GNS Science Geothermal

GNS Science Geothermal Development Advice and Expertise



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GNS Science : Who we are …

- Independent, New Zealand Government-owned Crown Research Institute.
- New Zealand's leading supplier of earth science research and consultancy services.
- Clients include:
  - private sector (New Zealand and internationally)
  - government organisations
  - international funding agencies
  - research groups in New Zealand / overseas

Core purpose : To understand Earth system processes & resources, and translate these into economic, environmental and social benefits.

GNS Geothermal – What we do …

- Resource Delineation, Exploration & Development Advice
- Core funded, Multidisciplinary Research
- Permitting / Resource Consenting (Independent Geoscience Opinion)
- Training (student / industry internships)

GNS Geothermal : Commercial

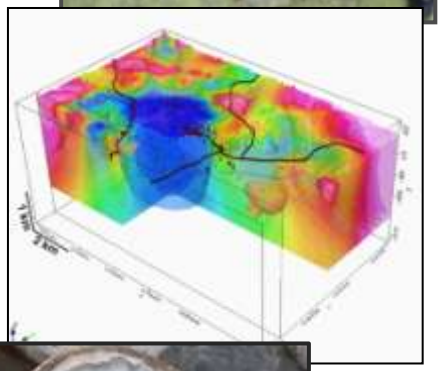
The GNS Geothermal team contracted for commercial services and advice in a range of areas in 2014 -15.

Thank you to our many commercial clients.

We look forward to working with you in the future for services, expert advice, internships and training.

Commercial Services were provided to clients in :

- New Zealand
- Indonesia
- Philippines
- Mexico
- Chile
- USA
- Taiwan
- Comoros
- Kenya
- Japan
- Australia
- Papua New Guinea
- Caribbean



GNS Investment in Analytical Services

New Zealand Geothermal Analytical Laboratory (NZGAL) : **world leader** in geothermal/groundwater analysis.

Expertise is available for all stages of geothermal power and direct use projects: incl. non-routine analyses.

- Refurbishment completed
- Investment in 2014-15 in new analytical tools and techniques
- NZS/ISO 17025:2005 accreditation

- Major Capex Acquisitions Planned for Wairakei in 2015

GNS Geothermal : Our Research

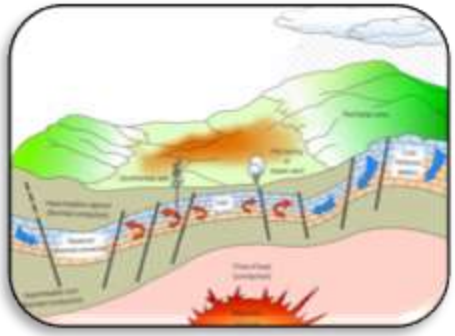
"… environmentally sustainable growth in geothermal electricity generation, including utilisation of the deep (3-7 km) resources, an increase in direct applications, and new industries leveraged from geothermal resources."

Key elements of success :

- **Innovative "problem solving" research**
- **Sophisticated analytical tools / facilities**
- **Industry – Researcher – Iwi relationship**

- Core funding ($4.4M p.a.)
- Contestable ($2.9M p.a.)
- Royal Society of New Zealand
- Univ. supported research
- Industry supported research

Sustainable Development

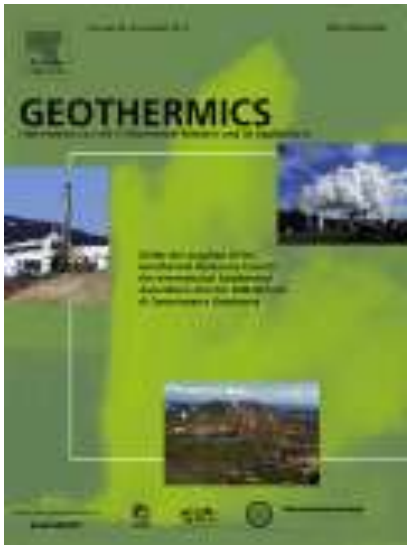


System Characterisation and Science Drilling

Environmental Effects Low Enthalpy Systems

Geomicrobiology

Geothermics Special Issue



Taupo Volcanic Zone Geothermal Systems, New Zealand : Exploration, Science and Development

