



Analytics Over Open Spatial Data for Policy Development

Peter Leihn

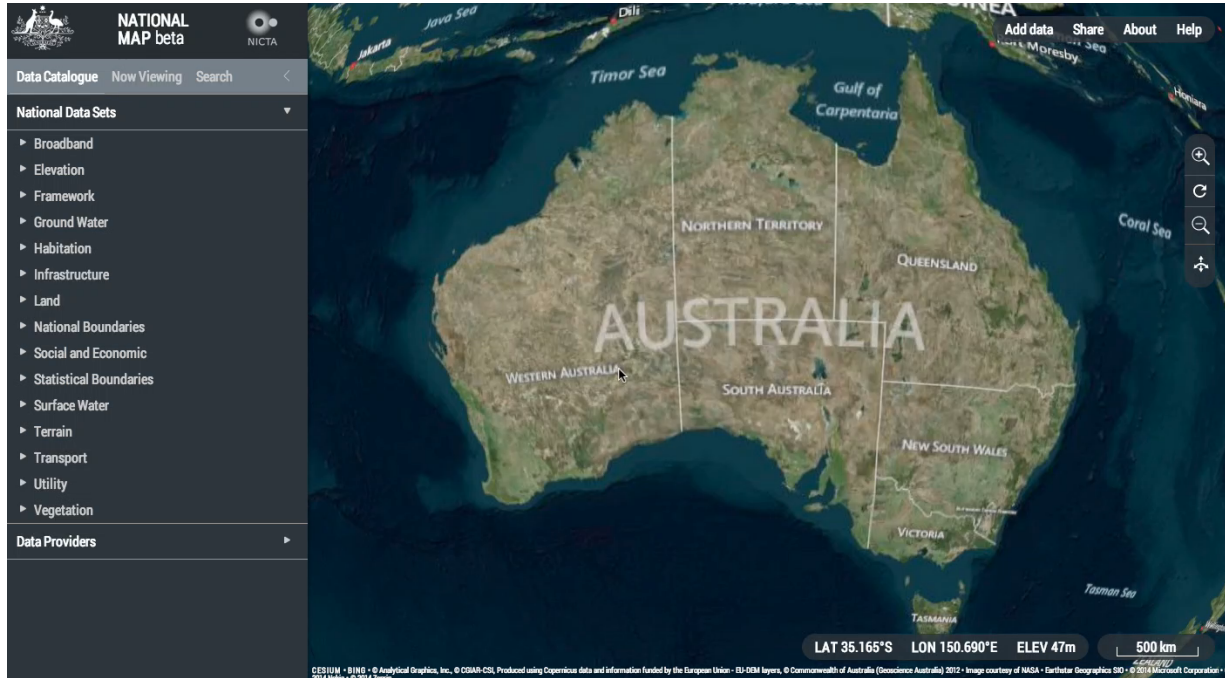
Director Environment, NICTA

Co-Founder, Terria



Spatial Analytics

National Map Project



Project client

Australian Government

Initial Australian Government collaborators

- Department of Communications
- Geoscience Australia
- Bureau of Meteorology
- Department of Finance
- Bureau of Statistics
- State Governments

