
**Understanding Risk Forum**
**Cape Town, June 3rd 2012**

# *Crowdsourcing Earthquake Data*

*Open-source tools developed within the scope of GEM*

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## The Project

The tool is called **Faulted Earth**,
It is part of the **OpenQuake** Platform,
which is being developed by **GEM**.

**Check out our booth!**

## The Project

The GEM Foundation is a public-private partnership that drives a collaborative effort aimed at developing and deploying tools and resources for earthquake risk assessment worldwide.

Hundreds of organisations and individual experts, professionals and practitioners are working together on uniform global databases, methodologies, tools and open-source software.

**Check out our booth!**

## The OpenQuake Platform

OpenQuake is a tool that allows users to model, calculate earthquake hazard and risk, explore earthquake hazard and risk by looking at maps, indicators and curves, capture and integrate new data, and finally use decision-making support tools that help users manage risk.

**Again, check out our booth!**

## The Faulted Earth Tool

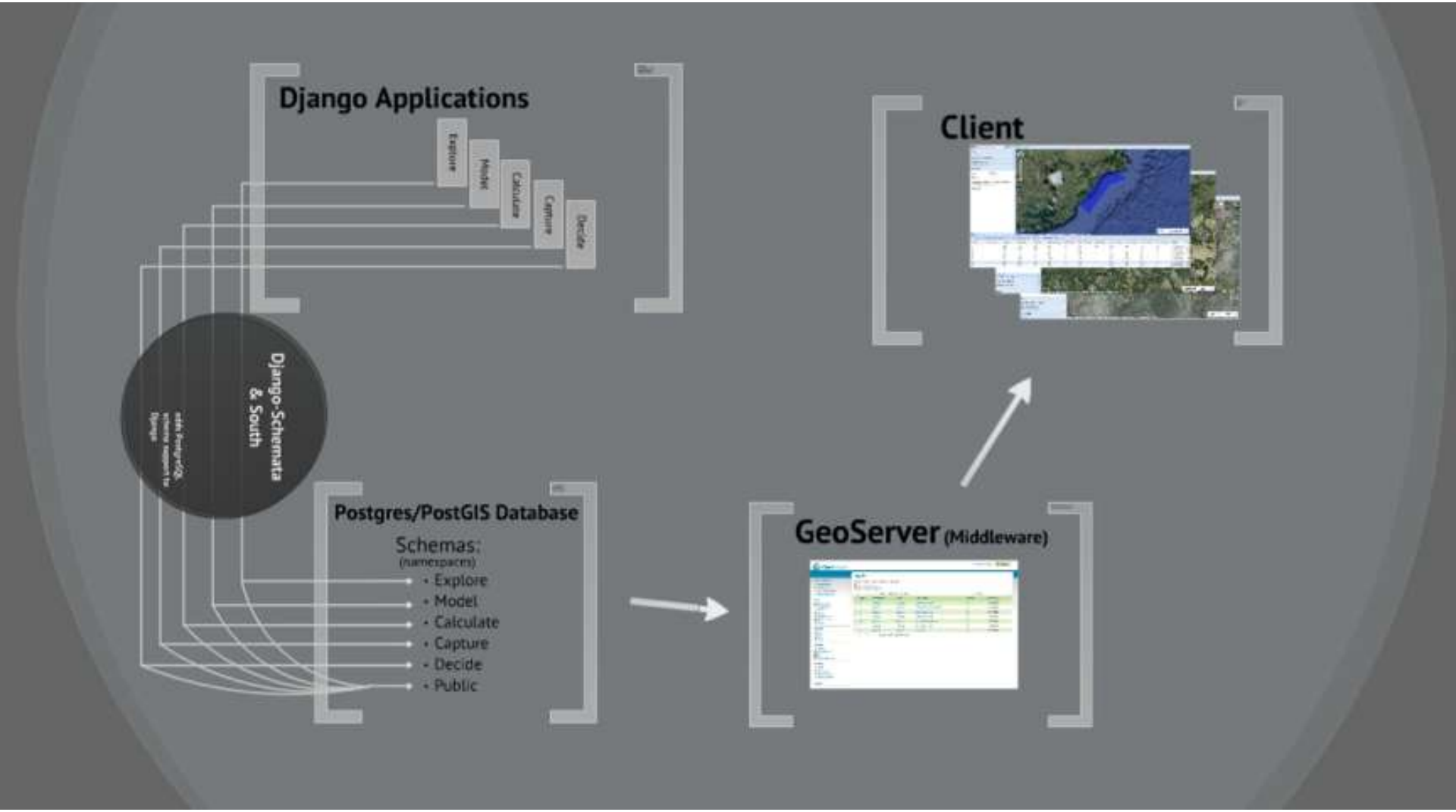
We are using GeoNode.

*“GeoNode is a platform for the management and publication of geospatial data”*

The GeoNode stack:

- **OpenLayers**
- **GeoServer**
- **Postgres/PostGIS**
- **Django**

# The OpenQuake Platform



## The Faulted Earth Tool

The tool is used to capture fault information and then to generate a fault source.

GEM is interested in capturing fault information in order to construct seismogenic sources in PSHA (Probabilistic Seismic Hazards Assessment) models to be used in hazard assessment.

