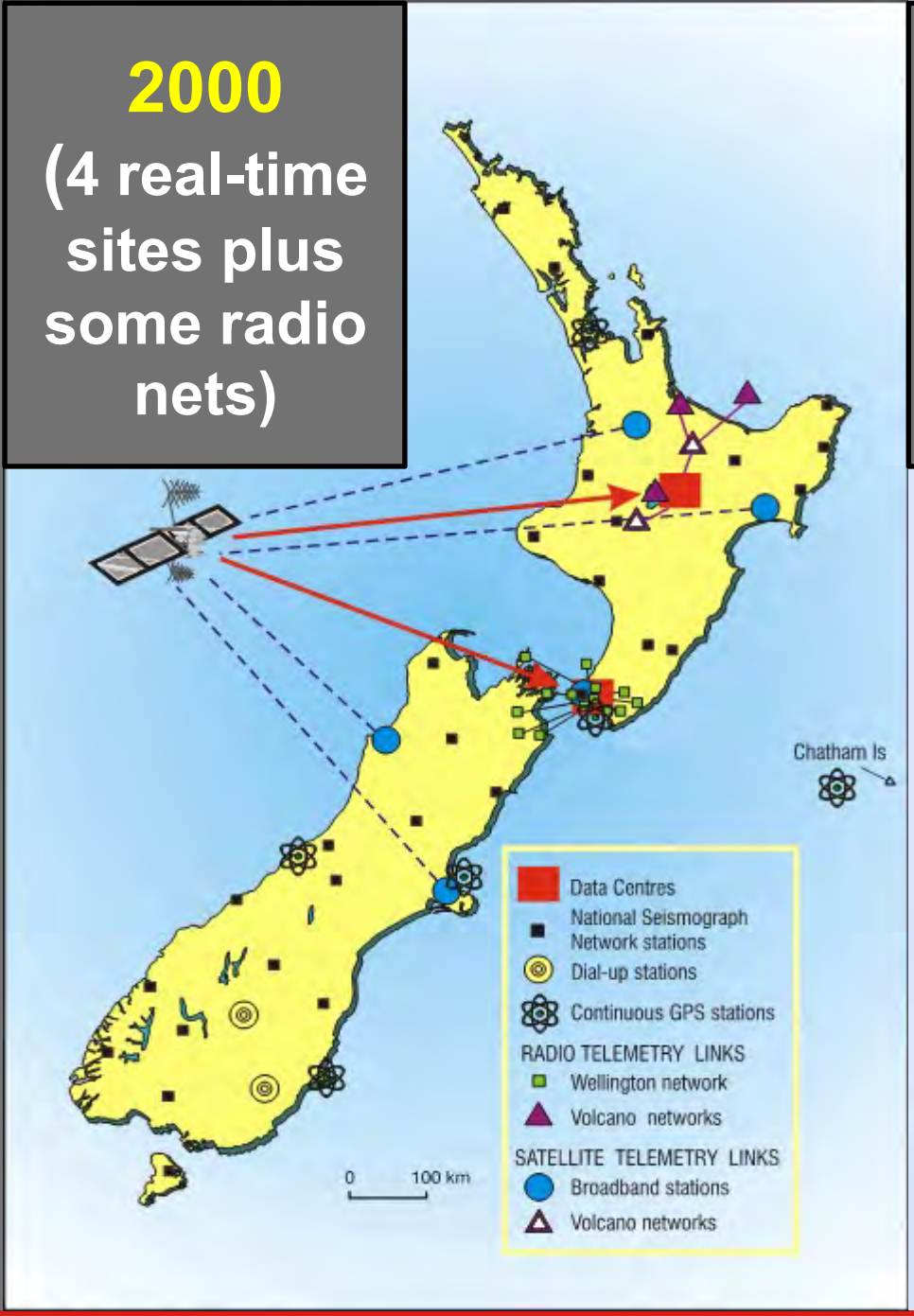
Real-time hazard monitoring

- Earthquakes
- Volcanic unrest
- Tsunami
- Land stability
- Land deformation

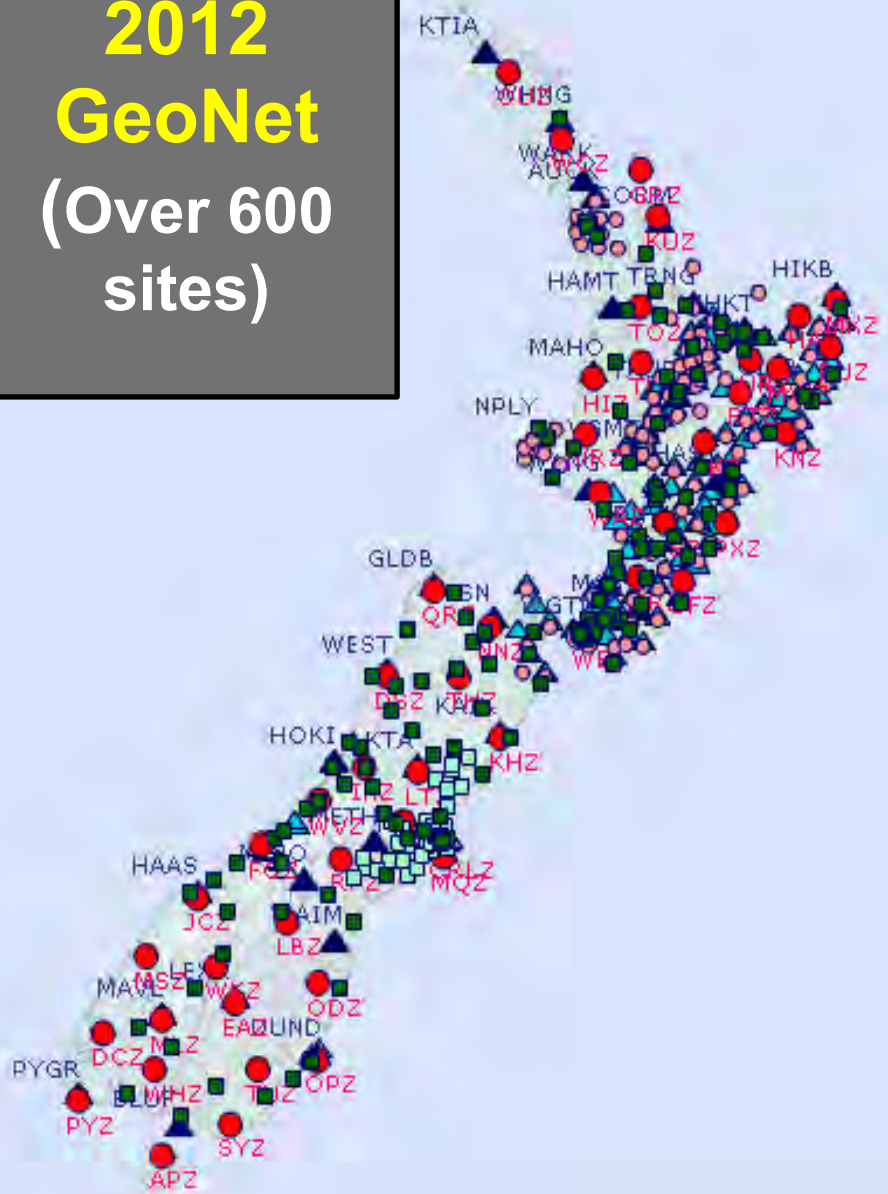
End users

- Emergency managers
- Scientific researchers
- Engineers
- Lifeline utility groups
- Planners
- General public

2000
(4 real-time sites plus some radio nets)