NICTA capability

Terria visualisation platform

Rapid software innovation

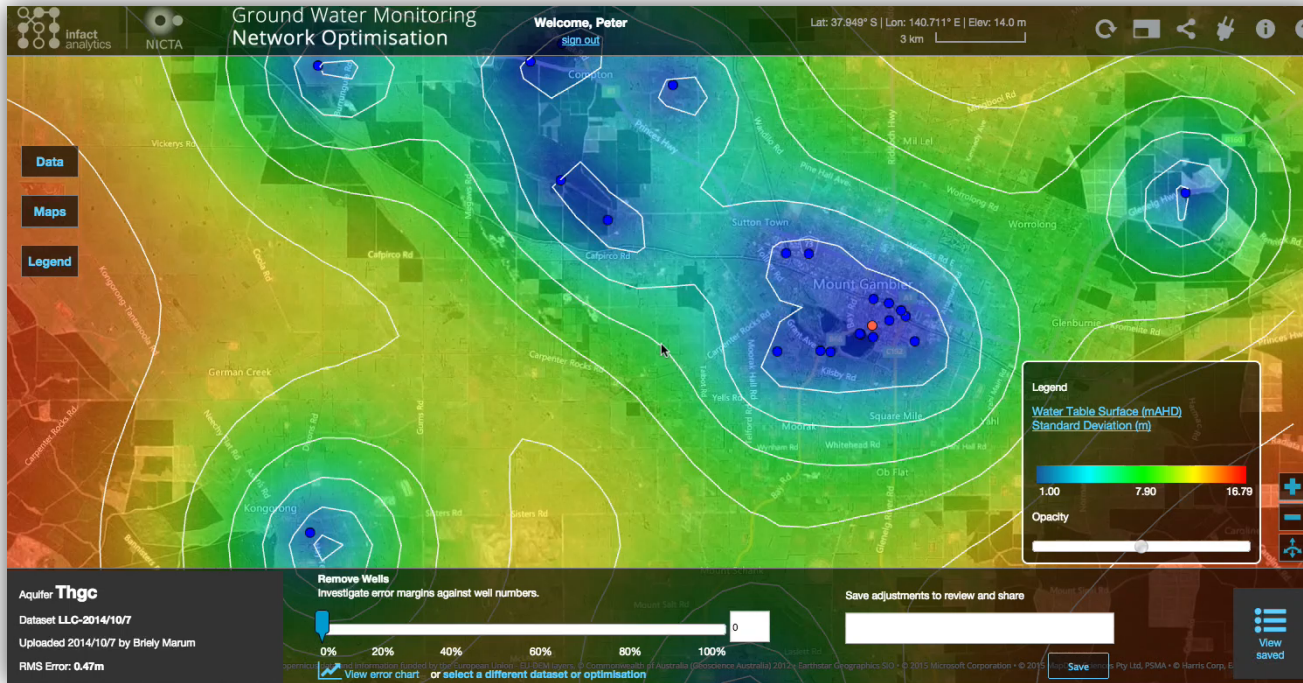
Policy issue

Accessing and making sense of open Government data

nationalmap.gov.au

Environmental Management

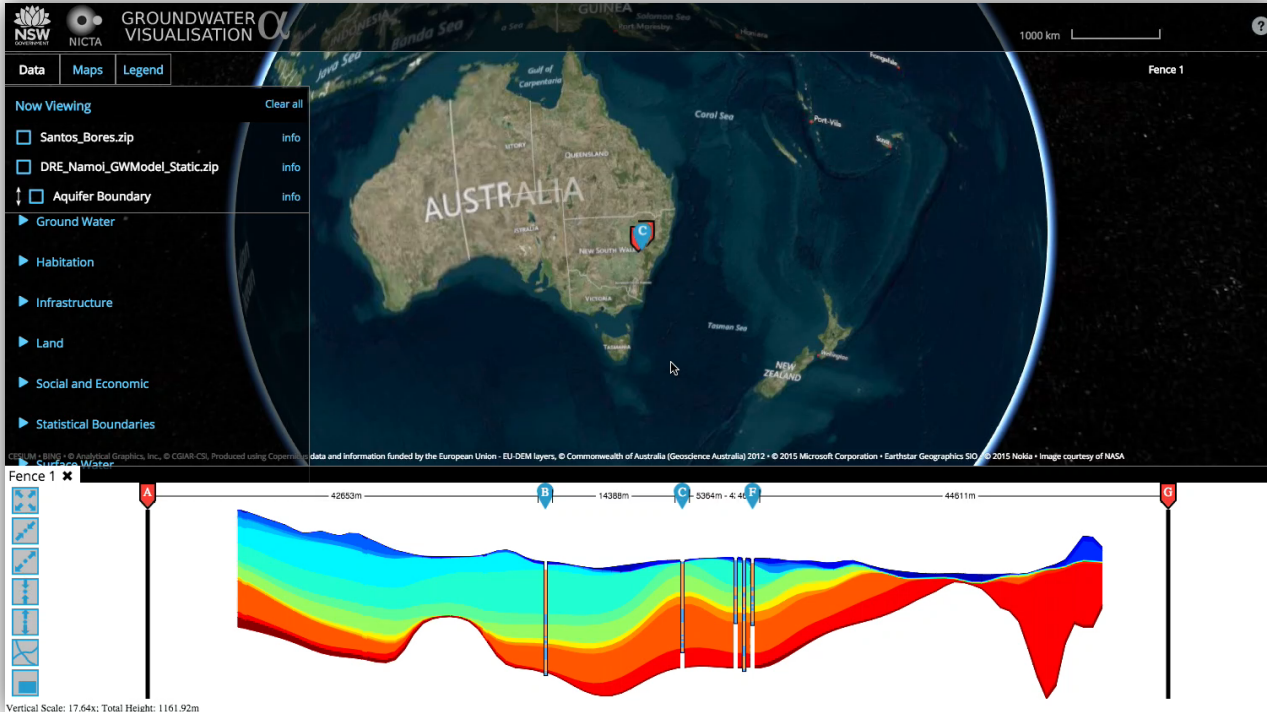
Groundwater Monitoring



Project client
South Australian
Government, Australia
Collaborators
University of Sydney
NICTA capability
Machine learning
Terria visualisation platform
Rapid software innovation
Policy issue
Groundwater sensor network
evaluation and design for cost
effective monitoring