# OPENQUAKE – FAULTED EARTH

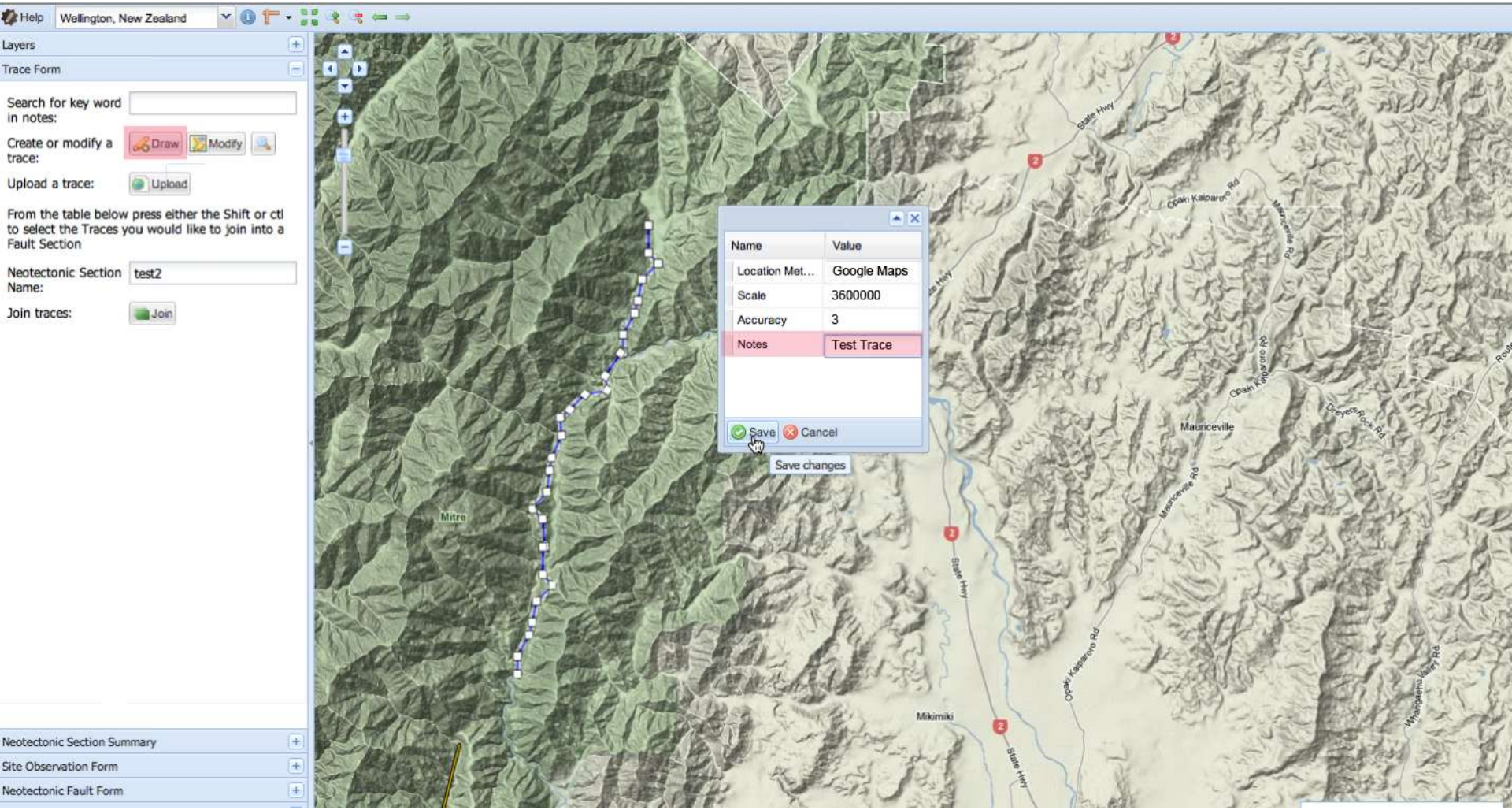
## Map-centric layout


Trace Grid | **Neotectonic Section Summary Grid** | Site Observations Grid | Fault Grid | Fault Source Grid

| Fault Section Na... | Length Min | Length Max | Length Pref | Strike (...°) | Episodic behavi... | Episodic behavi... | Upper seismoge... | Upper seismoge... | Upper seismoge... | Upper seismoge... | Lower seismoge... | Lower seismoge... | Lower seismoge... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| joined fault | | | | | | | | | | | | | |
| Ohariu South | | | | | | | 0.0 | 0.0 | 0.0 | 1.0 | 12.0 | 18.0 | 15.0 |
| Ohariu North | | | | | | | 0.0 | 0.0 | 0.0 | 1.0 | 12.0 | 18.0 | 15.0 |
| Joined junk fault | 2.0 | 5.0 | 4.0 | 15 | | | 0.0 | 0.0 | 0.0 | 2.0 | 15.0 | 20.0 | 17.5 |

