

The response to the tidal force by the active faults around Kyoto city recorded in the damaging earthquakes

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1.Introduction

The studies on the tidal forces of the moon and the sun working as trigger of earthquake continue for years, resulting recent better understanding. (Tanaka et al., 2004) Under this situation, the theoretical understanding is deepening, detailed studies on regions, on the other hand, have not widely been carried out. Last year this study showed the tendency of earthquake-occurrence from Niigataken-chuetsuoki to the east coast of Lake Biwa in the Niigata-Kobe tectonic zone. Succeeding it, this report shows the area around Kyoto city.

2.Data set

Kyoto and surrounding cities were the capital city of Japan for a long time, thus a lot of earthquake are recorded. The document which summarizes the records contains the damaging earthquakes from AD416 to AD1995. Omitting those occurred at the remote Nankai trough, the earthquakes that occurred around Kyoto are analyzed. As for the indicator of the phase of the moon, day in the lunar calendar is used.

3.Results

There is a remarkable dependency on the moon phase as explained below.

a. The earthquake equal to or less than level 5 of the JMA intensity standard, which did not produce serious damages, occurred regardless of the phase of the moon. Those higher than level 5 show clear dependency as explained below.

b. The outbreak date of the damaging earthquake is limited for the period of 1st-18th in the lunar calendar, which means the period from the new moon to just beyond the full moon though the first quarter moon.

c. Of these, there is a group of the outbreak on 1st-5th in the lunar calendar. The representative earthquake are

1st: 1662Biwakoseigan earthquake(M7.5), 1925Kitatajima earthquake(M6.8) and

4th: 1927Kitatango earthquake(M7.3).

The earthquakes occurred in Kyoto city and northward.

d. There is another outbreak group on 7th-18th in the lunar calendar. The representative earthquake is,

13th: 1596Keichofushimi earthquake(M7.8).

The earthquakes occurred in Kyoto city and southward.

e. The giant earthquakes of the M8 class occur in Noubi area where is located east of Lake Biwa. They gave Kyoto seismic intensity 5, but did not give the serious damages. This may be because Lake Biwa acted as breakwater of the earthquake wave.

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