Australian Government
Geoscience Australia

The Australian Neotectonic Features Database: Factsheet

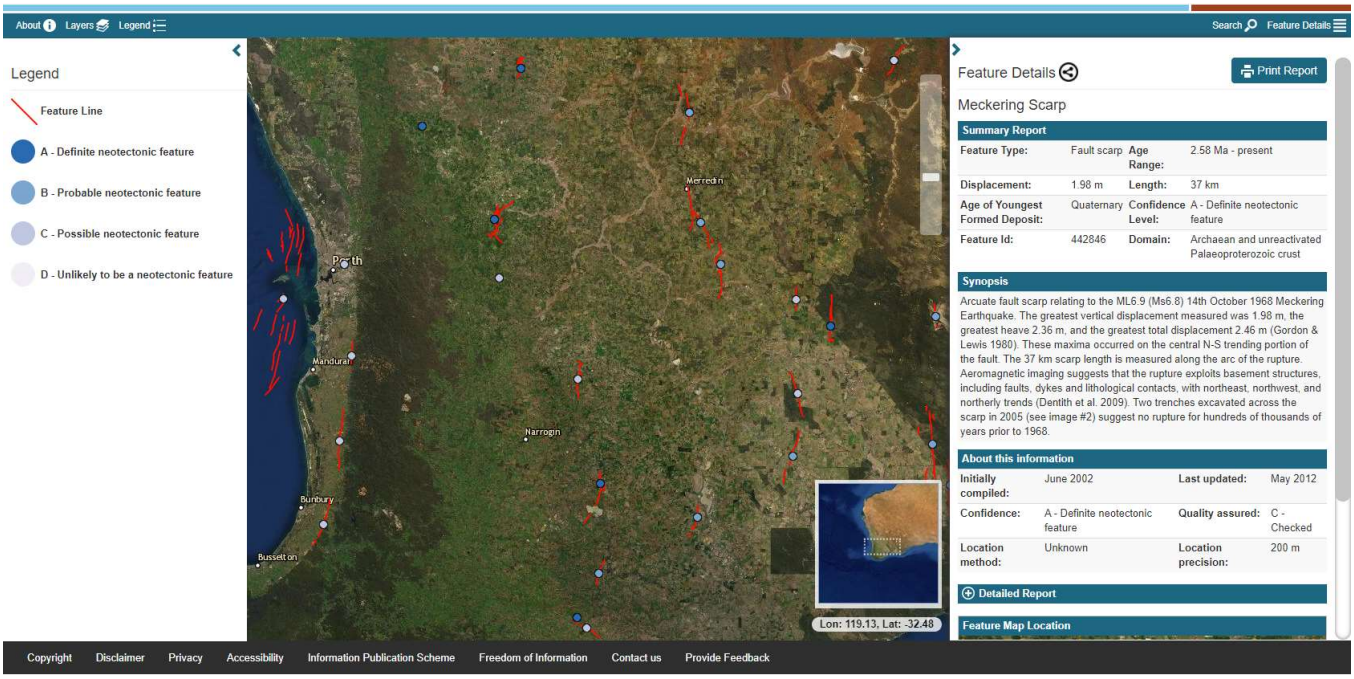

Figure 1: User interface for the Australian Neotectonic Features Database.

The Australian Neotectonic Features Database (NFD) hosts an inventory of over 370 Australian intraplate faults, fault-related folds, and other features that are demonstrated or suspected to relate to earthquakes large enough to deform the Earth's surface (i.e., mostly M>6). These features are considered likely to have been the source of hazardous ground shaking during the period that the current crustal stress field has pertained, and so may pose a future hazard.

Neotectonic Faults and Folds

Structural and sedimentary evidence from southeast Australian basins suggests that the current crustal stress regime in Australia was established between 5 and 10 million years ago (Sandiford et al. 2004). Faults that have hosted seismogenic deformation within this period are herein termed ‘Neotectonic Faults’. Neotectonic faults are of interest for the purposes of seismic hazard assessment because they are demonstrated to be favourably oriented for future failure. The NFD comprises these faults, fault-related folds, and secondary structures relating to earthquake-induced ground deformation and ground shaking. A small number of features of ambiguous origin, or subsequently found not to relate to neotectonic deformation, are included for completeness.