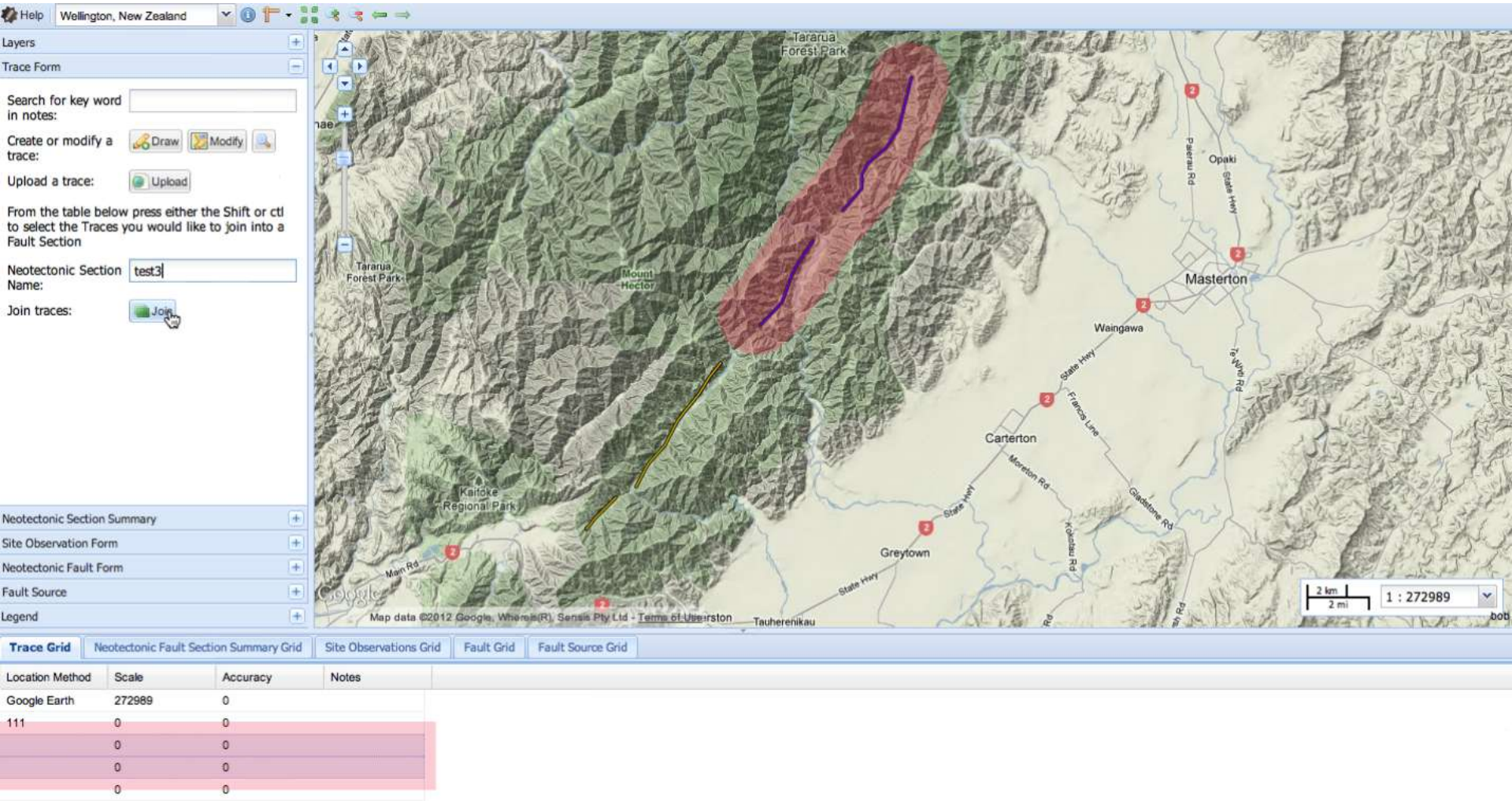
# OPENQUAKE – FAULTED EARTH

Digitize polylines & add attributes



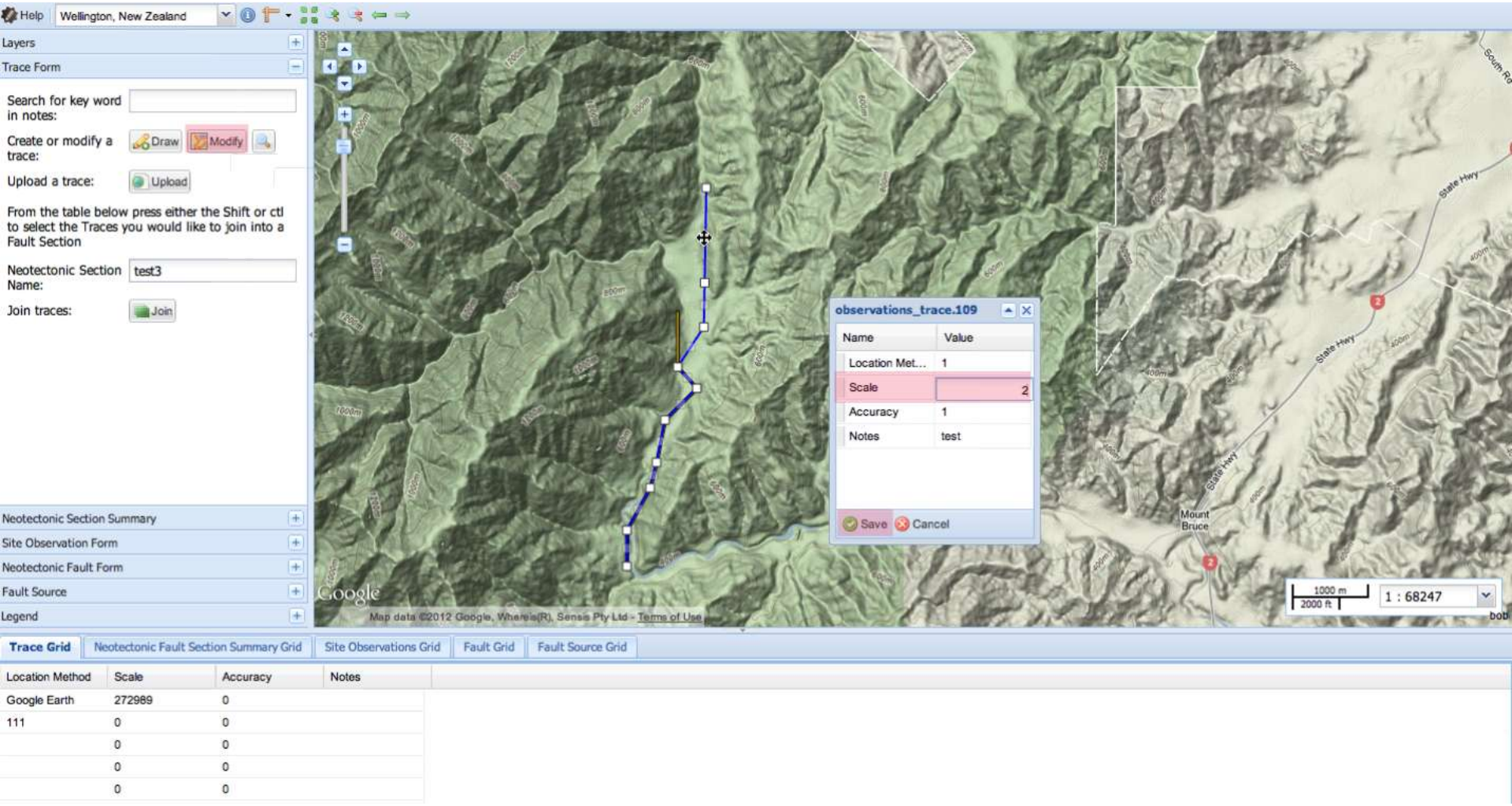
# OPENQUAKE – FAULTED EARTH

Select records and join



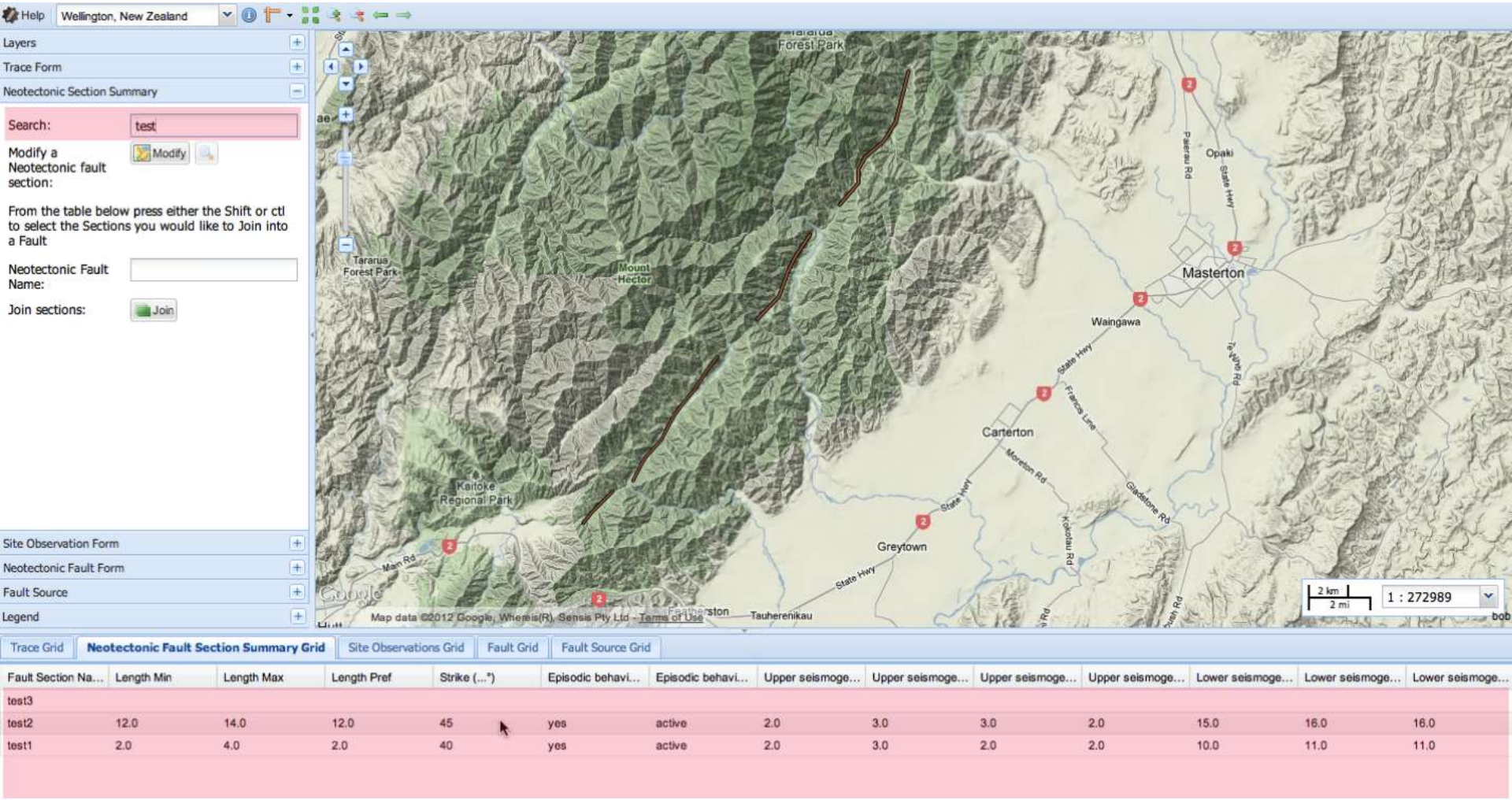
# OPENQUAKE – FAULTED EARTH

Modify existing records & change the geometry



# OPENQUAKE – FAULTED EARTH

Filter for records by record name (or any attribute)