Volume 59B

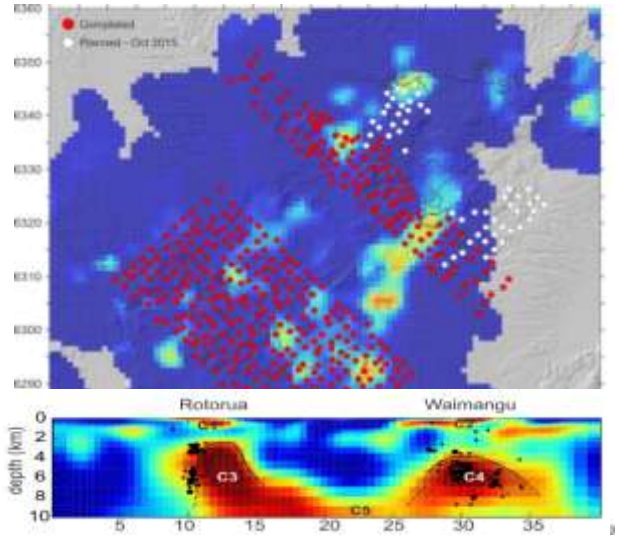
Editors: I. Chambefort and G. Bignall

- 7 general manuscripts on TVZ in regard to geothermal (history, volcanology, geophysics, resources, direct use, sustainability and modeling)
- 7 field specific manuscripts (Kawerau, Ohaaki, Rotokawa, Ngatamariki, Rotorua, undeveloped fields, and direct use example in Taupo)

The preface and 13 manuscripts are already online!