Environmental Management

Groundwater Impacts



Project client

NSW Government, Office of Agricultural Sustainability and Food Security

Collaborators

- NSW Office of Water
- NSW Resources and Energy
- University New South Wales

NICTA capability

Machine learning

Terria visualisation platform

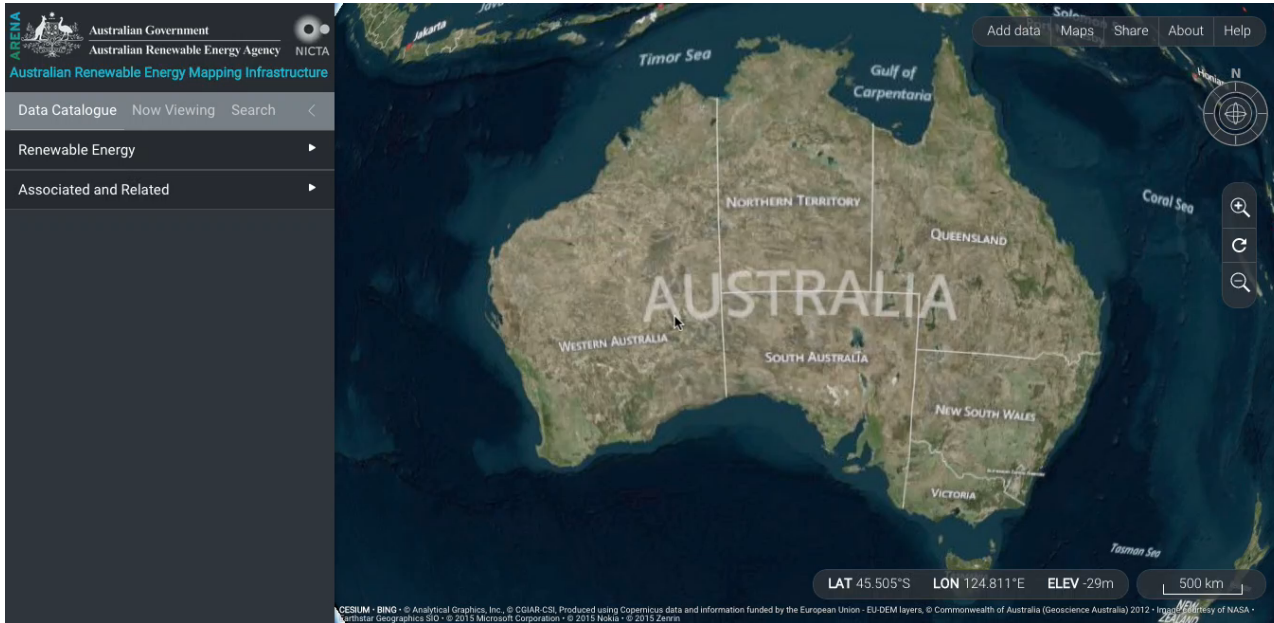
Rapid software innovation

Policy issue

Quantifying coal seam gas extraction impacts to groundwater systems

Spatial Discovery

Australian Renewable Energy Mapping Infrastructure (AREMI)