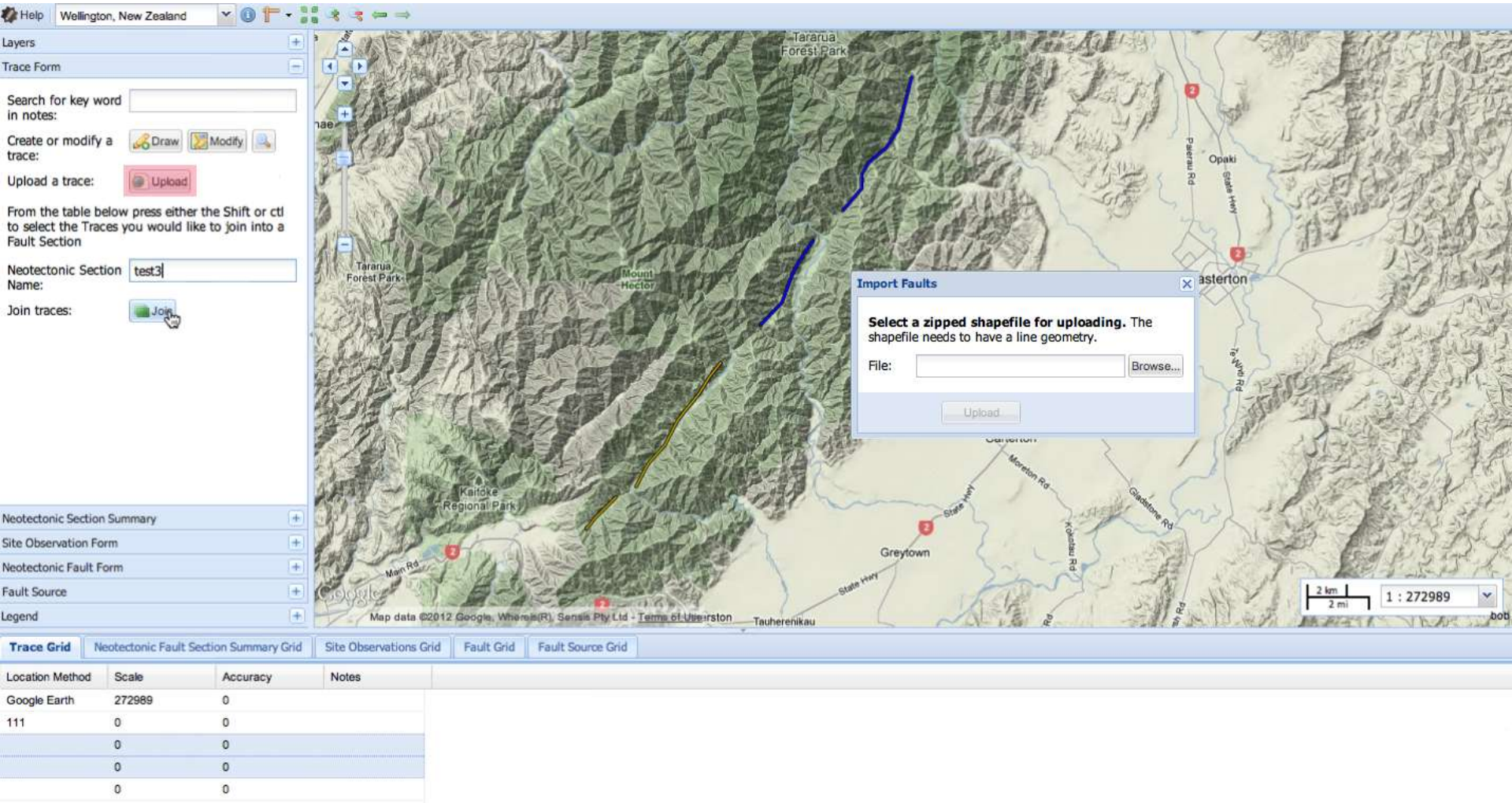



Trace Grid | **Neotectonic Fault Section Summary Grid** | Site Observations Grid | Fault Grid | Fault Source Grid

| Fault Section Na... | Length Min | Length Max | Length Pref | Strike (...°) | Episodic behavi... | Episodic behavi... | Upper seismoge... | Upper seismoge... | Upper seismoge... | Upper seismoge... | Lower seismoge... | Lower seismoge... | Lower seismoge... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| test3 | | | | | | | | | | | | | |
| test2 | 12.0 | 14.0 | 12.0 | 45 | yes | active | 2.0 | 3.0 | 3.0 | 2.0 | 15.0 | 16.0 | 16.0 |
| test1 | 2.0 | 4.0 | 2.0 | 40 | yes | active | 2.0 | 3.0 | 2.0 | 2.0 | 10.0 | 11.0 | 11.0 |

