

Review for Air Temperature Changes before the 1995 South Hyogo Pref. Earthquake

Hiroyuki Inubushi[1], Masashi Hayakawa[2]

[1] UEC, [2] Univ. Electro-Comms.

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

1. Introduction

The South Hyogo Pref. Earthquake, also known as the Great Hanshin Awaji Earthquake, occurred on Jan 17, 1995, but abnormal air temperature changes were observed on Jan 3 and 4, fourteen days prior to the earthquake. Normally, the air temperature drops steadily throughout the night, but from 6PM January 3 through 12PM January 4, the air temperature steadily increased. There is a possibility that this phenomenon was a forewarning of the Great Hanshin Earthquake. The following is a report of the results of that investigation.

2. Process of Phenomenon Discovery

Russian Scientist Dr. Tronin has been studying the relationship between earthquakes and thermal infrared images from a NOAA satellite. Dr. Tronin reports that approximately 10,000 NOAA images have been analyzed from the Central Asia earthquake belt, and a statistically significant correlation was found to exist.

Furthermore, Prof. Gotoh from Nagasaki Univ. reports that by using a LANDSAT satellite, it was determined that the average air temperature at the Nojima fault line, which occurred after the great Hanshin Earthquake, increased by 3deg.C after the earthquake as compared to before the earthquake.

It is possible that if investigations using satellites are continued, the "relationship between earthquakes and the ground surface temperature" can be further clarified, but we have hypothesized that some correlation could be found using the temperature 1.5m above the ground, or in other words, the air temperature, and we have performed our investigation on the Great Hanshin Earthquake, which recently caused the greatest amount of suffering. Because the effect of sunlight during the day causes major shifts in the air temperature, this investigation was primarily performed at night when there is no sunlight.

3. Data Relating to the Phenomenon

Fig1 shows air temperature trends in Kobe during Jan 1995, and for comparison, air temperature trends in Hiroshima. Although Kobe and Hiroshima are approximately 240km apart, the air temperature trends from Jan 9 through Jan 16 were quite similar. In contrast, from Jan 1 through Jan 8, a wave shaped difference occurred between the two. In particular, on the evening of Jan 3 while the temperature in Kobe was steadily increasing, the temperature in Hiroshima was trending slightly downward after 7PM.

Furthermore, although the wind generally blows in an east to northeasterly direction in Kobe, the wind speed and direction at this time were exceptional with readings of North Northwest - velocity 1 at 9PM, West-velocity 1 at 10PM, West Northwest - velocity 2 at 4AM the following day, and West Southwest - velocity 2 at 5AM. Wind velocity 2 refers to a level which "can be held on the face", and it was determined that there was no south wind. On the other hand, the wind in Hiroshima was basically blowing in a North to North Northeasterly direction. (Wind velocities 0 - 4)

4. Conclusion

The data obtained is still insufficient and we cannot be certain at this point in time that this phenomenon was a forewarning of the great Hanshin Earthquake. However, considering the facts that "the temperature in Kobe rose steadily" and "there was no south wind", it cannot be denied that there is a possibility that the air temperature during the night, when there was no effect from sunlight, was a forewarning. Future investigations will be to develop a correlation. Furthermore, at the time of announcement, data mining aspects of this research will be reported.

Currently, Seismo-Electromagnetics research is continuing, and we anticipate that when this electromagnetic research is combined with the research of this report, earthquake predicting technology will be improved.

