Science Advice for Decision-making in Responses to Natural Hazards Event – Some Lessons Learnt

Gill Jolly
Volcanologist
Theme Leader – Natural Hazards and Risks
Co-opted onto PM Chief Science Advisor's Forum for natural hazards and risks
QuakeCoRE, 9 December 2020

A personal journey

The stories I will tell:

- **Different challenges presented by natural hazards events**

➢ **What have I learnt?**
➢ **Where to next?**

What I can’t talk about: Whakaari

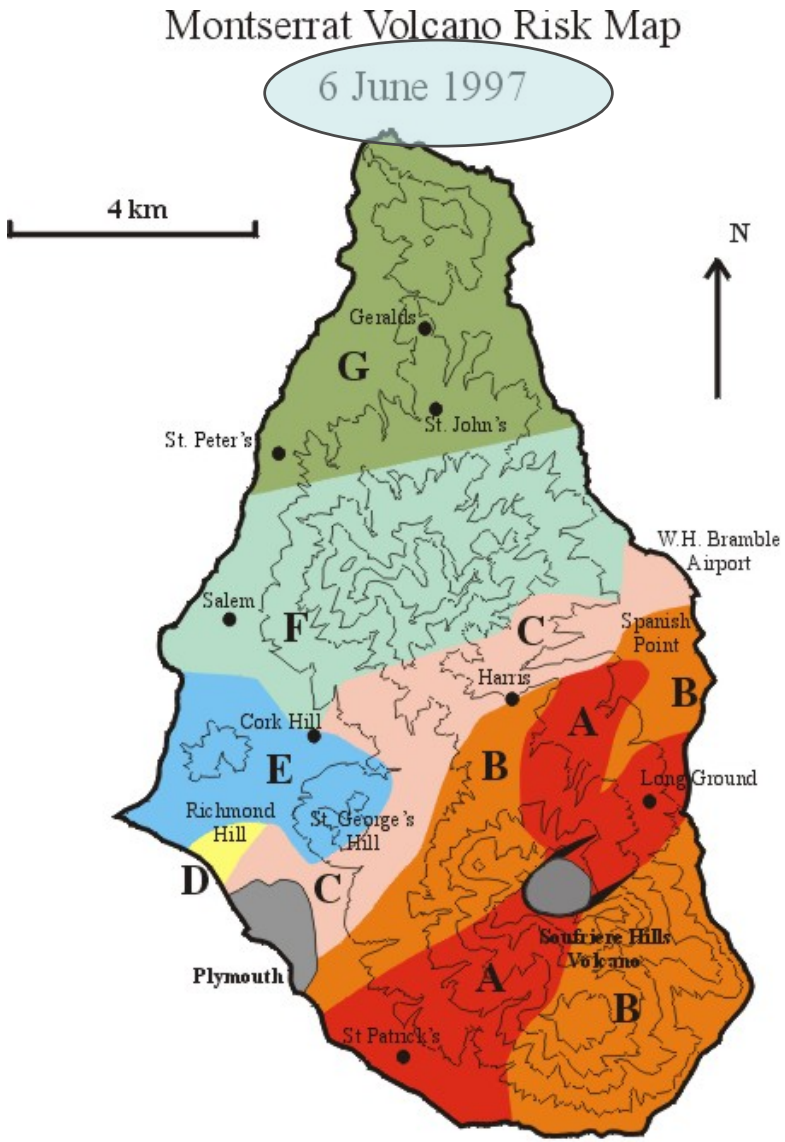
Step 1 – Montserrat, West Indies. 1996-2005. A steep learning curve.

What I learnt along the way

The importance of teamwork and diversity –
and recognising and understanding different perspectives

What I learnt along the way

A first lesson in uncertainty – how safe is “safe”?



