Geophysical Research Abstracts
Vol. 14, EGU2012-3916-1, 2012
EGU General Assembly 2012

The trial edition of historical earthquake data base in Japan

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There are many historical documents in Japan and these are analyzed by historical researchers. The descriptions of the occurrence times and damage of historical earthquakes in and around Japan are included in these historical documents. However, the analyses of these historical documents require technical knowledge and therefore, it is not straightforward for unprofessional researchers to directly utilize these historical documents. A historical earthquake document data base was made by Ishibashi et al. for ancient and medieval ages (until around AD 1600). For early modern, or Edo, period, the amount of historical documents is significantly larger and quality of documents is variable, hence quality check is important.

We are making historical earthquake data base, which is composed of the historical earthquake document data base and seismic intensity data base, for a few earthquakes in Edo period. The 1751 Echigo-Takada and 1828 Echigo-Sanjo earthquakes, which occurred in Echigo (the present Niigata Prefecture) and caused extensive damage, were selected for the trial edition of historical earthquake data base. We selected historical records with high reliability, formatted them as XML data, and created historical earthquake record data base. Incidentally, pictures which describe damage of these historical earthquakes are also contained in this data base, and the damage can be visually shown. From the reliable documents, we estimated a ratio of collapsed houses and seismic intensity, and created the trial edition of seismic intensity data base by using Google Earth as a platform.

We selected historical records which describe both the total number of houses and the number of collapsed houses in each village or town at the occurrence time of these earthquakes because the number of houses varies in time. Then, we calculated the ratio of collapsed houses and estimated seismic intensities in the Japan Meteorological Agency (JMA) scale based on Usami (1986)'s table as described below.

JMA seismic intensity 7 (XII on Modified Mercalli (MM) intensity scale): 81-100% ratio of collapsed houses.
JMA seismic intensity 6 (X-XI on MM intensity scale): 71-80% ratio of collapsed houses.
JMA seismic intensity 5+ (IX on MM intensity scale): 1-70% ratio of collapsed houses.
JMA seismic intensity 5- (VIII on MM intensity scale): 0% ratio of collapsed houses.