Project client

Australian Renewable Energy Agency

NICTA capability

Machine learning

Terria visualisation platform

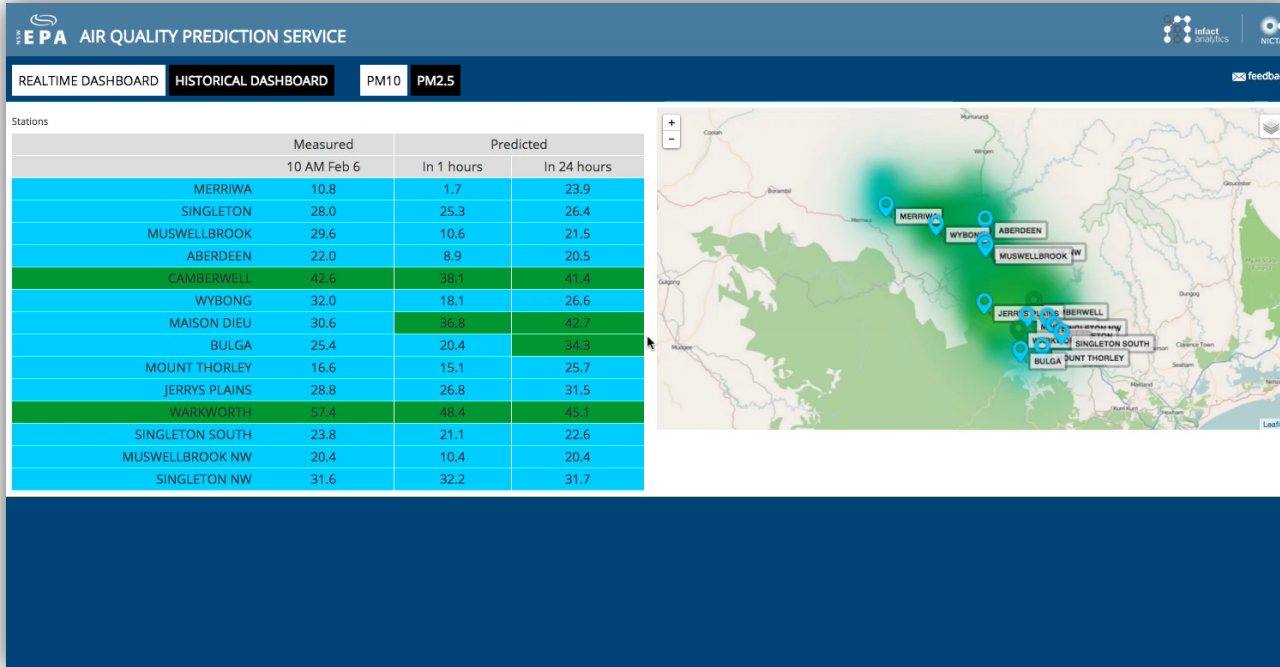
Rapid software innovation

Problem addressing

Web-based spatial data infrastructure to provide open access to Australia's past, present and and future renewable energy data

aremi.nicta.com.au

Environmental Management Air Quality Prediction Service



Project Client

NSW Government,
Environment Protection
Authority

NICTA Capability

Machine learning,
Rapid software innovation

Collaborators

University of Sydney

Policy issue

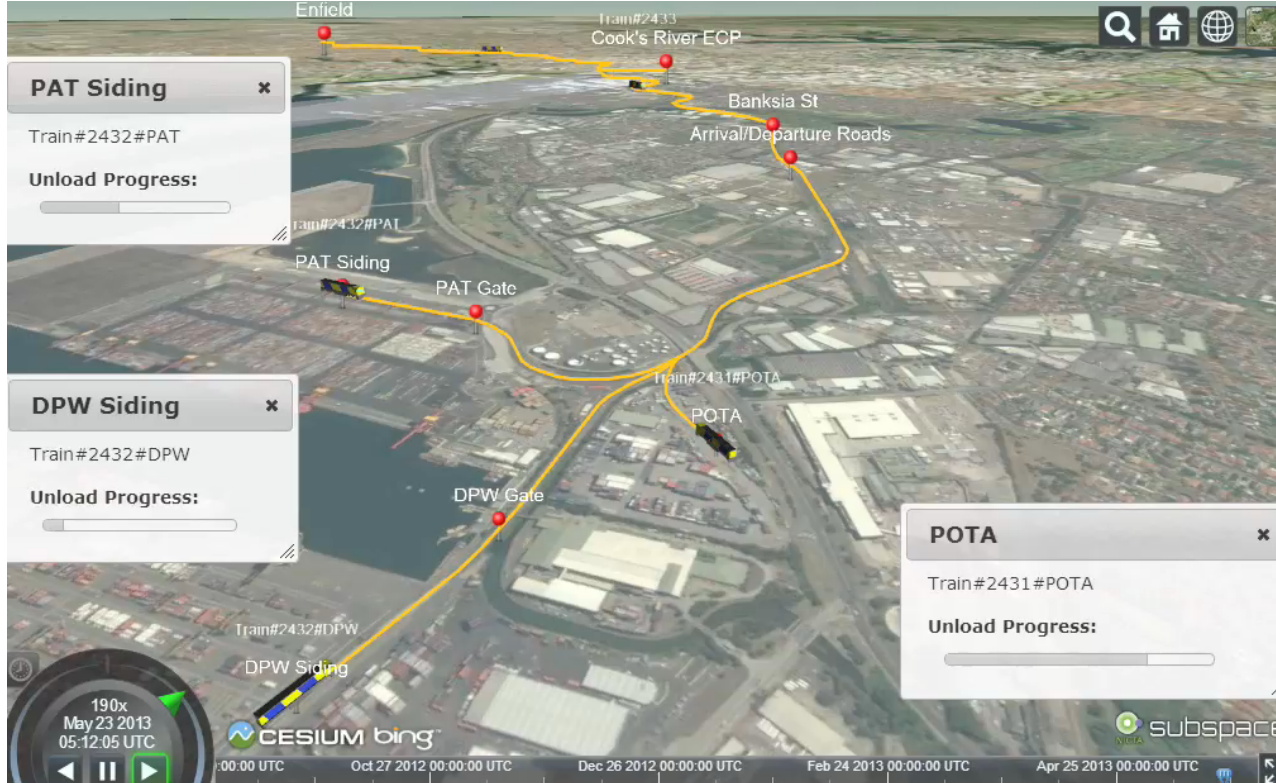
PM10 and PM2.5 pollution
from coal mining becoming a
community health concern