2012
GeoNet
(Over 600 sites)



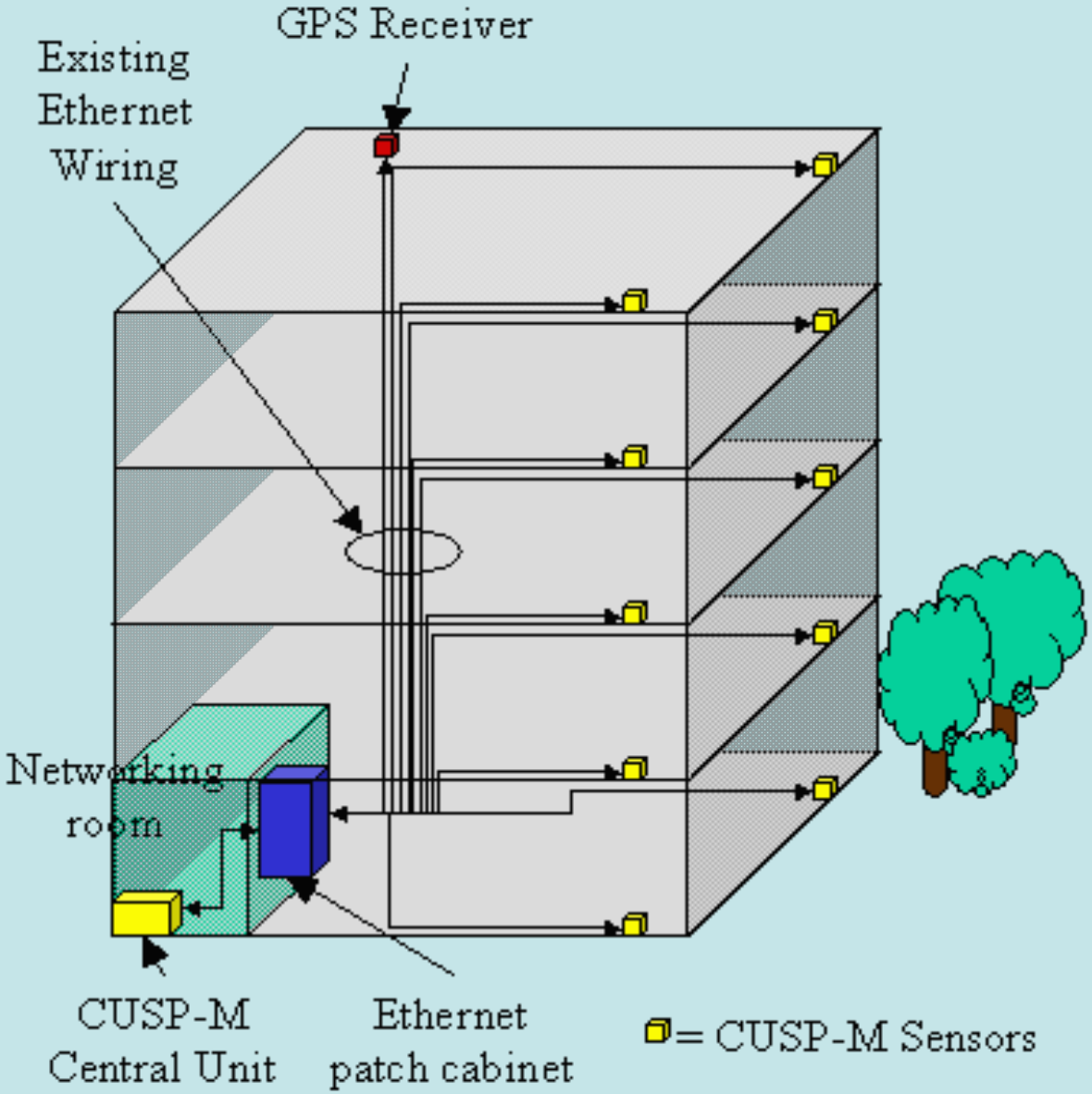
Monitoring Earthquakes

Deformation Monitoring

