

LEADING EARTHQUAKE

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Having studied many historical earthquakes ($M \geq 6$) in the mainland of china, we found that there is correlation of the multiplied nine days between the occurrence dates of them. The correlation is characterized by the multiplied nine days of different years. We call the initial earthquake the leading earthquake. The relation between the occurrence date of the leading earthquake and the date of the following earthquake is shown as follows:

$$T = T_0 \pm n \cdot 9 \text{ (day)}, n = 0, 1, 2, \dots \quad (1)$$

where T_0 is the occurrence day of the leading earthquake, T is the occurrence day of the following earthquake.

The error of T in formula (1) is

$$\Delta T = \pm 1 \text{ day} \quad (2)$$

In this case, the natural possibility P of the multiplied nine days in a month is equal to $N/3$, where N is the total number of earthquakes studied in a month.

We take some examples in China as follows.

1. AD 1679 02 09 Sanhe earthquake ($M = 8$)

If we regard the 1679 Sanhe earthquake as the leading one, the correlation of the multiplied nine days between it and the following earthquakes ($M \geq 6$) in this century is shown in Fig. 1.

From Fig. 1, we can see there are 5 earthquakes following the 1679 leading earthquake during two months before and after the leading

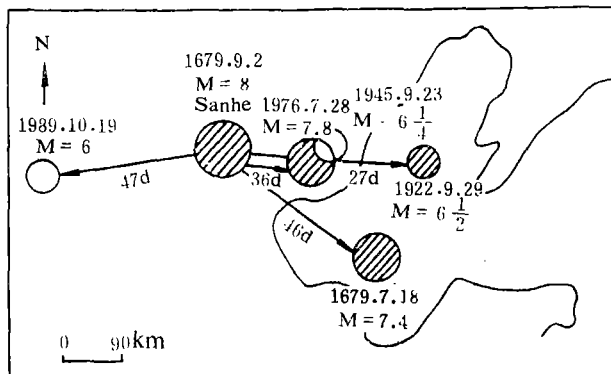


Fig. 1 The 1679 Sanhe leading earthquake

one, and 3 earthquakes of them are accordant with formula (1) and (2).

2. AD 1668 07 25 Tancheng earthquake ($M=8.5$)

In this century there are 3 earthquakes ($M \geq 6$) to follow the 1668 leading earthquake during about two months before and after the leading one as shown in Fig.2. There are 2 earthquakes to be accordant with the formula (1) and (-2).

3. AD 1604 12 29 Quanzhou earthquake ($M=8$)

In this century there are 3 earthquakes ($M \geq 6$) following the 1604 leading earthquake during three months before and after the leading one as shown in Fig. 3. From this Figure, we know the total earthquakes studied are accordant with the formula (1) and (2).

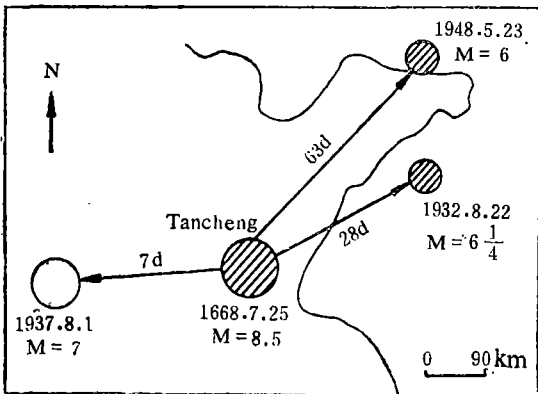


Fig. 2 The 1668 Tancheng leading earthquake

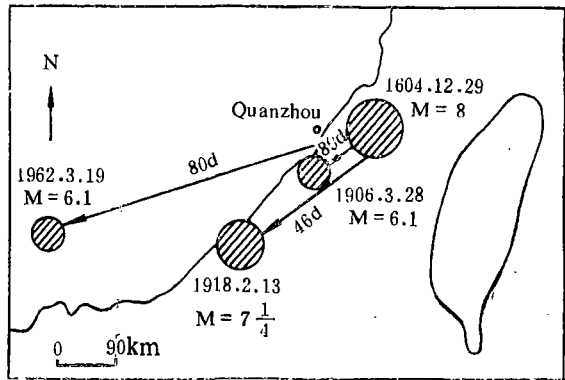


Fig. 3 The 1604 Quanzhou leading earthquake

4. AD 1624 02 10 Yangzhou earthquake ($M=6 \sim 7$)

In this century there are 4 earthquakes following the 1624 leading earthquake during about 3 months before and after the leading one as shown in Fig. 4. Three earthquakes of them are accordant with the

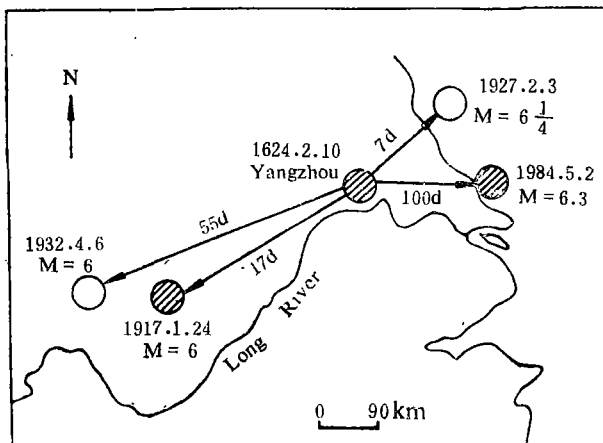


Fig. 4 The 1624 Yangzhou leading earthquake

formula (1) and (2).

In the mainland of China, there are many leading earthquakes which are defined by the formula (1) and (2). For example, AD 1902 08 22 Atushi earthquake ($M = 8 \frac{1}{4}$), AD 1709 10 14 Zhongwei earthquake ($M = 7 \frac{1}{2}$), AD 1933 08 25 Diexi earthquake ($M = 7 \frac{1}{2}$), AD 1515 06 17 Yongsheng earthquake ($M = 8$), and so on.

The leading earthquakes have the following characteristics,

(1) In general, leading earthquake is as big as magnitude of $7 \frac{1}{2}$ and more.

(2) Leading earthquake may be several hundred years earlier than the following earthquakes.

(3) In general, the led earthquakes are located within 200—300km from the leading earthquake.

(4) The effective leading duration is about 2-3 months before and after the leading earthquake.

Finally, we want to point out that the mechanism of leading earthquake may be modulation of external factors having commensurability of multiplied nine days to the process in the earth. The leading earthquake is useful for predicting occurrence date of strong earthquakes on the basis of precursory observation.

带头地震

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摘 要

带头地震是异年倍九律时间系列中的头一个地震，其震级较大。在它发生后几百年内附近200—300公里范围的6级和6级以上地震与它的发生日期往往呈倍九天的关系，其月份范围在带头地震发生日期前后2—3个月内。已发现的带头地震有1679年三河平谷大震，1668年郟城大震，1624年扬州大震，1604年泉州东大震。另外还发现在中国西部也有不少带头地震。带头地震和随后的被带地震其间的倍九律关系可能是具有倍九天可公度的外因调制地下过程的结果。在前兆观测的基础上用带头地震有助于选择发震日期。