South Australian Historical Earthquakes in the Pre-Instrumental Period 1837-1963: A Comprehensive Chronicle and Analysis of Available Intensity Data

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Abstract

Macroseismic data in the form of felt reports of earthquake shaking is vital to seismic hazard assessment, especially in view of the relatively short period of instrumental recording in many countries. During the early 1990s, a very detailed examination of historical earthquake records held in the State Government archives and the Public Library of South Australia was carried out by myself. This original work resulted in the compilation of a list of just over 460 earthquakes in the period prior to seismic network recording, which commenced in 1963, The majority of these events had escaped mention in any previous publication on South Australian seismicity and seismic risk. This historical earthquake research, including the production of a large number of isoseismal maps to enable earthquake quantification in terms of magnitude and location, appears to have been the only study of its kind in South Australia performed so comprehensively, and resulted in the most extensive list available. After 20 years, it still stands as the definitive list of historical earthquake events in the state. The incorporation of these additional historical events into the South Australian Earthquake Catalogue maintained by the SA Department of Primary Industries and Resources had the potential to raise the previous listing of just 49 pre-instrumental events to 511 earthquakes, and to extend it back another 46 years to 1837. Some of the major events have been formally included in the South Australian Earthquake Catalogue. However, for many events, there was insufficient information and/or time to finalise the source parameters due to the onerous task of manually trawling through historical records and newspapers for felt reports.

With the advent of the information age, researching historical newspapers and records is now a feasible undertaking. As an example, I recovered reports of an additional 110 previously unrecognised events during the first 50 years of colonisation from digitised South Australian newspapers, recently made available on the National Library of Australia's website called TROVE. This was done in a relatively short period of time and now the South Australian Historical Earthquake List incorporating these events comprises some 679 entries.

This thesis builds upon and consolidates the work that was commenced 20 years ago. By doing so, it proposes the establishment of flexible and convenient computerized processes to maintain well into the future an increasingly accurate record of historical earthquakes in South Australia. This work may also provide a model for the ongoing development of historical earthquake records in other states and territories of Australia.

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