Project summary

Hosted real-time analytics
service for air quality providing
1-24 hour forecasts

Infrastructure Management

Port Optimisation



Project client

New South Wales
Government Australia

NICTA capability

Terria visualisation
platform

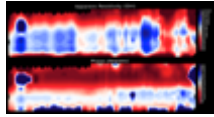
Rapid software innovation
Optimisation

Policy Issue

Determining infrastructure
upgrade for Sydney's major
sea port

Natural Resource Management

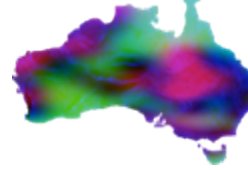
Large Scale Data Fusion



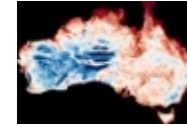
Magnetotellurics



Seismic

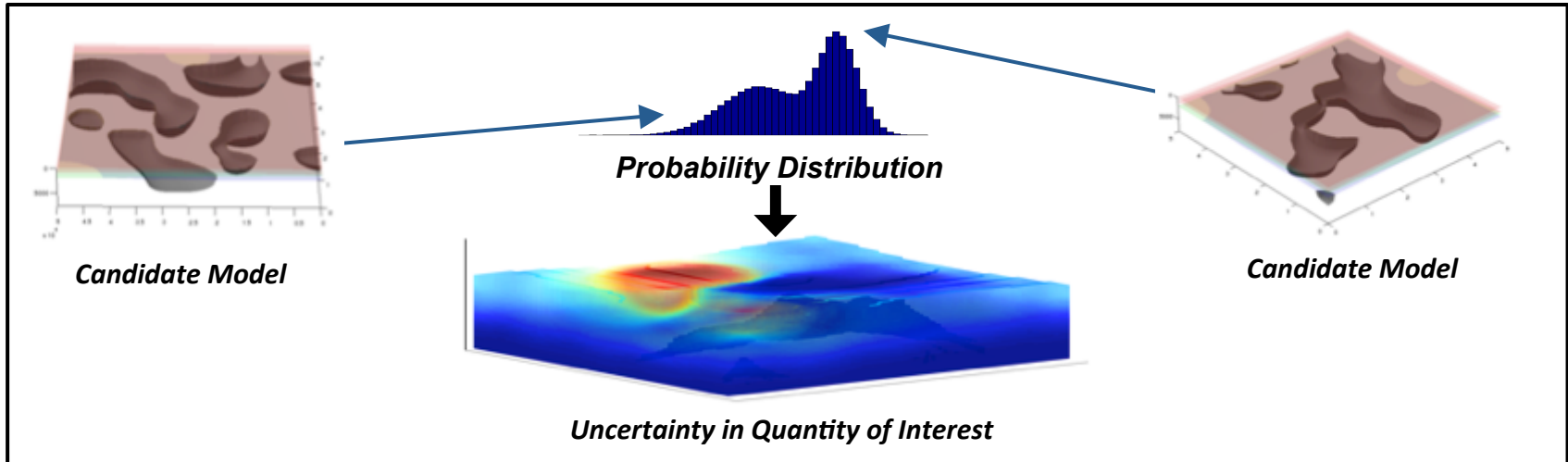


Temperature



Gravity

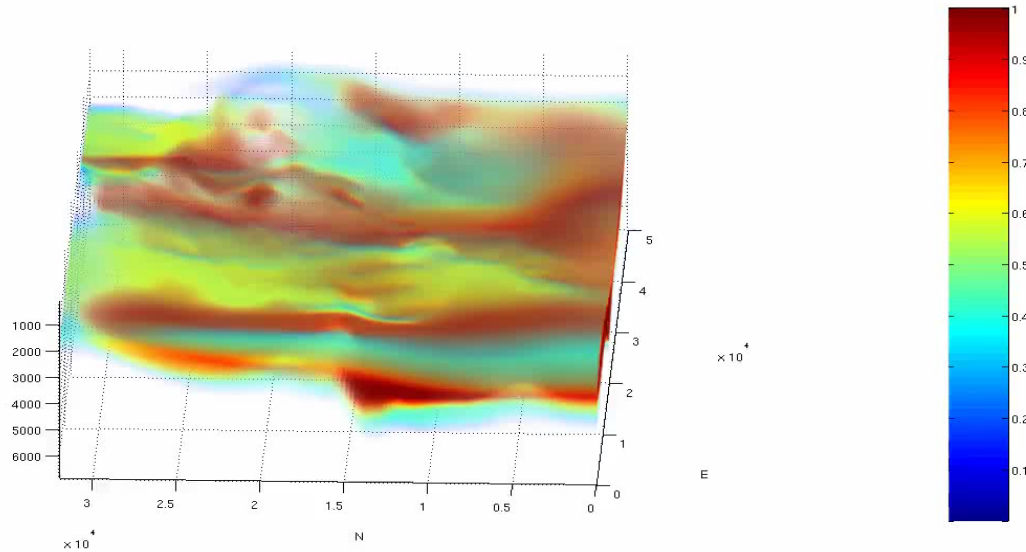
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Decision Support