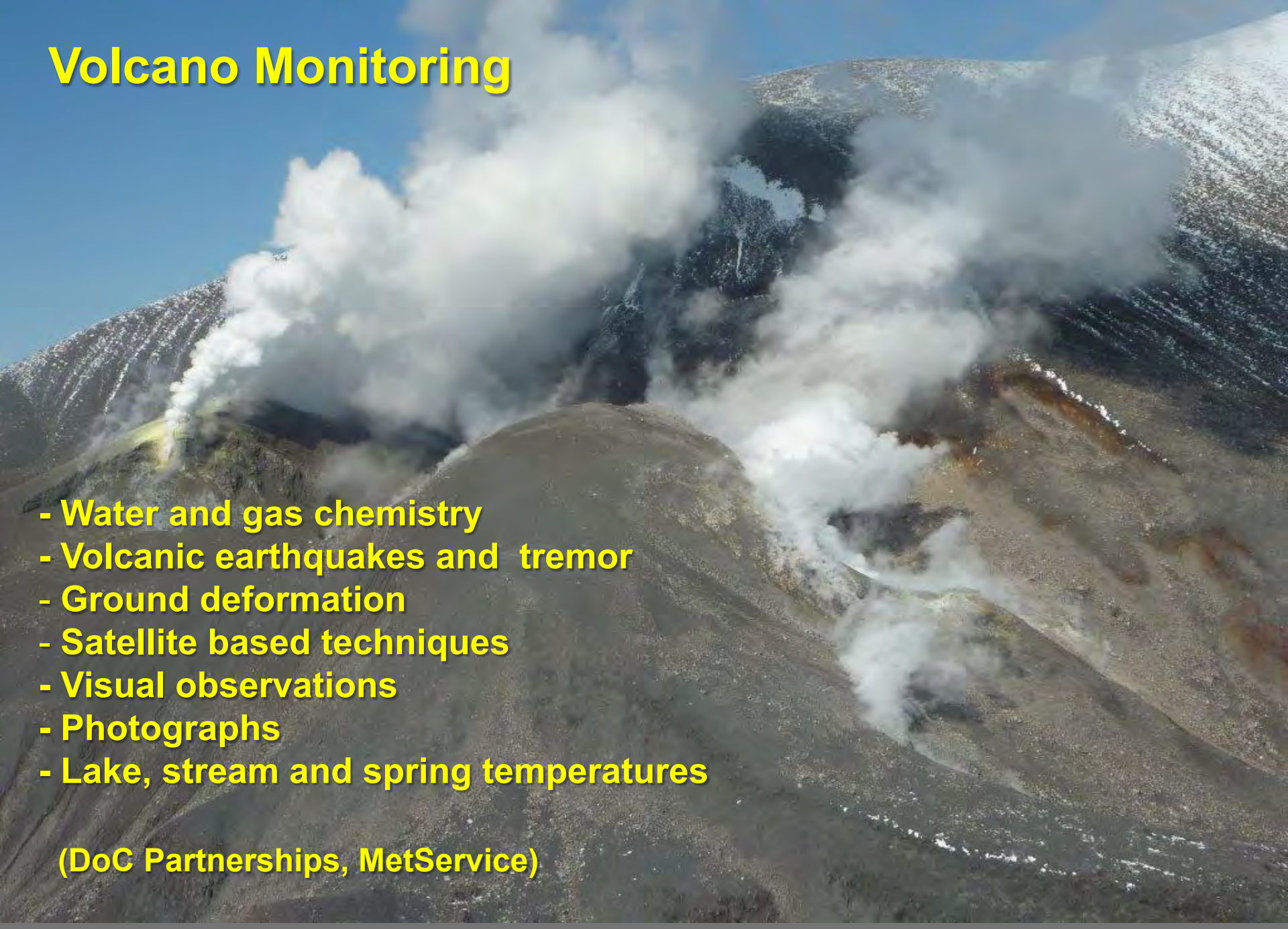
In major centres of population, near significant faults, or in different types of building structures