Changes as a result of pyroclastic flows down the north flank, early June 1997

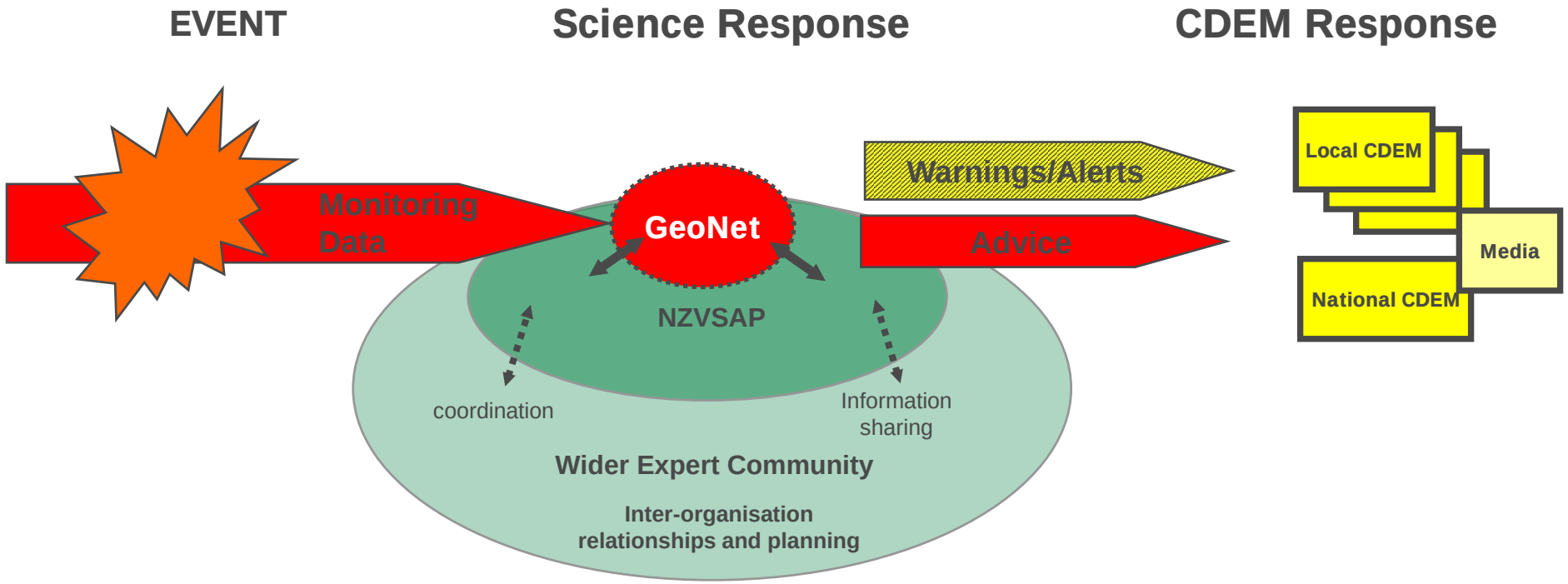
What I learnt along the way

A first lesson in uncertainty – how safe is “safe”?

The development of a Science Advisory Group to bring different expertise together – both for rapid response and for more considered long term advice

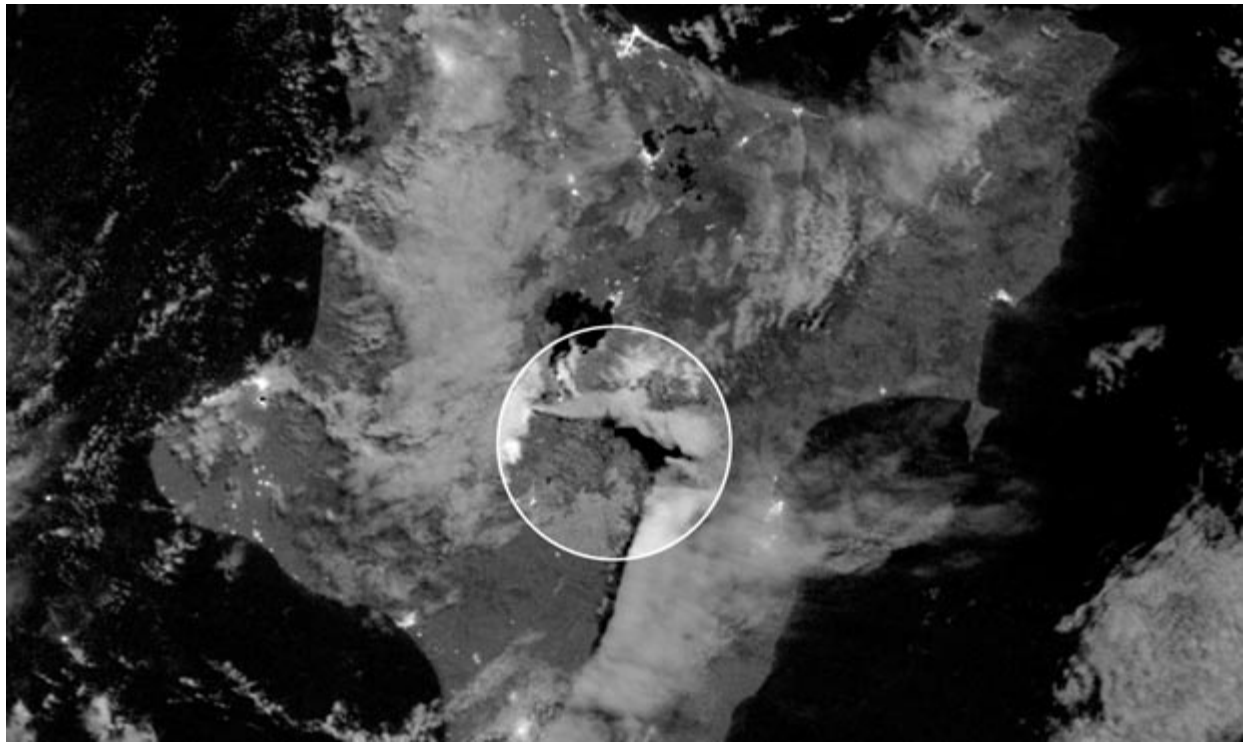
Changes as a result of dome collapse and pyroclastic flows, 25 June1997

