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DISCUSSION ON THE RELATION BETWEEN BURST TIME OF KOKAIKAWA (小贝川) DIKE IN JAPAN AND SOLAR TERMS (节气)

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In 1988, we found a close relation between the 24 solar terms and the occurrence time of natural disasters in some places in China, such as earthquakes and meteorological disasters. In this paper, we try to study the relation between burst times of Kokaikawa dike in Japan and the 24 solar terms.

In 1982, Y. Tagutschi (田口雄作) and K. Yoshikawa (吉川清志) published a paper about the flood disasters due to the bursts of Kokaikawa dike and gave a flood disaster chronology of the bursts of Kokaikawa dike in history. Studying the date of every burst in the chronology, we found that the majority of them within July and August coincide with the time of the solar terms (节气) in the traditional Chinese calender, as shown in the following Fig. 1. In the Fig. 1, the solid circle denotes the burst date, the open circle denotes the solar terms. This figure shows, the dates of burst of Kokaikawa dike predominantly distribute for two rintervals, one covers the period from 7th to 11th, another from 22th to 26th. The correlation is useful for studying the flood disaster of Kokaikawa dike.

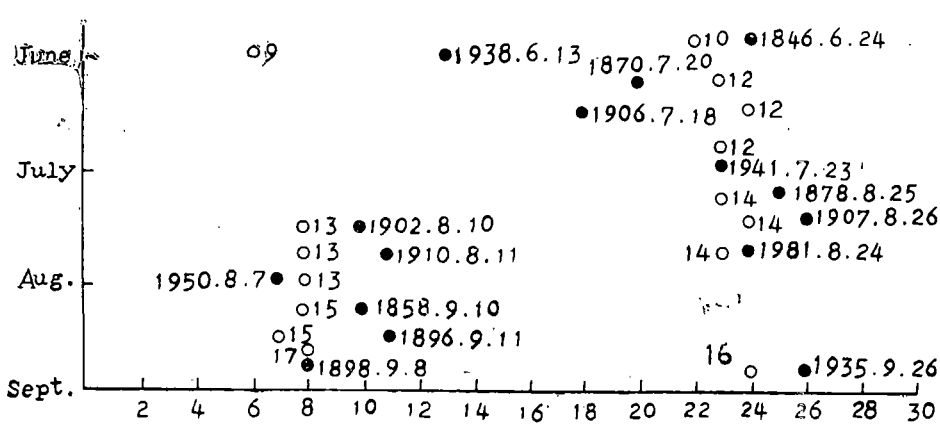

Fig. 1 Relation between solar terms and burst time of Kokaikawa dike

The number on the side of open circles denotes the ordinal number of the solar terms.

In China, a solar year is divided into 24 solar terms (Jeqi in Chinese) as list in the following table.

The 24 solar terms (Jeqi节气)

1.Spring begins (立春)	2.Rainwater (雨水)
3.Insects stir (惊蛰)	4.Vernal equinox (春分)
5.Clear and bright (清明)	6.Grain rains (谷雨)
7.Summer begins (立夏)	8.Grain fills (小满)
9.Grain in ear (芒种)	10.Summer solstice (夏至)
11.Slight heat (小暑)	12.Great heat (大暑)
13.Autumn begins (立秋)	14.Limit of heat (处暑)
15.White dew (白露)	16.Autumnal equinox (秋分)
17.Cold dew (寒露)	18.Frost descends (霜降)
19.Winter begins (立冬)	20.Little snow (小雪)
21.Heavy snow (大雪)	22.Winter solstice (冬至)
23.Little cold (小寒)	24.Severe cold (大寒)

The date of every Jeqi is nearly deterministic. In general, there are two Jepi in a month. For the earlier half year, the first Jeqi is on 6 th ± 1 day, and the second Jeqi is on 22th ± 1 day. For the later half year, the first Jeqi is on 7 th ± 1 day, and the second Jeqi is on 23th ± 1 day. In China, during the Jeqi interval (Jeqi date ± 2 days), earthquake and meteorological disaster and so on are more than that on other dates.

We take some earthquakes and meteorological disasters in China as examples as follows.

1.Earthquakes: On November, 6, 1988 in Lancang (澜沧) — Gengma (耿马) region, Yunnan Province, China, a great earthquake (M=7.6) occurred. The earthquake date is the day before the winter begins (立冬). On May, 7, 1989, a strong aftershock (M=6.2) occurred in Gengma (耿马). The aftershock date is the two days after the summer begins (立夏).

2.Meteorological disasters: In 1989, there were two catastrophic rainstorms in Sichuan Province of China, one is on 19 th—20 th of April, another is on 7 th—12th of July.

During the two rain storms, about 100 people and 814 people were killed by them. The 20th of April is the Grain rains (谷雨); 7 th of July is the Slight heat (小暑).

In 1988, we pointed out, that in America, tornados are predom-

inant to appear in the solar terms. The time distribution of tornados in America in 1989 is accordant with the Jeqi predominantly. We consider that to study further the above mentioned problem is useful for preventing disasters.

Reference

(1) Guo Zengjian, Jeqi and Disasters, Northwestern Seismological Journal, Vol.10, No.3, 1988.

(2) Y.Tagutschi and K.Yoshikawa, On the flood due to burst of Kokaikawa dike in August, 1981, Geological News, Geological Survey of Japan, 330, 1982.

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