



## Daily felt earthquake database based on historical diaries of pre-modern Japan

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In Japan, seismic observation using modern instruments was started at the end of the 19th century, and the nationwide seismic observation network was developed in the early 20th century. Therefore, to study earthquakes that occurred before the start of modern seismic observation, it is necessary to conduct research and analysis based on historical documents.

Since the end of the 6th century, there have been various types of historical documents describing earthquakes and their damage in Japan. Especially since the 10th century, historical source journals have described not only large earthquakes that caused great damage, but also small earthquake quakes. In Japanese history, pre-modern diaries were considered as semi-official archives intended for future reference and are used in various studies as reliable primary archives. The history diaries have the following features: (1) their descriptions are highly reliable because they were written immediately after the event or on the same day. (2) You can specify exactly where the history diaries were recorded. (3) The same author kept a diary for ten to several decades, providing continuous and stable information. (4) In some areas in Japan, historical diaries have existed almost continuously since the 10th century.

In this study, many such history diaries are accumulated over a wide area in Japan, and the descriptions of felt earthquakes are extracted and digitized, and a database has been constructed so that the digitized information can be easily used for seismology research. In the prototype of the "Historical Diary-based Sensible Earthquake Database" introduced at the previous meeting, the diary historical data at 28 locations and 2,767 felt earthquakes were registered for four years from 1853 to 1856 (Nishiyama et. al., 2019).

Since then, the database was released in a website, and the data has been expanded to 47 locations and 3,376 felt earthquake data for the same period. The database includes the date and possible occurrence time of the earthquake, the recording location, and the magnitude of shaking. In order to efficiently utilize this database for seismology research, we also have developed a graphic user interface (GUI) with the following functions.

(a) A function to display the locations where shaking was recorded during the same time period on

the same map, and plays the specified period as a moving image.

(b) A function to examine whether a felt earthquake recorded at different locations on the same day is caused by the same earthquake. The possible time periods of each shaking are displayed side by side.

This database and the newly developed GUI eliminate the need to read historical diaries, which requires the specialty of history. Utilizing digitized data, it is expected to promote seismology research, such as elucidation of long-term seismic activity including not only large-scale but also small- and medium-scale earthquakes.