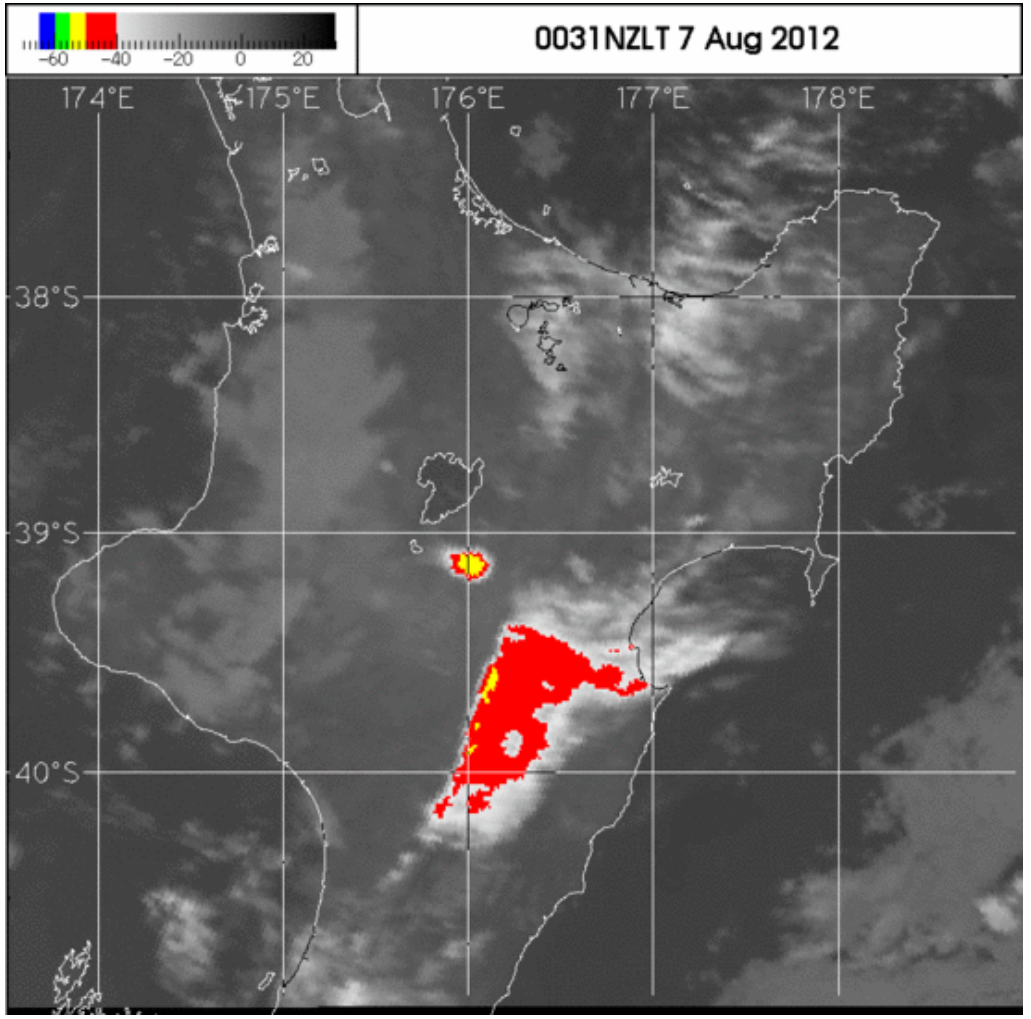
Step 2. Move to New Zealand: 2006



- Working with MCDEM (Richard Smith) to develop the NZVSAP concept (2008-12). Initial ToRs discussed by early 2012