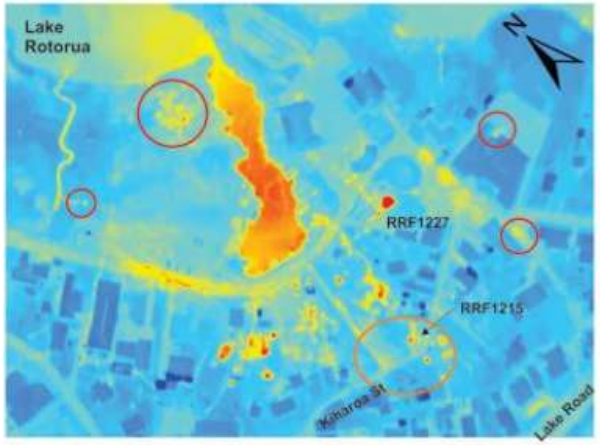
Geoscience - Research Highlights

Improved system delineation



Enhanced Feature Monitoring

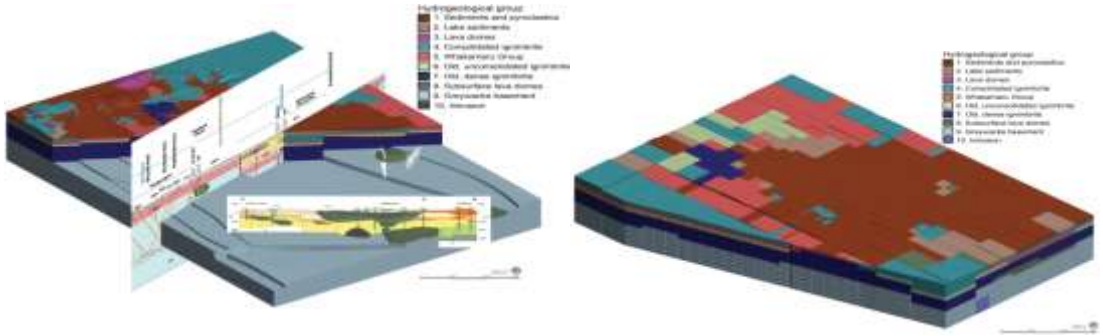
Heat Flow – TIR : Rotorua

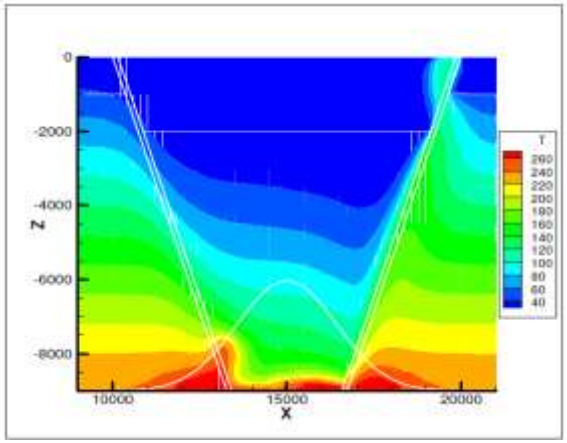


Ecosystem Restoration

Geochronology – Mineral Mapping

I^{125} Tracer Study
Waste to Wealth





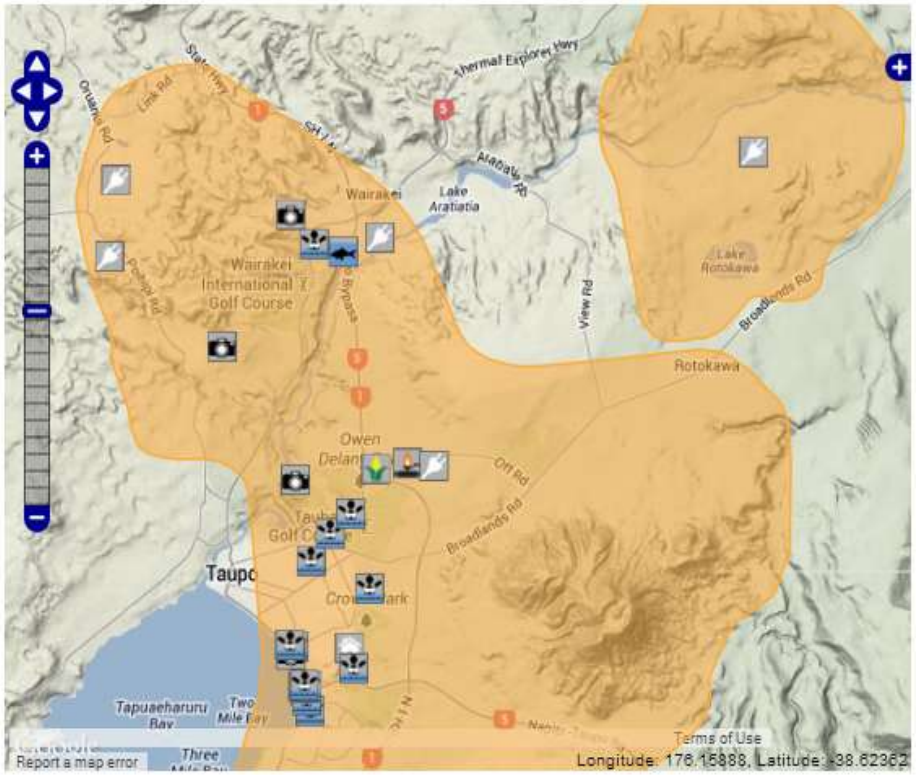
Integrated Geology – Numerical Modelling Tools : Supermodels