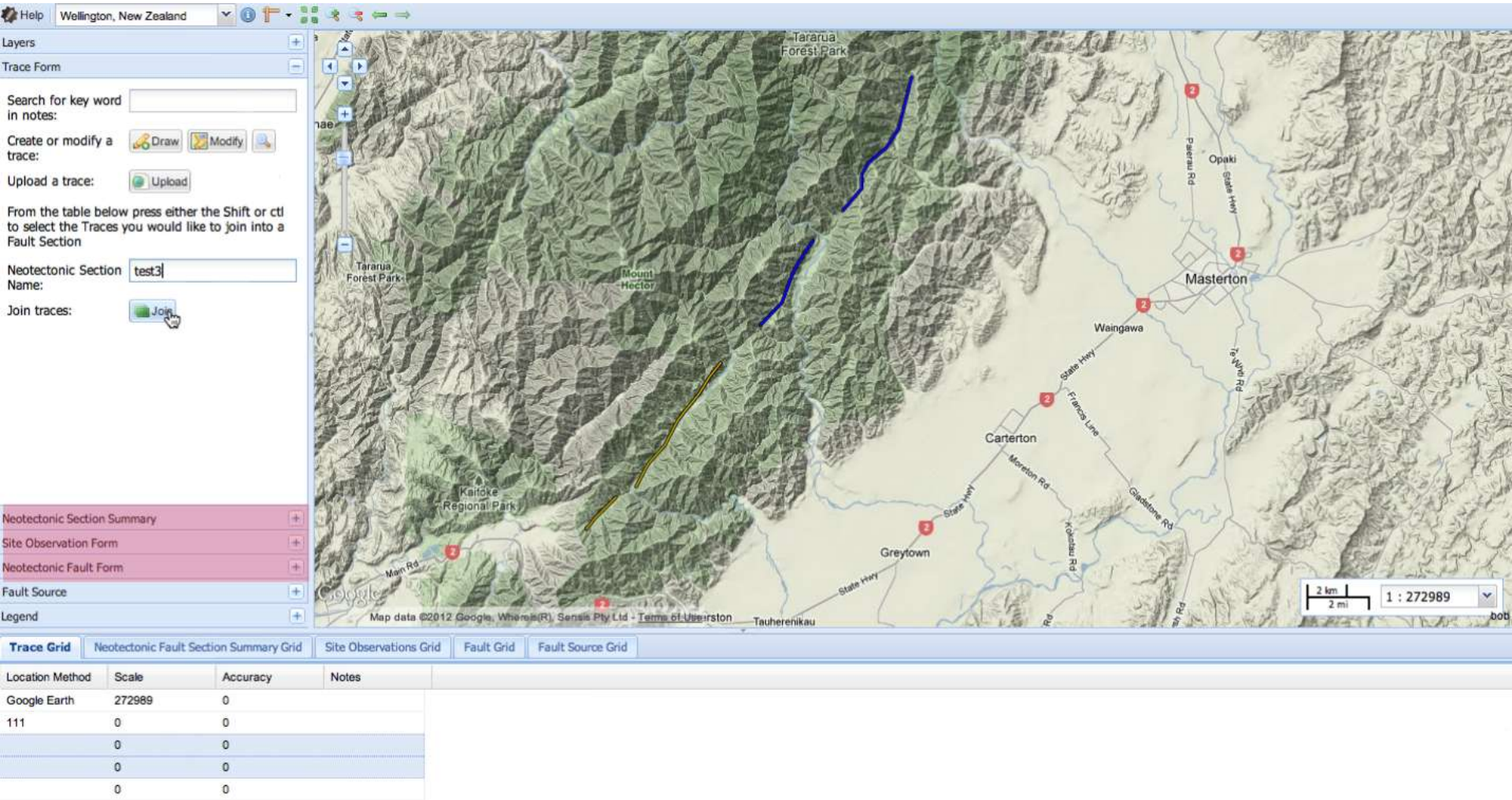
# OPENQUAKE – FAULTED EARTH

## Upload features



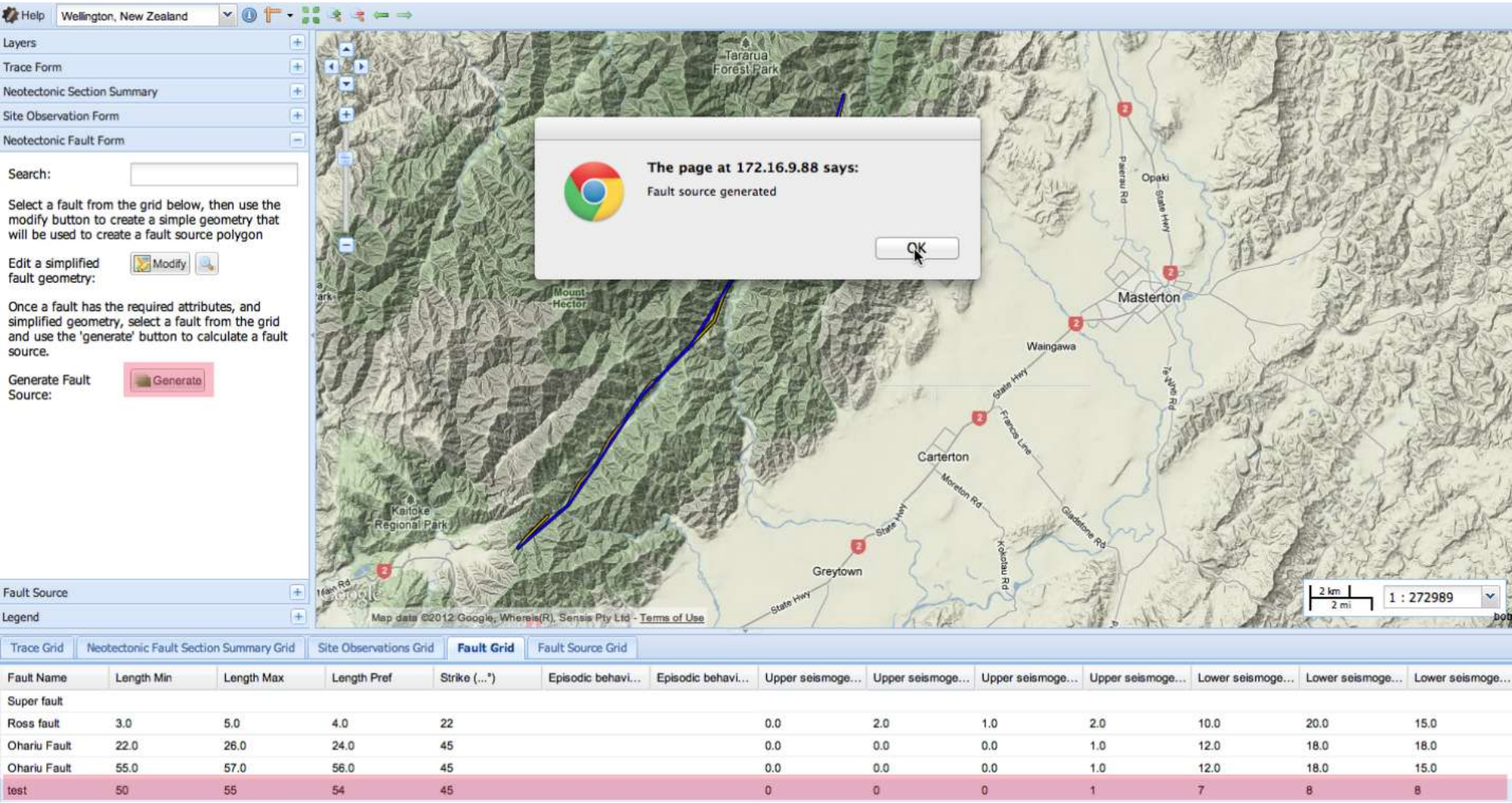
# OPENQUAKE – FAULTED EARTH

## The workflow



# OPENQUAKE – FAULTED EARTH

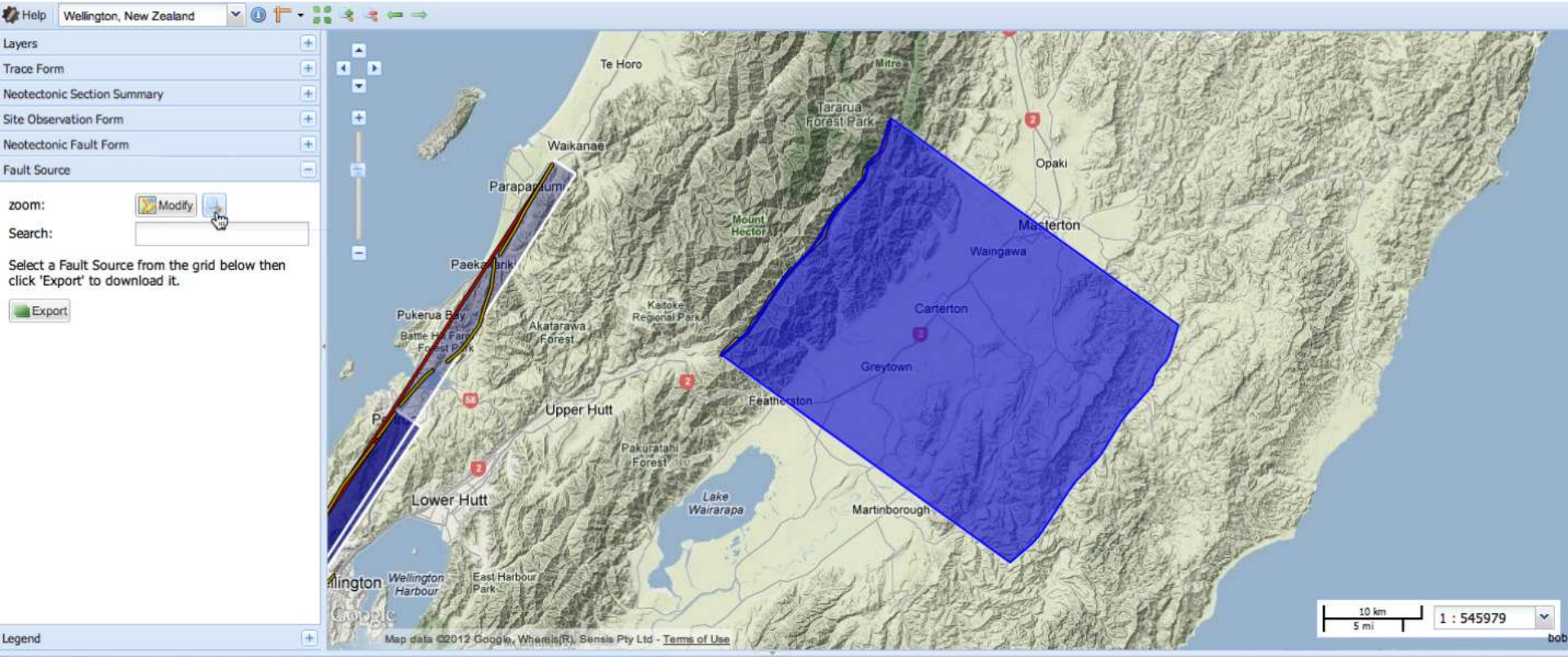
## Generate a fault source




| Fault Name | Length Min | Length Max | Length Pref | Strike (...°) | Episodic behavi... | Episodic behavi... | Upper seismoge... | Upper seismoge... | Upper seismoge... | Upper seismoge... | Lower seismoge... | Lower seismoge... | Lower seismoge... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Super fault | | | | | | | | | | | | | |
| Ross fault | 3.0 | 5.0 | 4.0 | 22 | | | 0.0 | 2.0 | 1.0 | 2.0 | 10.0 | 20.0 | 15.0 |
| Ohariu Fault | 22.0 | 26.0 | 24.0 | 45 | | | 0.0 | 0.0 | 0.0 | 1.0 | 12.0 | 18.0 | 18.0 |
| Ohariu Fault | 55.0 | 57.0 | 56.0 | 45 | | | 0.0 | 0.0 | 0.0 | 1.0 | 12.0 | 18.0 | 15.0 |
| test | 50 | 55 | 54 | 45 | | | 0 | 0 | 0 | 1 | 7 | 8 | 8 |

# OPENQUAKE – FAULTED EARTH

## The final product




Trace Grid | Neotectonic Fault Section Summary Grid | Site Observations Grid | Fault Grid | **Fault Source Grid**