Te Maari (2012) eruption





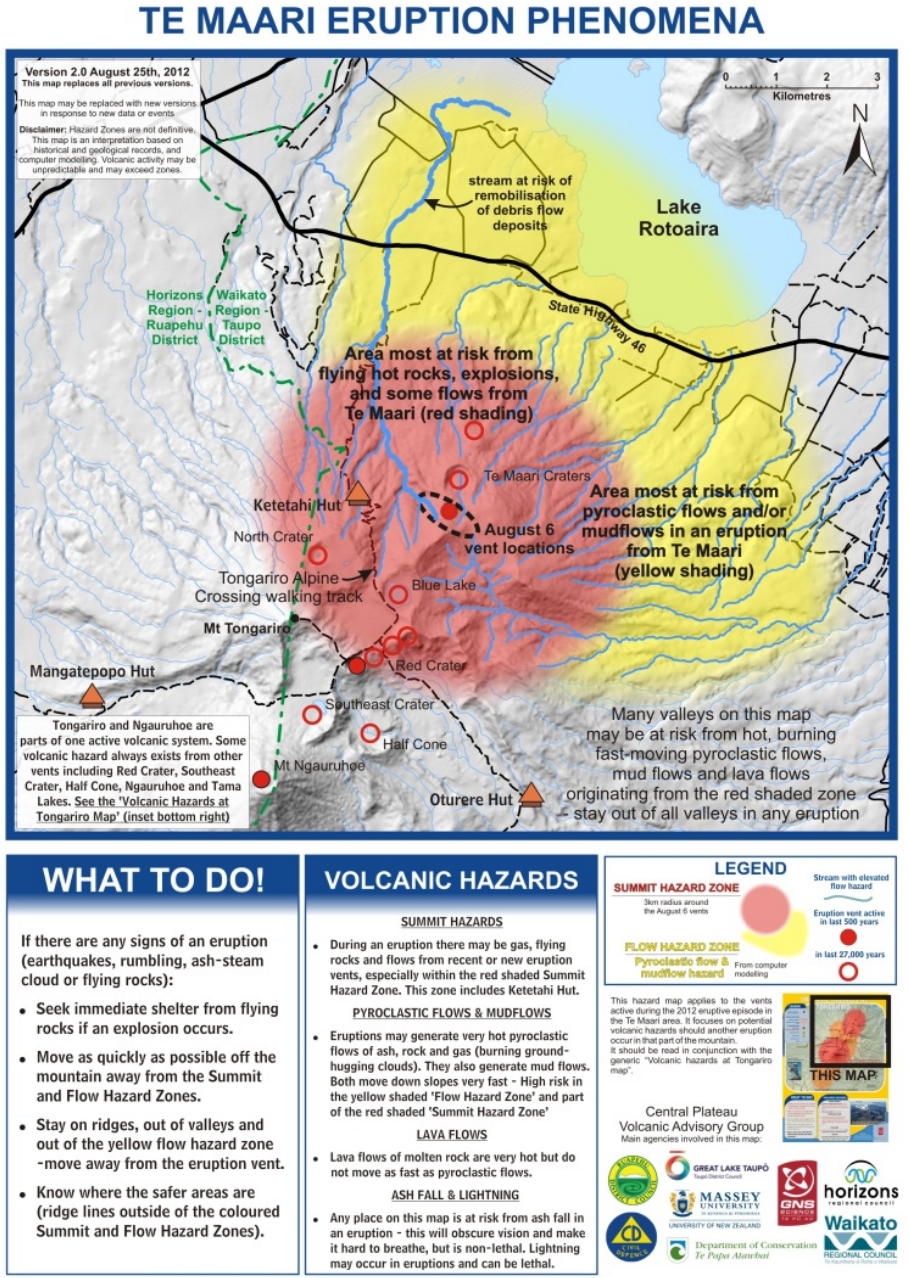
Eruption impacts

What I learnt along the way

Importance of co-ordination, communication and risk management

NZVSAP in action

- **Ash collection and analysis**
- **Map production**
- **Hui with Ngati Hikairo**



What I learnt along the way

Working with stakeholders to build trust

Step 3 – Earthquakes and tsunami. Kaikōura. Advice to government.

