

Earthquake Intensities

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Investigations

During this reporting period we designed and began implementation of a data base system for historical earthquake information. We also continued to search for additional information on Washington and Oregon earthquakes prior to 1928. The search included review of early journals and letters, mostly in the Pacific Northwest Collection at the University of Washington, and a search for newspaper accounts of earthquakes. We also wrote to over a hundred historical societies and libraries in Washington and Oregon, requesting that they explore their material for indices to local newspapers or accounts of early earthquakes.

During the process of compiling existing catalogs and collecting additional material, it became clear that managing the information posed a significant problem. In the Pacific Northwest, there are about a dozen existing catalogs, which vary in the time periods and geographical areas covered. Many are themselves compilations of earlier catalogs. We started out by using a scrapbook to collate entries from all catalogs for the largest cataloged earthquakes. However, in reviewing newspaper clippings, we soon found several sizable earthquakes which had not been previously recognized as significant, and we realized that a more extensive review of Northwest seismicity was needed. Scrapbooks have some limitations; the information is difficult to share with other investigators, and difficult to search for specific pieces of information, such as reports of fore or aftershocks, intensity estimations, or mention of previous earthquakes felt in the area. If newspaper clippings or other accounts are included, the information may also be quite voluminous. Time bases also complicate the compilation, as some existing catalogs have standardized to PST or GMT, even for earthquakes prior to the the initiation of standardized time in the 1890s. Finally, the investigator must have some way of improving the catalog, and of referencing sources and documenting the reason for changes; otherwise, erroneous entries may be reintroduced.

A data base not only overcomes the difficulties of compiling and collating such detailed information, but has many additional advantages, such as the ability to search the data and easy transfer of information; either printed, on tape or disk, or via e-mail. The data base, when completed, will provide a framework for storage and retrieval of historical earthquake information. We are currently concentrating on Cascadia earthquakes prior to 1928, but the data base system is quite general in design, and we hope that other investigators will use our data base, or some of our design concepts. A description of the data base specifications is available upon request.

Briefly, our data base consists of three parts; all of the source material, the corrected catalog, and an intermediate section which links the two. The source material is stored in a large multi-source table. Each record in the table is referenced by source, and includes a single verbatim event description, plus additional fields for specific pieces of information (such as time, location, depth, intensity, etc.) which have been given in the entry. The corrected catalog identifies each individual earthquake, collects all the source material for that earthquake, and allows a preferred time, location, and magnitude to be specified. To formulate the corrected catalog, a procedure to review the source material, and link all

accounts of an earthquake is used.

Publications

Johnson, T.E., A.I. Qamar, R.S. Ludwin, and R. Ellsbury, 1991 (abstract), Historical Earthquake Database for Events in Washington, Oregon, and Southern British Columbia Prior to 1928, EOS, V. 72, # 44, p. 604.

Ludwin, R.S. and A.I. Qamar, 1991 (extended abstract), 1882 earthquake rediscovered, Washington Geology, V. 19, # 2, p. 12.