Tsunami Gauge Network

Structural Monitoring



Volcano Monitoring



- Water and gas chemistry
- Volcanic earthquakes and tremor
- Ground deformation
- Satellite based techniques
- Visual observations
- Photographs
- Lake, stream and spring temperatures

(DoC Partnerships, MetService)

Landslide Monitoring

- Rapid response teams can be deployed within 24 hours
- A landslide monitoring capability

Major Events Since 2008 ….

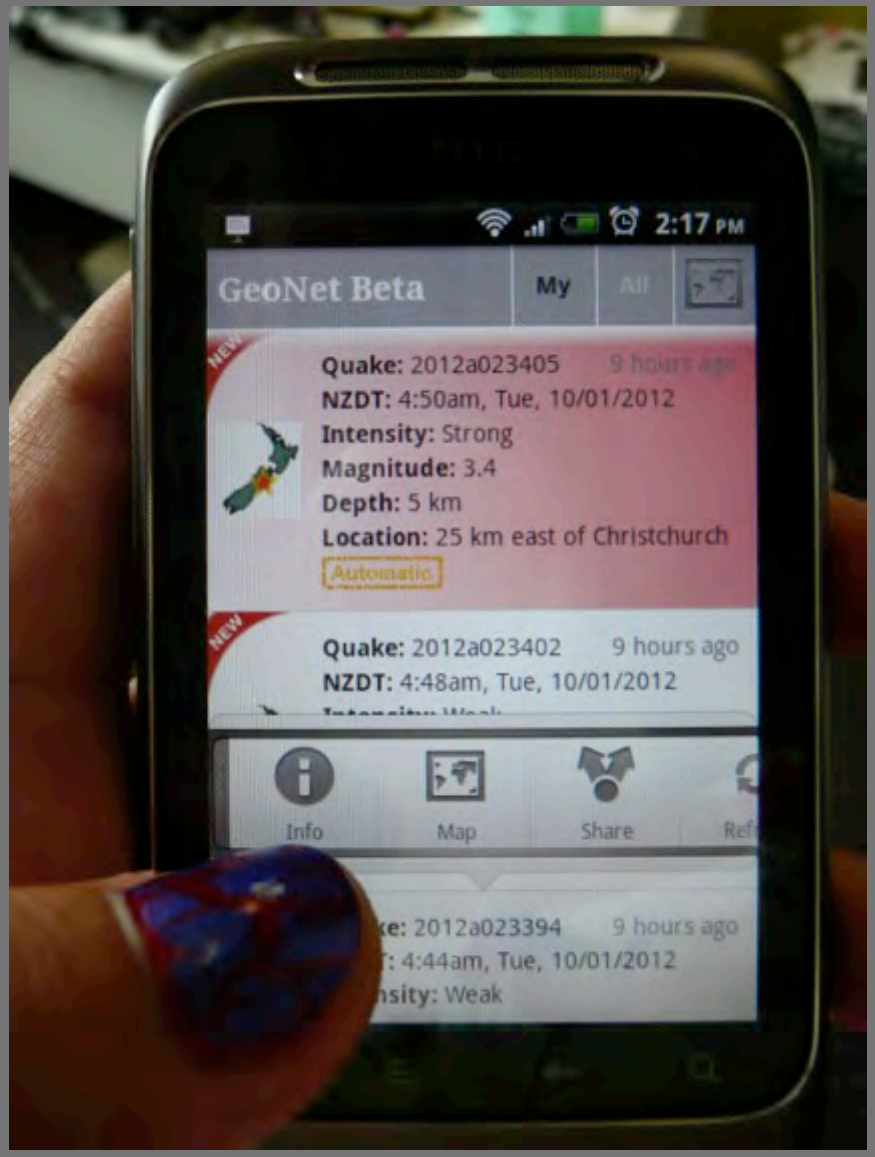
- 2009 (July): Dusky Sound Earthquake (M_W 7.6)
- 2009 (September): Samoan Islands Tsunami
- 2010 (February): Chile Tsunami
- 2010 (September): Darfield Earthquake (M_W 7.1)
- 2011 (February): Christchurch Earthquake (M_W 6.2)
- 2011 (March): Japan Tsunami
- 2011 (June): Canterbury Earthquake (M_W 6.0)
- 2011 (December): Canterbury Earthquakes (M_W 5.8, 5.9)
- 2012 (August): Tongariro Eruption