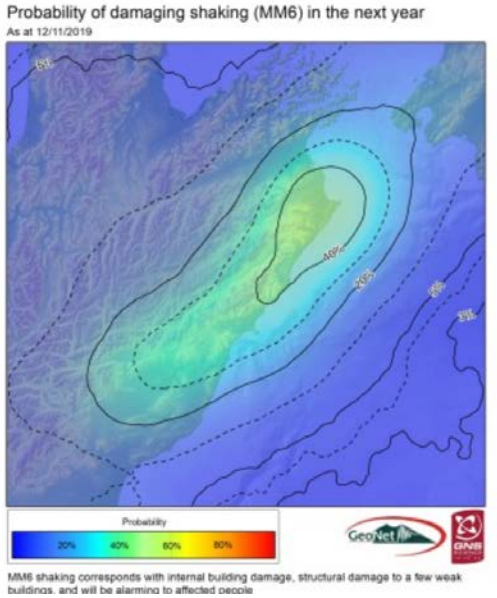
What I learnt along the way

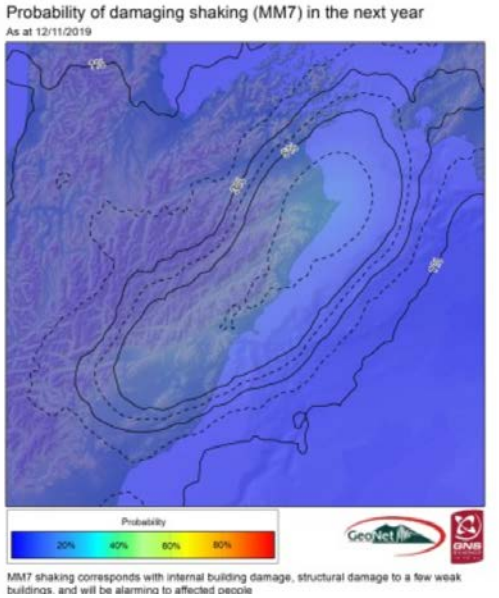
- **Evolving data and different needs for information**
- **How the research community collaborated, co-ordinated and communicated**
- **Enormous goodwill**

Aftershock shaking forecasts

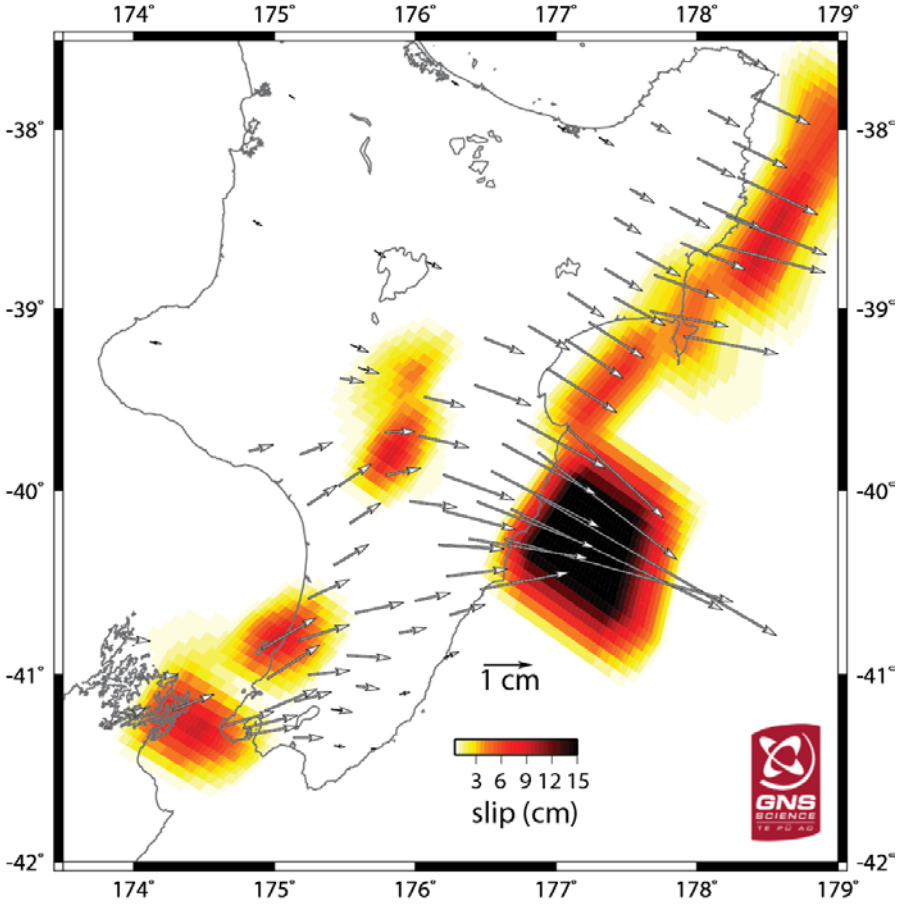
We have also calculated the probability of strong and severe earthquake shaking from aftershocks over the Modified Mercalli Intensity (MMI) scale Strong shaking is classed as MM6, and severe as MM7. The MMI sc describes the intensity and impacts of the shaking, which depend on the magnitude of the earthquake, how ground you are on. At MM6 intensity shaking levels, walking steadily is difficult, furniture and appliances ma walls and shelves; glassware and crockery break; slight non-structural damage to buildings may occur. At M furniture and appliances move; contents are damaged; there is minor building damage and liquefaction can

The maps show the probability of MM6 and MM7 shaking within the aftershock region, which includes Welli shaking is largest around Cape Campbell with around 15%. In comparison, the probability of MM7 shaking i the next year. While this probability is considerably lower in Wellington than in the areas around Kaikoura (1 occurred during the mainshock to happen again in Wellington.