| Fault ID | Fault Name | Fault Source Na... | Length Min | Length Max | Length Pref | Upper seismoge... | Upper seismoge... | Upper seismoge... | Upper seismoge... | Lower seismoge... | Lower seismoge... | Lower seismoge... | Lower seismoge... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | Ross fault | | 3.0 | 5.0 | 4.0 | 0.0 | 2.0 | 1.0 | 2.0 | 10.0 | 20.0 | 15.0 | 2.0 |
| 3 | Ohariu Fault | | 22.0 | 26.0 | 24.0 | 0.0 | 0.0 | 0.0 | 1.0 | 12.0 | 18.0 | 18.0 | 2.0 |
| 3 | Ohariu Fault | | 22.0 | 26.0 | 24.0 | 0.0 | 0.0 | 0.0 | 1.0 | 12.0 | 18.0 | 18.0 | 2.0 |
| 3 | Ohariu Fault | | 22.0 | 26.0 | 24.0 | 0.0 | 0.0 | 0.0 | 1.0 | 12.0 | 18.0 | 18.0 | 2.0 |
| 4 | Ohariu Fault | | 55.0 | 57.0 | 56.0 | 0.0 | 0.0 | 0.0 | 1.0 | 12.0 | 18.0 | 15.0 | 2.0 |

## Why GeoNode?

OpenLayers + GXP

Django – User authentication & authorization (LDAP compatible)

- gxp.plugins
  - gxp.plugins.AddLayers
  - gxp.plugins.BingSource
  - gxp.plugins.CSWCatalogueSource
  - gxp.plugins.CatalogueSource
  - gxp.plugins.ClickableFeatures
  - gxp.plugins.DeleteSelectedFeatures
  - gxp.plugins.FeatureEditor