Natural Resource Management

Geological Characterisation



Project client

Victorian Government, Australia
Geological Survey Victoria

Collaborators

Hot Rock Ltd
University of Melbourne
University of Sydney
University of Adelaide
Australian National University

NICTA capability

Machine learning

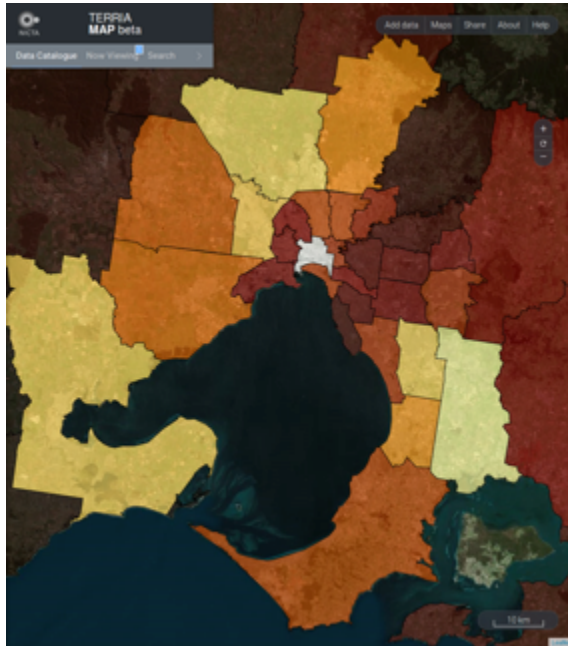
Policy issue

Probability of presence of hot sedimentary aquifers for geothermal energy