What I learnt along the way



Patches of slip on the Hikurangi subduction plate boundary beneath the North Island This is recorded by the GeoNet and PositioNZ GPS stations. GPS station movements are denoted by the arrows.

Decision makers need science as one input:
Understand what they need, why and what they need to decide.

- **“Free and frank advice”**

Step 4. 2018 - present

- **Co-opted to join PM Chief Science Advisor's Forum**

VISION for the role (Juliet's words!)

a trusted, accessible bridge between scientists, society and government

PRINCIPLES*

Inclusive, Rigorous, Transparent, Accessible

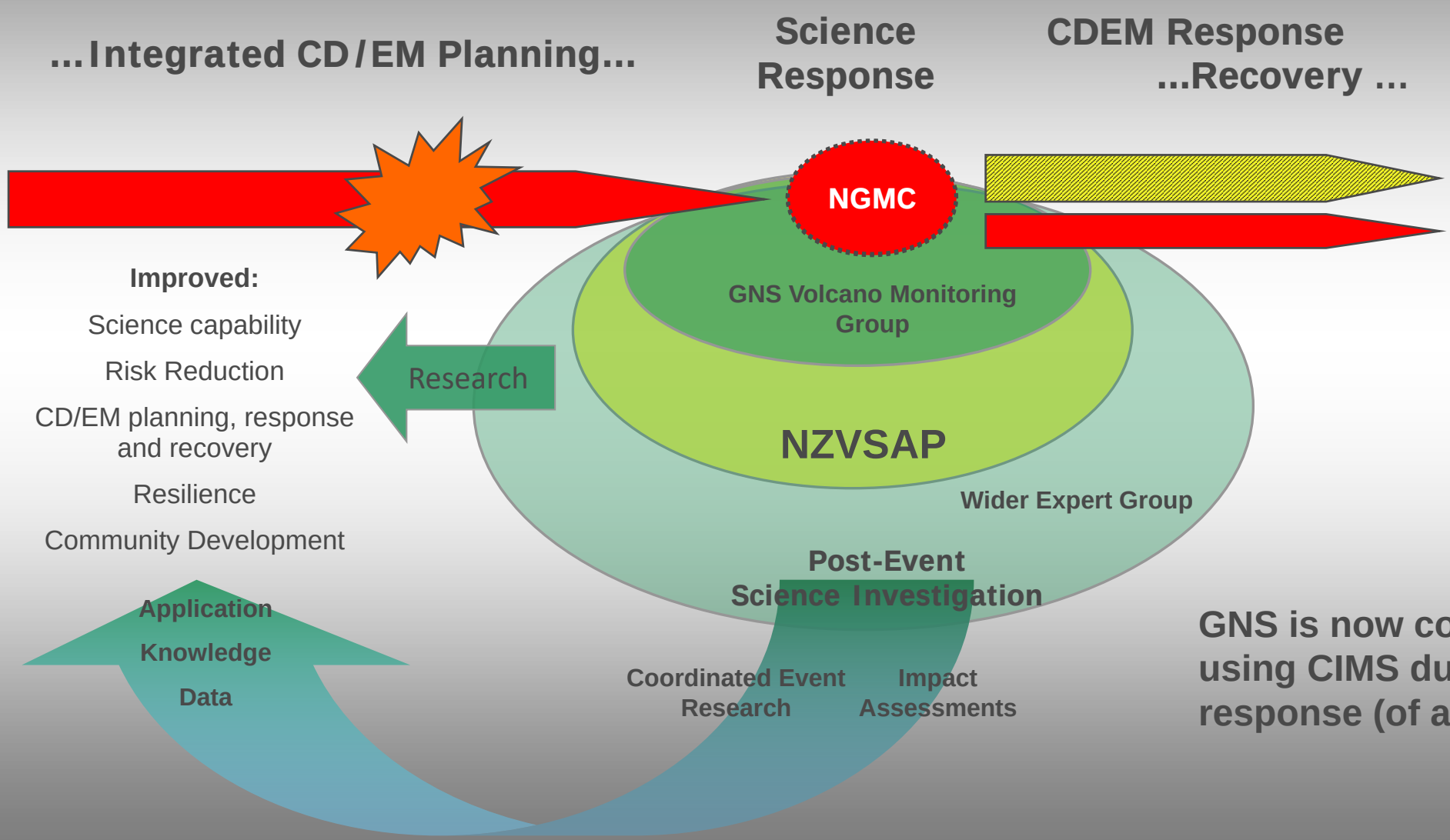
CHALLENGE

Providing advice on a useful timescale

*Nature, June 2018 : Four principles to make evidence synthesis more useful for policy

