

The characteristic of the earthquake damage in Kyoto during the historical period

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The Kyoto city is located in the northern part of the Kyoto basin, central Japan and has a history of more than 1200 years. Kyoto has long been populated area with many buildings, and the center of politics, economics and culture of Japan. Due to historical large earthquakes, the Kyoto city was severely damaged such as collapses of buildings and human casualties.

In the historical period, the Kyoto city has experienced six damaging large earthquake of 976, 1185, 1449, 1596, 1662 and 1830. Among them, Kyoto has experienced three damaging large earthquakes from the end of the 16th century to the middle of the 19th century, when the urban area was being expanded. All of these earthquakes are considered to be not the earthquakes in the Kyoto basin but inland earthquakes occurred in the surrounding area.

The earthquake damage in Kyoto during the historical period is strongly controlled by ground conditions and earthquakes resistance of buildings rather than distance from the estimated source fault. To better estimate seismic intensity based on building damage, it is necessary to consider the state of buildings (e.g., elapsed years since established, histories of repairs and/or reinforcements, building structures) as well as the strength of ground shakings. By considering the strength of buildings at the time of an earthquake occurrence, the seismic intensity distribution due to historical large earthquakes can be estimated with higher reliability than before. The estimated seismic intensity distribution map for such historical earthquakes can be utilized for developing the strong ground motion prediction in the Kyoto basin.