Probability of Pretty Hill Formation versus Location

Spatial Detailing

Crime statistics analysis

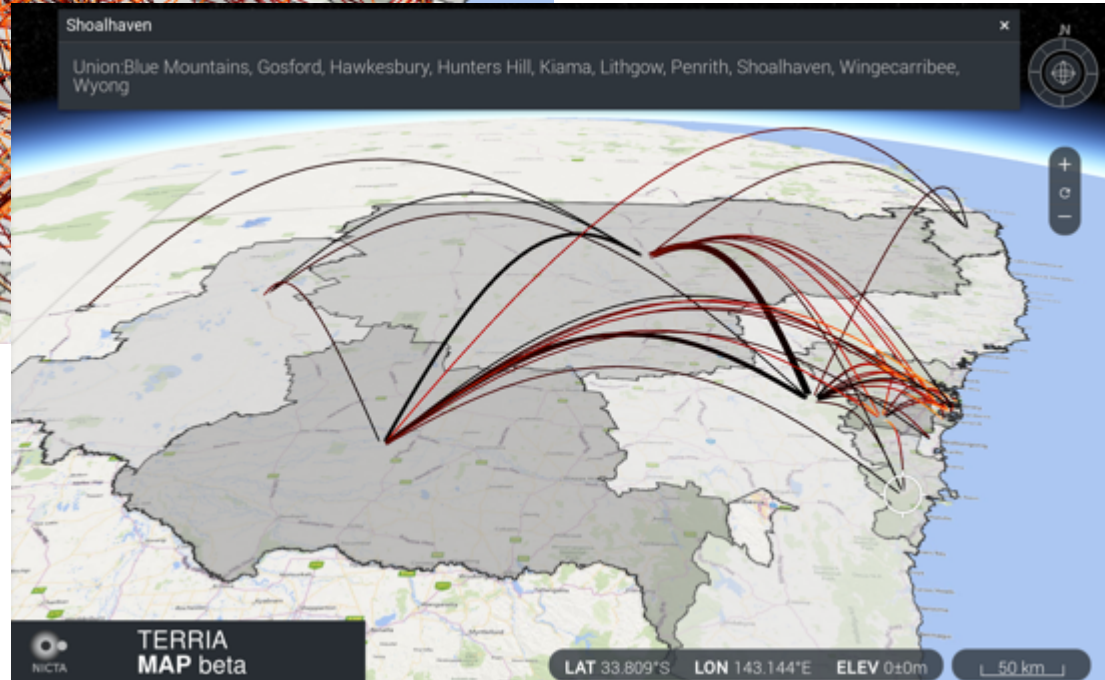
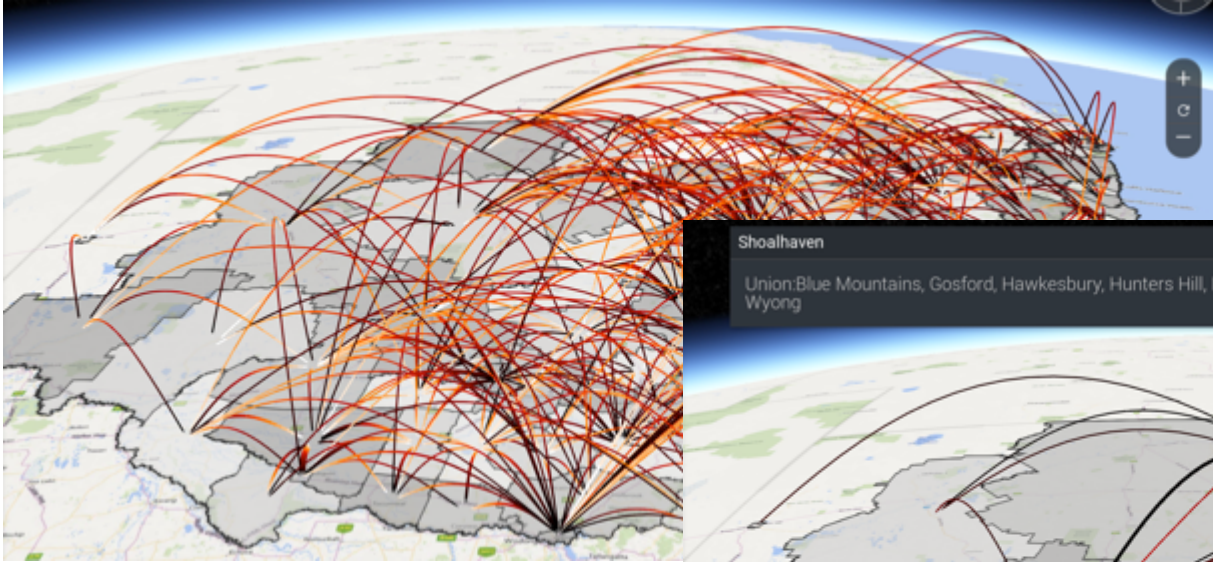


Spatial detailing:
Taking available data at
a coarse spatial
distribution and fusing
related datasets at a
higher resolution to
infer statistical
relationships to
estimate original in
higher detail