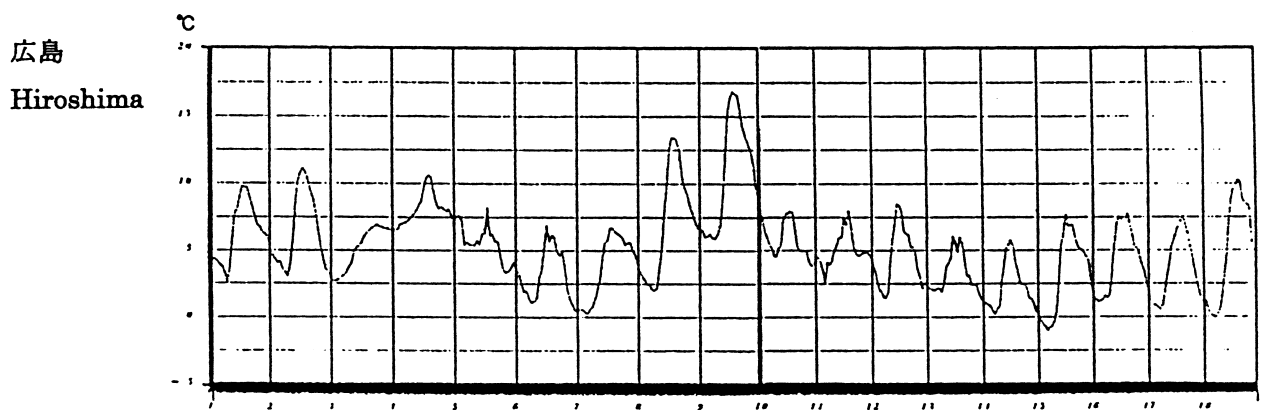
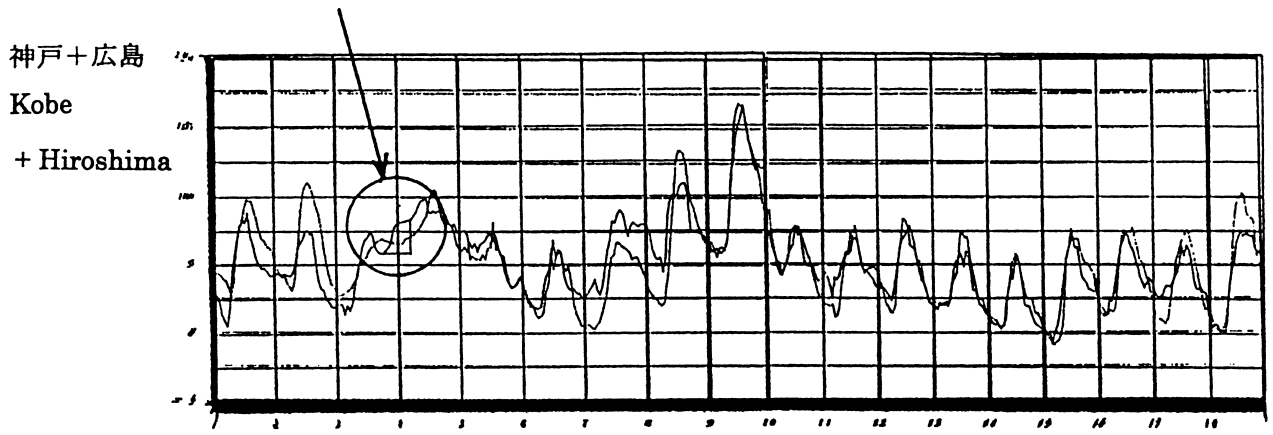
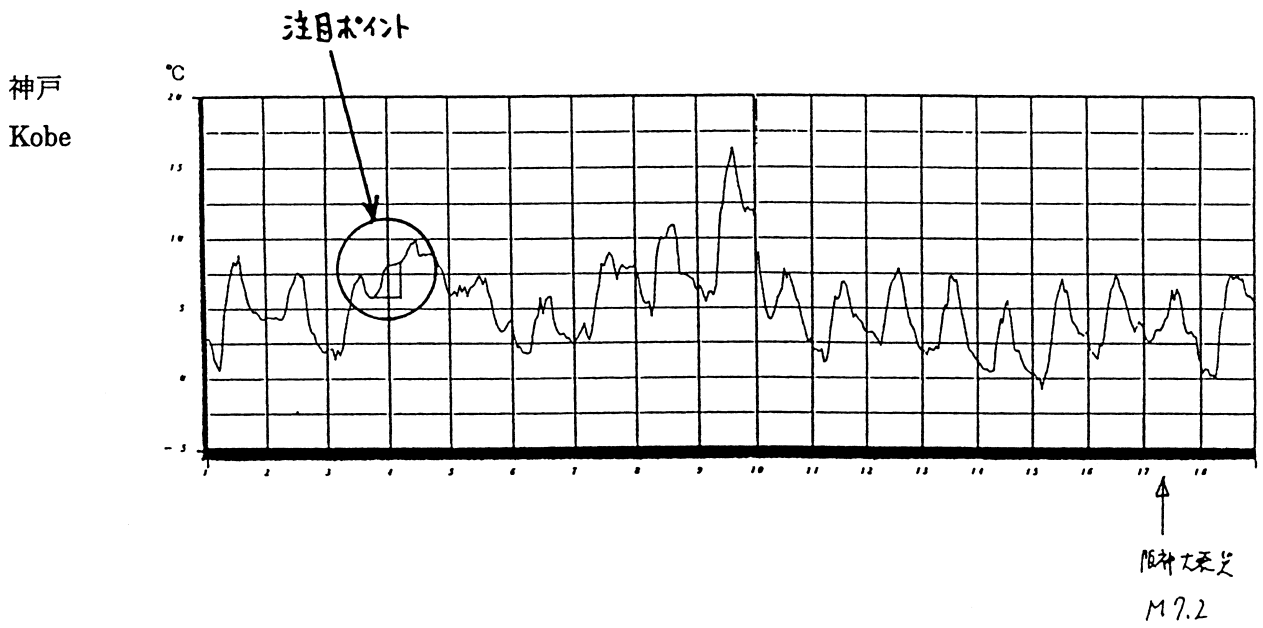


Fig. 1 気温推移 1995年 1月 / Trend of Temperature (Jan. 1995)