  - gxp.plugins.FeatureEditorForm
  - gxp.plugins.FeatureEditorGrid
  - gxp.plugins.FeatureGrid
  - gxp.plugins.FeatureManager
  - gxp.plugins.FeatureToField
  - gxp.plugins.GeoNodeCatalogueSource
  - gxp.plugins.GeoServerStyleWriter
  - gxp.plugins.GoogleEarth
  - gxp.plugins.GoogleGeocoder
  - gxp.plugins.GoogleSource
  - gxp.plugins.LayerManager
  - gxp.plugins.LayerProperties
  - gxp.plugins.LayerSource
  - gxp.plugins.LayerTree
  - gxp.plugins.Legend
  - gxp.plugins.LoadingIndicator
  - gxp.plugins.MapBoxSource
  - gxp.plugins.MapProperties
  - gxp.plugins.MapQuestSource

## GeoNode wish list

If we could dream for a moment… we would love to see

- Federation
- Data revision control
- More documentation
- Mobile device integration

## Pros & Cons

Pros

- Lots of ‘out of the box widgets’ to make your life easy
- It’s all open source & has a great community!
- Robust tool with a lot of capabilities
- Scalability
- It’s web based

Cons

- It’s web based
- Customization comes with a cost

Thank you, please come talk to us at our booth and don't forget to check out our projects at openquake.org