GeoNet Web Traffic 2001 to 2012

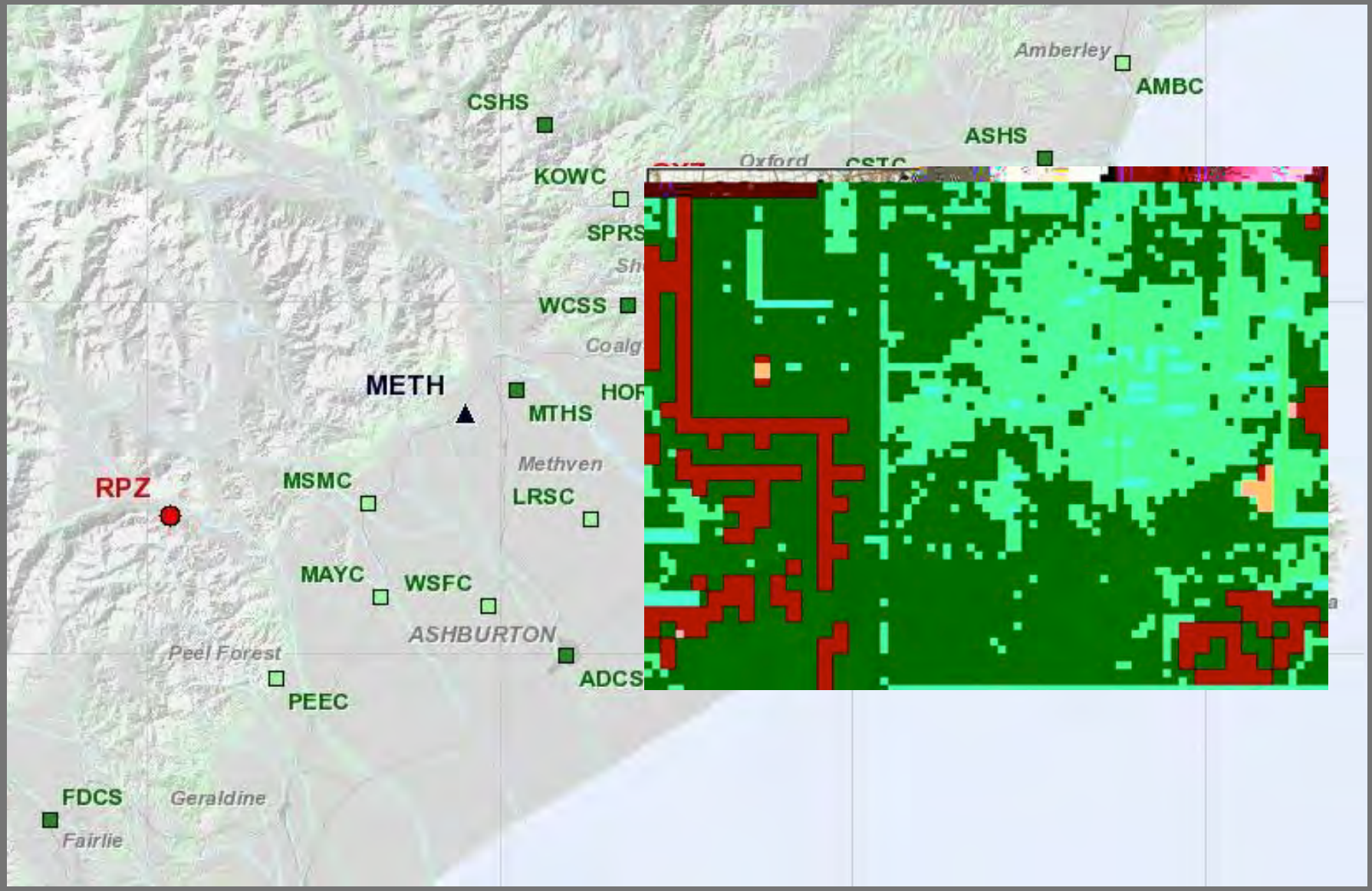
- Early years (Dino the dinosaur) — 10 hits/s
- 2005 Upper Hutt earthquakes — 300 hits/s
- 2010 Darfield Earthquake — 5,000 hits/s
- 2012 Deep North Island Earthquake — 16,000 hits/s