Validating numerical models

GNS : Promotion of Direct Use

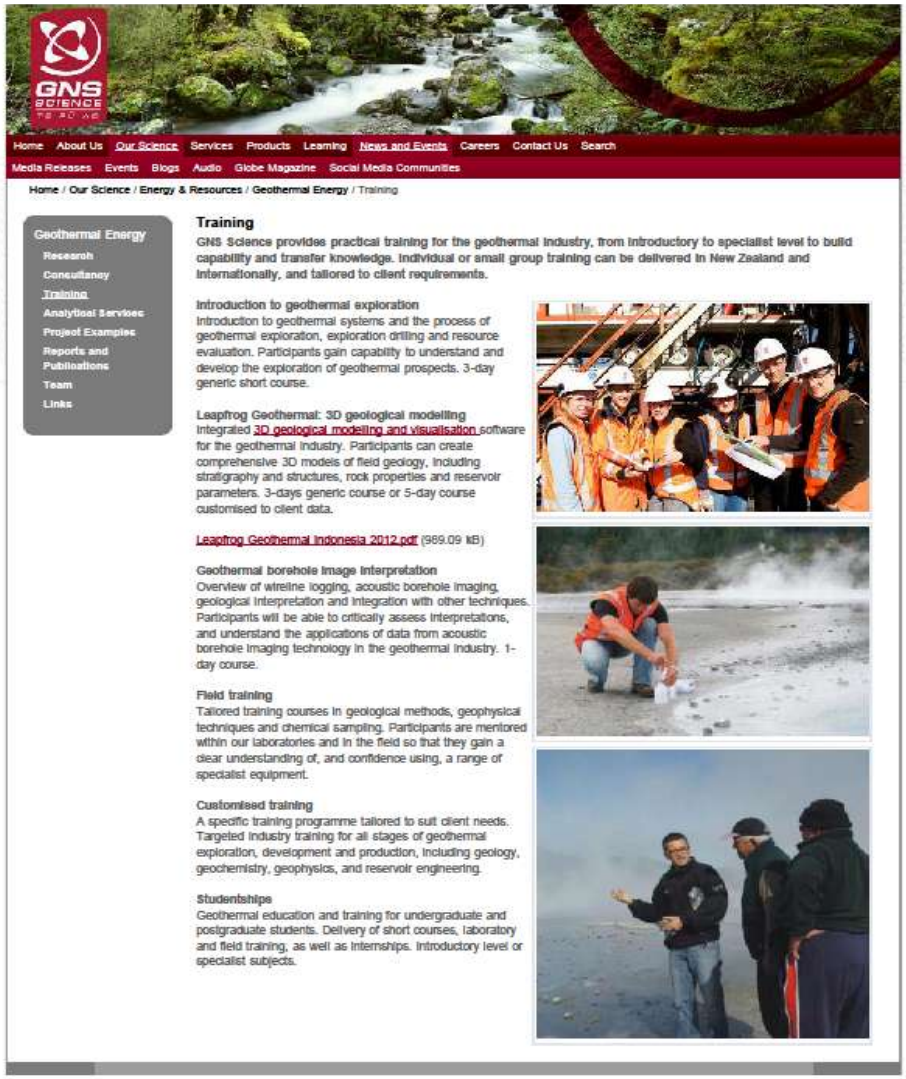
Case Studies

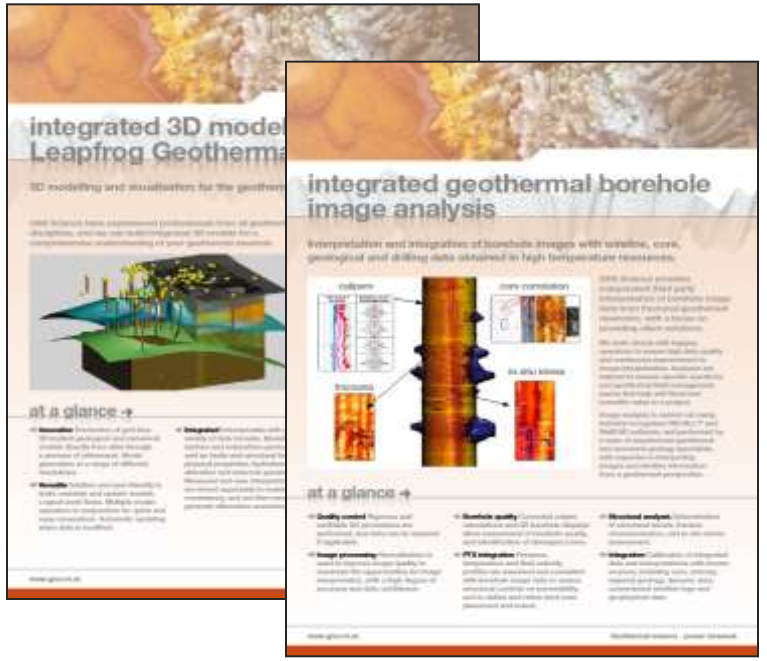
Geothermal use map **www.gns.cri.nz**



Double-click to zoom in, and drag to pan. Hold down the shift key and drag to zoom to a particular regior
Use the layer switcher in the top right hand corner (+ sign) to change map backgrounds.

Technical Training and Supervision





New Zealand Geological Survey establish in 1865




Thank you

Dr. Kevin Faire

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