A Vision of Coordinated, Comprehensive Science (2019)

Major Credit to Richard Smith



GNS is now committed to using CIMS during a response (of any size)

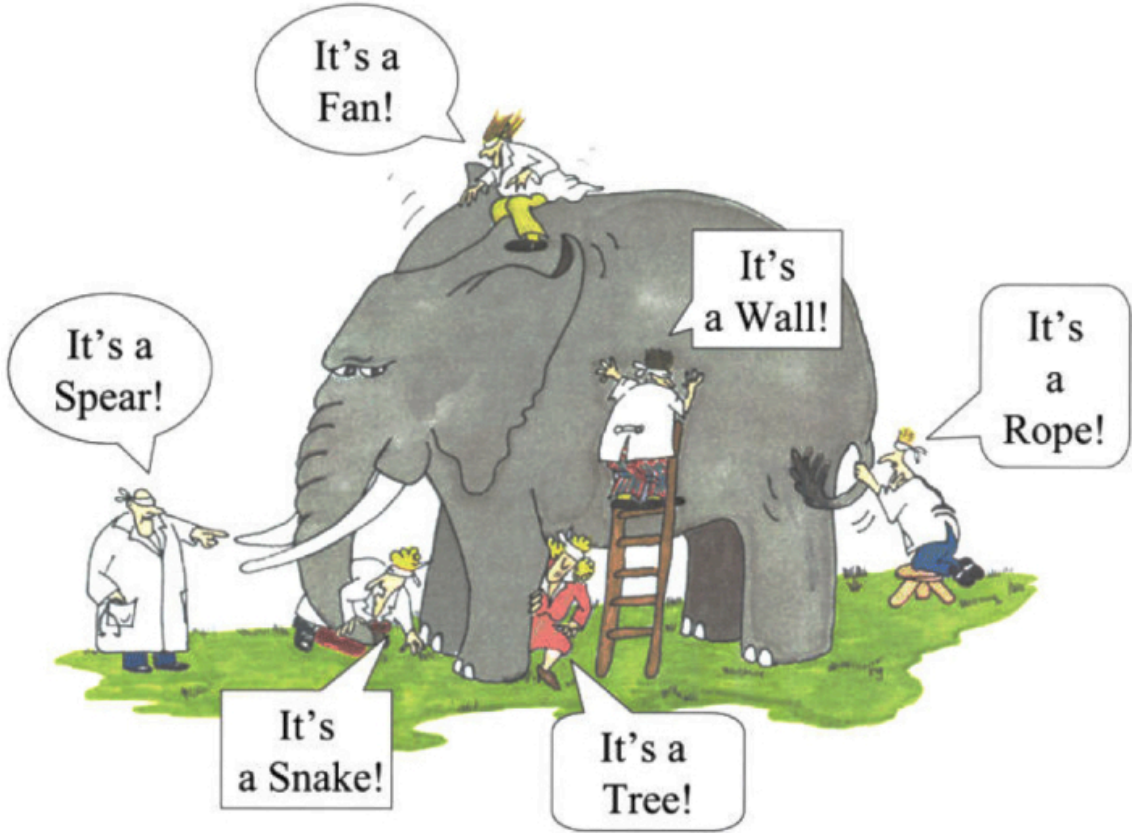
How do we all co-ordinate, collaborate, communicate before, during and after an earthquake?

- **Working with NEMA to develop Science Advisory Panels for other perils**
  - Earthquake?
  - Tsunami?
  - Landslide?
- **Come and have a chat after the session or email:**

