

The seismic catalog

Back to 1964, the seismic catalog is more-or-less complete to M4, ~M5 to 1940 and ~M6 prior to that.

Please use only the quakesearch

<http://magma.geonet.org.nz/quakesearch/>

for downloading data from prior to 2012. Geonet is in transition to a new operational system and there is currently a break in the catalogue at Jan 2012.

So:

- 1) Quakesearch gives the most up-to-date catalogue for pre 2012 and does not contain the most recent earthquakes
- 2) Webservice contains post Jan 2012 earthquakes. It will also provide earthquakes pre-Jan 2012 BUT this catalogue is out of date and many new events have been added and changes have been made.

Depth control is very bad in the catalogue. We just focus on the top 40km and then ignore depth, as done in CSEP.

The depth control for the Canterbury sequence is good (in case it is needed for calculations).

The completeness analysis can be made directly by each single researcher.

The background seismicity model

Some model wants to estimate the background by itself, other models may accept a background coming from other sources (i.e., hazard map).

Matt offers to create a smoothed seismicity model, but he would like to know exactly what you want. Matt can also provide the smoothed seismicity model from the NSHM or a gridded version of the NSHM (gridded faults).

Other parameters

- Seismic source parameters (including slip distributions) for the critical-major events. These data will be available at the time we got it (https://dl.dropboxusercontent.com/u/51584618/slip_models.txt)
- Afterslip model for the main event (Darfield). We have no model for this, but some indications seems to suggest that there was little/no afterslip.
- Map of faults. All the known faults will be represented in a grid. In case, there is the possibility to have a map of faults from New Zealand colleagues.
- Relevant information of stressing rates or loading rates of the faults. GPS def rates are the best that NZ colleagues have at the moment. But this is something needed for other work, so, depending on time frames it may be available.
- slip models of major aftershocks, or alternatively their focal mechanisms; Slip models are available for 5 or 6 events >~M6, focal mechs down to about M3.4
- regional stress field; ok (ask to Matt Gerstenberger)
- catalog of past focal mechanisms in the area. In the past 50 years, there were 10 M>4 in the region. Matt is checking if focal mechs are available for those.

Rules of the game

- spatial grid used by CSEP New Zealand
 - .05 degree
 - We need to find the grid we are using for the work with Sandy and will get that to you but is roughly a 2.5 degree square grid around Christchurch
 - Top 40km treated uniformly
- Forecasting window of 1 week, 1 month, 1 year
- Magnitude bin (4-5, 5-6, 6+)
- Starting period immediately after Darfield.
- Each model has to provide the number of earthquakes for each space-time-magnitude bin
- Each model can be use only data available before the date of the forecast
- The whole time period starts with Darfield and ends with the present.

Submitting the models to the testing center

All models have to be run in a CSEP testing center; the codes have to be sent to Masha Liukis (liukis@usc.edu) who is the person that will help us to set the codes running in the testing center.

CSEP is using grid templates files in XML format. Examples of templates used by the SCEC testing center are described and can be downloaded at <http://northridge.usc.edu/trac/csep/wiki/ForecastTemplates>.

Ideally, each model should generate forecast file in XML format by populating "master" XML template for the experiment with it's rates. In a case when model generates ASCII format of the forecast file (RELM-like forecasts), then CSEP can populate "master" XML template with the information provided by the ASCII forecast file. An example of master XML template for 0.1 degree grid with $M \geq 3.95$ bins as it is defined and used by the NZ testing center for ongoing experiments can be downloaded at <https://dl.dropboxusercontent.com/u/51584618/NZM4Template.tar.gz>

We follow the same model submission requirements as we use them within CSEP testing center at SCEC, adjusting these requirements for this specific experiment (data source and other experiment specifics). The requirements are posted at <http://northridge.usc.edu/trac/csep/wiki/CSEPModelRequirements>.

The idea is for the modelers to install and compile, if appropriate, their codes on the CSEP server, and to provide a set of input data and any control parameters to invoke their model to generate expected forecast. This way we can easily verify that their model is working as expected when propagated to the "operational" testing center by running an acceptance test for it: given fixed data and parameters, it always generates expected forecast.