Hits/s = requests received by the website per second

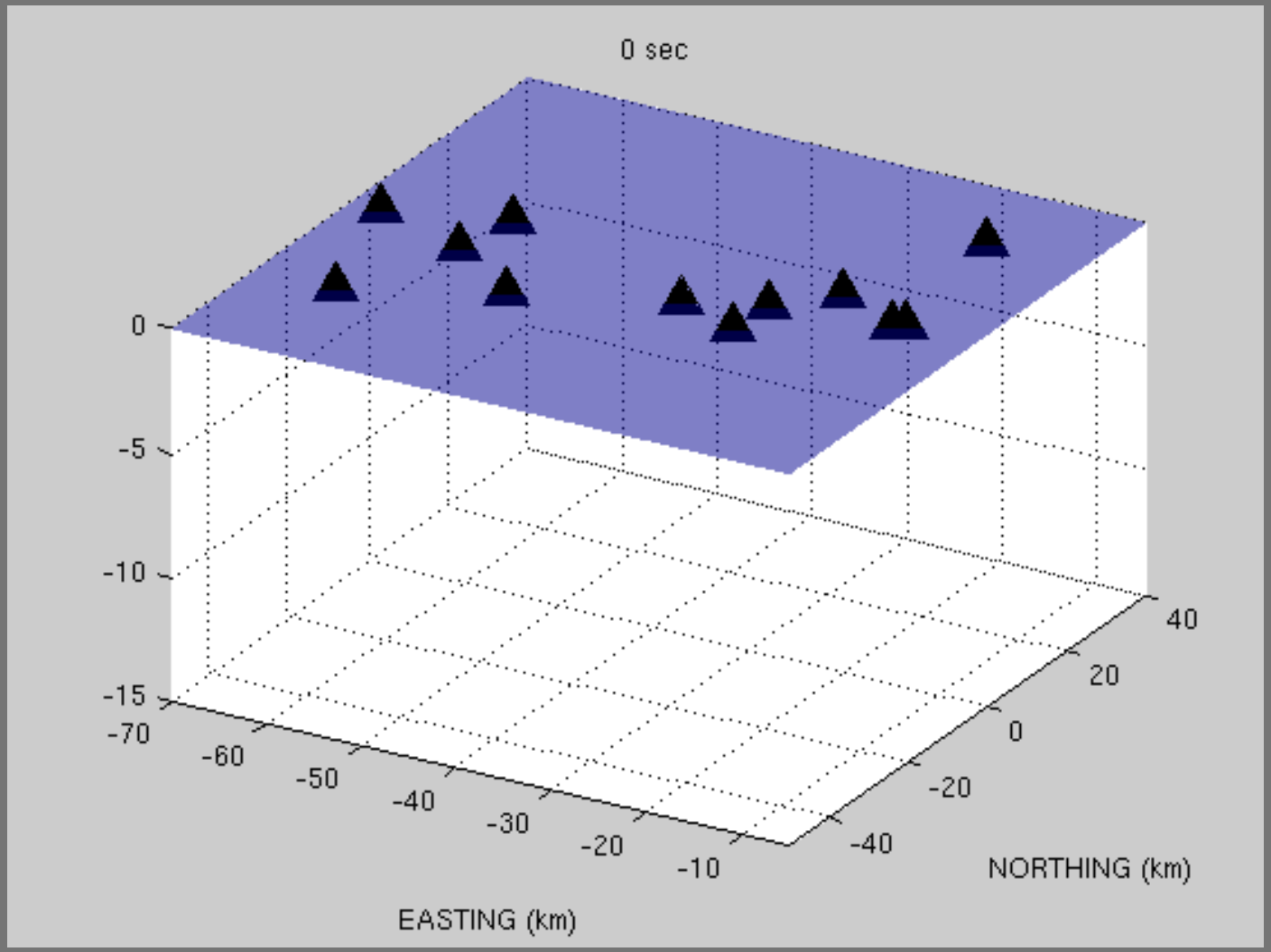
Android and iPhone Applications



GeoNet Canterbury Sensor Network Sites

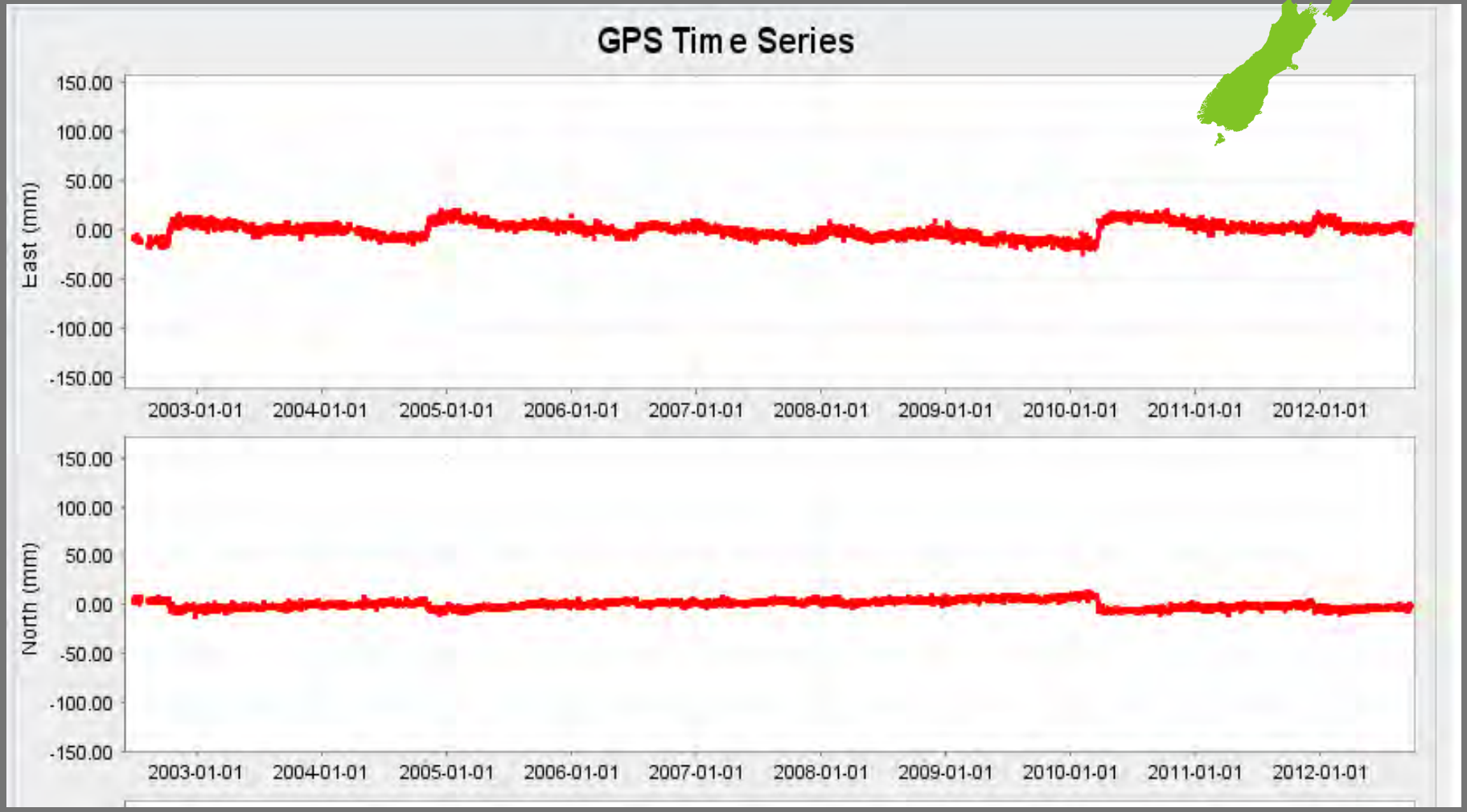


Complexity: Kinematic source model for the Darfield Earthquake

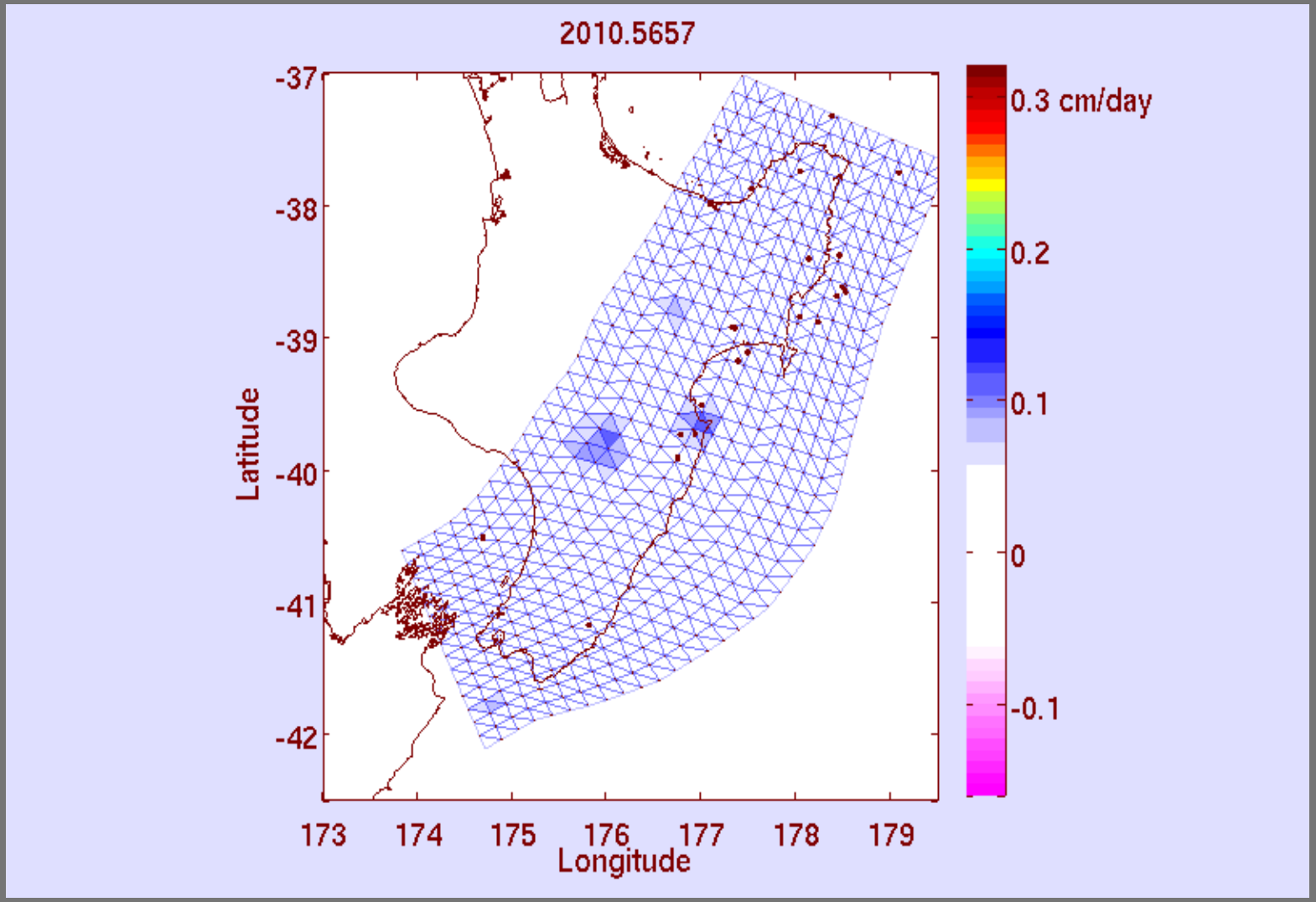


(Holden et al., 2010-2012)

Slow Slip Events



Slow Slip Events, 2010 - 2012



GeoNet is Currently Producing, Analysing and Making Available:

- Data from 52 broadband and 126 regional seismograph stations
- Data from 180 cGPS deformation stations
- Data from >240 strong ground motion stations and 15 strong motion building and borehole arrays
- Data from 17 tsunami (sea level) gauges
- A number of medium to low data-rate data streams (chemistry, landslide monitoring)
- A total of 7+ Gigabytes of data a day
- **Total archive currently 20 Terabytes**
- **ALL DATA freely available**

www.geonet.org.nz