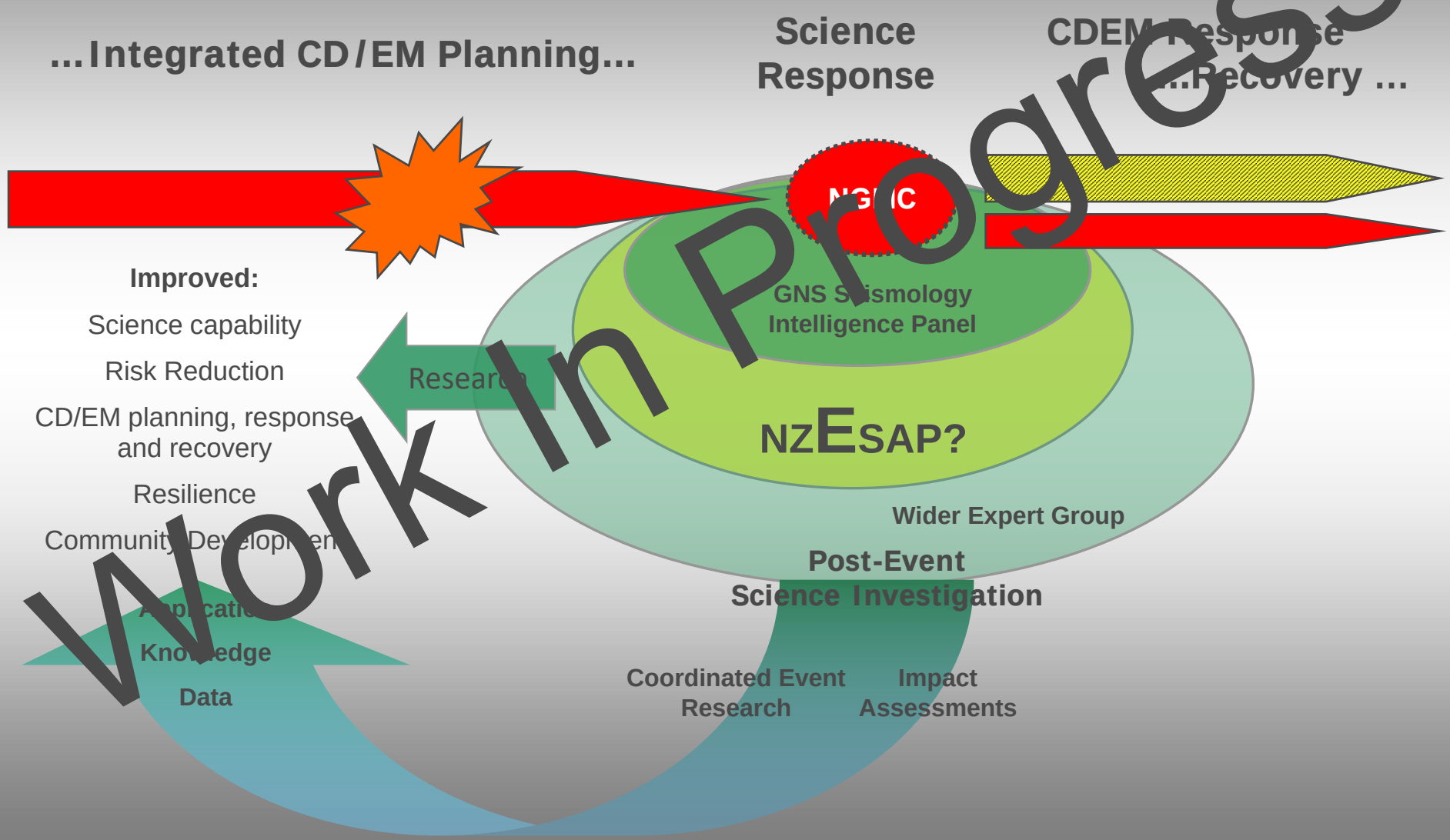
g.jolly@gns.cri.nz

richard.smith@gns.cri.nz

daniel.hill@nema.govt.nz



New Zealand Earthquake Science Advisory Panel??



What I've learned about science advice in a crisis

- **No single person or group has all the knowledge**
  - Use the evidence base and be open to change as new information is available
  - Listen to different perspectives
  - Be clear about differences of opinion when providing advice
  - Take a "team approach" wherever possible
- **Understand what information is required, in what time frames and for what reason**
  - Be clear on roles and responsibilities
- **Understand and communicate uncertainty and ambiguity**
  - Be clear about what you know and what you don't
- **Build trust**
  - Be open and honest; "free and frank advice"

I'm still on the journey and still learning

One year on from this tragic day, our thoughts are with the friends and whānau of those who lost their lives, the survivors of the eruption, the first responders, emergency services, Ngāti Awa and the people of Whakatāne. Our thoughts are with them on this difficult day.

Kāti rā!
Kia hora te marino
Kia papa pounamu te moana
Kia teretere te kārohirohi
Tēnā koutou, tēnā tātou!
Kia kaha!

May there be pervasive calm
Let the oceans glisten as the pounamu
There now the shimmering, dancing haze of our summers before us
Greetings, we acknowledge you, one and all.
Be strong!

Ngā mihi nui