Review for earthquake prediction method by night-time temperature changes

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http://seismo.ee.uec.ac.jp/index.html

1.Introduction

The Hyogo southern part earthquake / Hanshin Awaji great earthquake was generated on January 17, 1995.There was a temperature change phenomenon from three days which are 14 days before the earthquake to four days.

We reported this phenomenon at the Joint Meeting of Earth and Planetary Science.[1] We conducted data-mining investigation for the Kobe data for ten years after 1990 after the Meeting.We report this investigation. Furthermore, we also report the possibility of this method which paid its attention to the rise of temperature night.

2. Phenomenon 14 Days before Great Hanshin Earthquake

The temperature of Kobe(20:00 on Jan.3) was 6.0 degrees. Usually, temperature decreases in monotone night.However, it increased in monotone conversely and became 8.2 degrees at 4:00 on Jan.4 on that day.We investigated meteorological influence by the ground weather chart.The low pressure system which suited 3 day and night in west part of Setonaikai progressed east of Japan. And the low pressure system passed through Kanto at 9:00 on the 4th.We calculated 'night temperature rise value Z' for the point in Kinki, Chugoku, and Shikoku district observing AMeDAS. Because to investigate the rise value distribution of the temperature from 20:00 on January 3 to 4:00 on the 4th.

Night temperature rise value Z(20:00 standard) =(MAX temperature[at 20:00 - following 4:00)-20:00 temperature

We calculated Z value in every place.We drew the contour of Z value on the map.Since the warm wind blew the Muroto cape and the cape of tide from on the south, they went up by about 5 to 6 degrees.On the other hand, since the low pressure passed on the south of Kobe , the north wind blew in and it was thought that there was no temperature rise not much.

However, by the contour, there was a peak of Z value centering on Kobe in fact.It seemed that there is this phenomenon about the relationship with an earthquake.(At present, we will investigate a decisive thing further from now on, although it cannot say)

3.Knowledge acquired from the temperature data of Kobe for 10 years

We showed the analysis of the Kobe temperature data for ten years in Table 1.We investigated the distribution, having become 2.0 degrees or more from 20:00 before following 4:00 remained in 37 in 3651 cases case.We classified based on the passage situation of a low pressure etc. about these 37 cases further.It seems that consequently, there is no meteorological disorder about nine cases.Then, it investigated about these nine cases further.

Consequently, there is the possibility as a sign of an earthquake about two cases.

4. The possibility as the earthquake prediction method

In two cases, the temperature change on the first stops being noticeable on the other hand, and, as for another side, temperature rises night.It cannot say immediately with this, 'The earthquake prediction method of having paid one's attention to the rise of temperature night is promising.'When further verification could be performed about correlation nature from now on, a possibility that it could be called practical 'one of the earthquake prediction methods (especially area prediction)' came out.Moreover, the phenomenon to which this technique is applied in 2000 and the Tottori western earthquake M7.3, and the temperature of night is rising 21 days before an earthquake is found.

Furthermore, we discovered that the rise of temperature will be before (13 days and 11 days) an earthquake also about the Okushiri island earthquake M7.8 night in 1993. We report by E074 session of the meeting.

データマイニング調査

表１．１９９０年～１９９９年の神戸の夜間気温上昇　統計解析

Z=MaxTemp(from20:00to4:00)−Temp20	case	%
4.0 ℃以上	3	0.1
3.0～3.9℃	2	0.1
2.0～2.9℃	32	0.9
1.0～1.9℃	172	4.7
0.1～0.9℃	1001	27.4
0.0℃	2441	66.7
欠測	1	0.1
合計	3652	100.0

２．０℃以上は　３７／３６５１＝　１．０％

気象学的観点から37ｹｰｽを絞込み実証例を抽出

A, 低気圧が北側を通過　19cases Zave=2.64

B, 低気圧が南側を通過　6cases Zave=2.43

C, 低気圧は通過しないが気象的乱れあり 3cases Zave=2.53

D, 気象的乱れ　なし　9cases Zave=2.14

Ｄの９ケースについて調査→　以下２ケースについて地震の前兆としての可能性あり（他の７ケースは前兆と考えるには難あり　例、１ヶ月以上地震無し　等）

①１９９４年１２月１４日 Ｚ＝２．０
→１２月２２日に大阪でＭ５．６発生

②１９９６年１２月１日　Ｚ＝２．３
→翌１月２日に福井でＭ５．１発生