The Database

Where known, the database includes information such as fault length, neotectonic displacement, fault orientation, sense of movement, slip-rate, and large earthquake recurrence data (Figure 1). A limited number of features have been the subject of paleoseismological investigation; the geologic investigation of pre-historic earthquakes. However, most of the features have been identified through geomorphic analysis of digital elevation data, and/or have not been the subject of detailed study (Clark et al. 2012). Because surface erosion and/or deposition acts to degrade earthquake-related topography with time, these landscape features are considered likely to reflect seismic events that have occurred in the last few tens of thousands to a hundred thousand years (Leonard and Clark 2011), and the data in general are of variable spatial completeness (Clark et al. 2016).

In order to recognise the uncertainty associated with the interpretation of each feature as a source of strong ground shaking, a confidence ranking system has been implemented ranging from A (best confidence) to D (least confidence) (Figure 1). The data for individual features are also flagged as quality assured or not. This distinguishes those entries that have been confirmed by field investigation.

Interface

The database can be browsed interactively in the main map window (Figure 1). A range of Base Maps can be selected from the Layers Panel to provide context for a feature of interest (Figure 2). To explore the NFD, click on a linear feature or a feature point to bring up details for that feature (Figure 1). The Share Feature button (⟨) copies a link for the feature to the clipboard, and the Print Report button (Print Report) produces a report of the data for that feature.

The Search function (Search) allows multiple records to be examined by selecting a State of interest or specifying an area of interest using the Draw tools. Searching with no selection returns all records in the database. Search results can be downloaded in a range of common formats for further analysis.

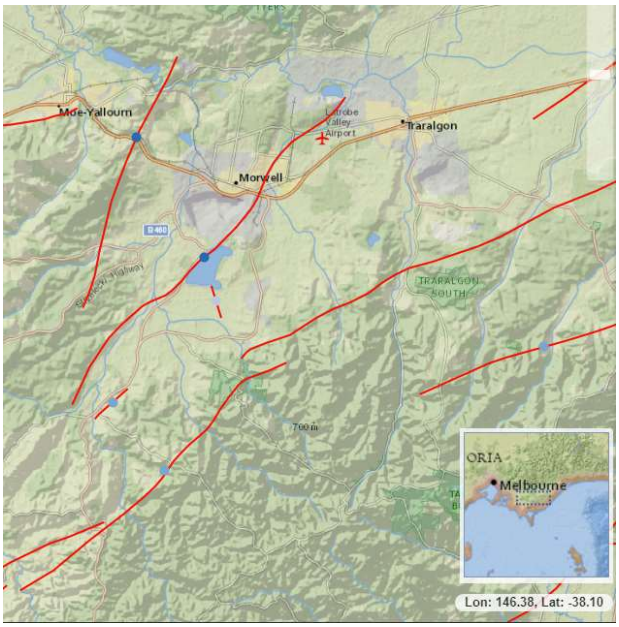

Figure 2: A selection of faults from the Latrobe Valley, Victoria, presented on the ARCGIS National Geographic base map.

Purpose and Uses

The database is designed to fulfil the needs of a broad group of users, ranging from the scientific and earthquake hazard assessment communities, to the general public. The database will allow scientific and technical professionals engaged in seismological and paleoseismological research to identify faults that have likely produced strong ground motion in the geologically recent past and that may contribute to future seismic hazards.

This dataset forms the basis for the Fault Source Model (FSM) used in the National Seismic Hazard Assessment 2018 (NSHA18, Allen et al. 2020), which is described in Clark *et al.* (2016), and can be accessed here (NSHA18 version, last updated March 2017):

https://github.com/GeoscienceAustralia/NSHA2018/tree/master/source_models/faults/FSM.

Further reading

ALLEN T. I., *et al.* 2020 The 2018 national seismic hazard assessment of Australia: Quantifying hazard changes and model uncertainties, *Earthquake Spectra*, pp. 1-37.

CLARK D., *et al.* 2016 Incorporating fault sources into the Australian National Seismic Hazard Assessment (NSHA) 2018. Australian Earthquake Engineering Society 2016 Conference, Nov 25-27. Melbourne, Vic.

CLARK D., MCPHERSON A. & VAN DISSEN R. 2012 Long-term behaviour of Australian Stable Continental Region (SCR) faults, *Tectonophysics,* vol. 566-567, pp. 1-30.

LEONARD M. & CLARK D. 2011 A record of stable continental region earthquakes from Western Australia spanning the late Pleistocene: Insights for contemporary seismicity, *Earth and Planetary Science Letters,* vol. 309, pp. 207-212.

SANDIFORD M., WALLACE M. & COBLENTZ D. 2004 Origin of the in situ stress field in southeastern Australia, *Basin Research,* vol. 16, pp. 325-338.

For further information:

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