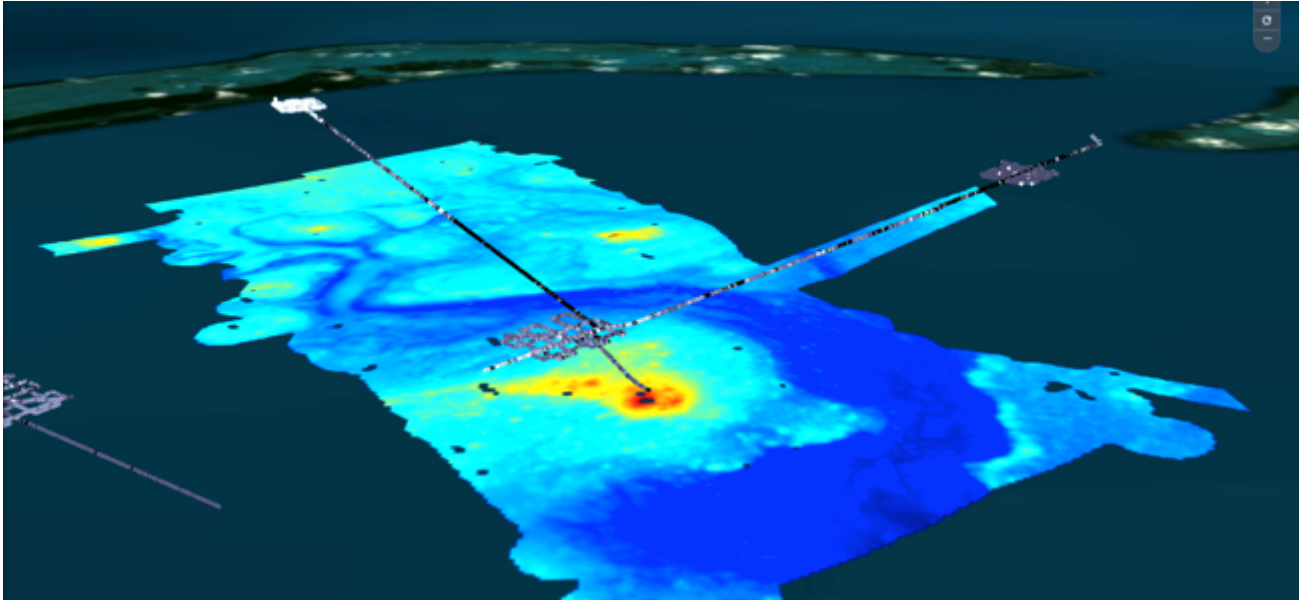
Spatial Community Discovery

Population migration trends



Complex datasets time consuming to analyse for domain experts – machine learning approach to summarise objectively

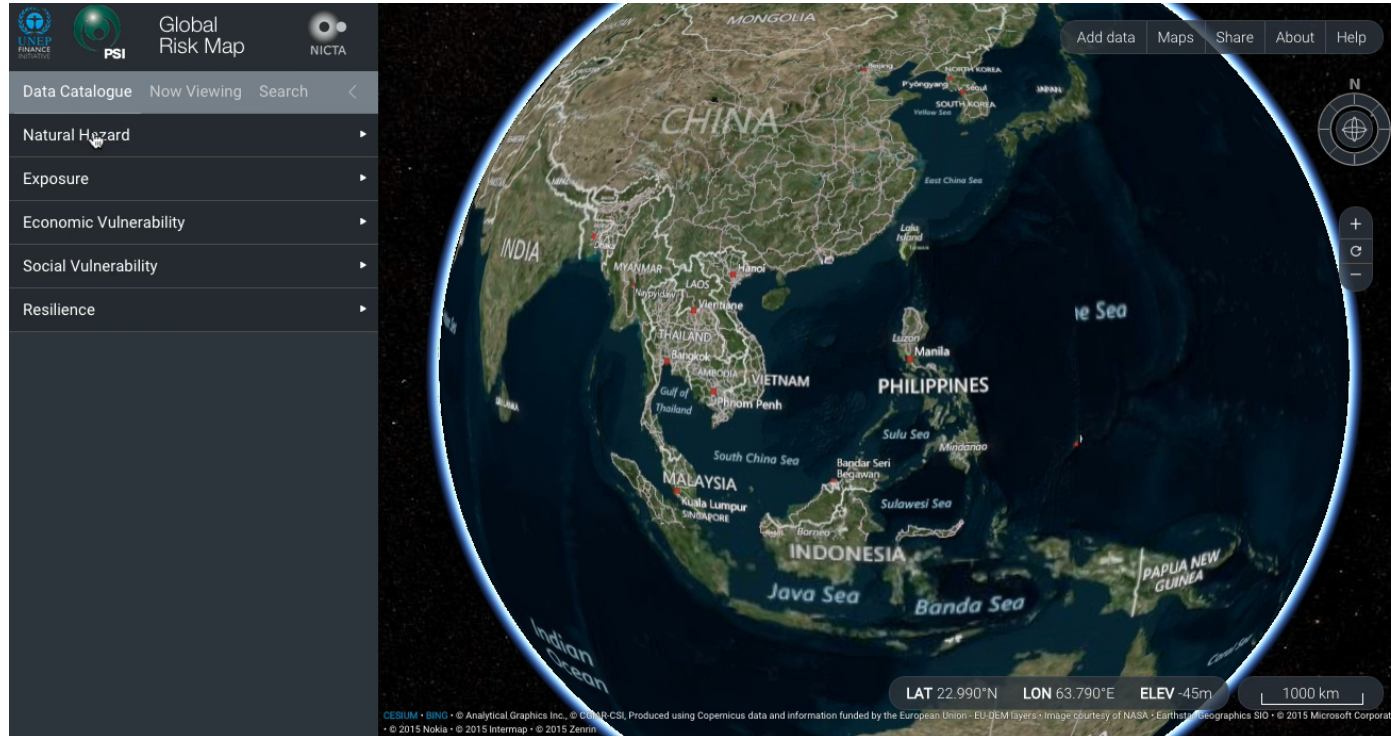
Spatial Prediction/Active Sampling Habitat modelling



Fusing known bathymetry data with vehicle acquired imaging to produce a probabilistic habitat model while planning future AUV vehicle tracks to maximally reduce model uncertainty

Spatial Analytics

Global Disaster Resilience



Insurance Australia Group (IAG) led Global Resilience Project under the UN-endorsed Principles for Sustainable Insurance (PSI) initiative to deepen the understanding of disaster risk reduction globally to help governments, businesses, NGOs and communities in vulnerable areas manage the risks they face and reduce impacts.



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