

DUPLICATED EARTHQUAKE PRECURSOR ANOMALIES OF ELECTRIC APPLIANCES

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Abstract

Mysterious behavior of home electric appliances before the Kobe Earthquake in 1995 was reported retrospectively. Radio and TV noises and channel setting anomalies were duplicated in a laboratory experiment using a Van de Graaff electrostatic generator utilizing frictional electricity. A second hand of a quartz clock placed on the high voltage sphere of the generator showed eight times faster movement by discharges as if Alice in the wonderland presumably by short-circuiting of the digital IC circuit. All these phenomena in a modern city indicates that intense seismic charges and electromagnetic (EM) waves caused these phenomena.

Key words: Earthquake precursor, Abnormal phenomenon, Electromagnetic wave, The Kobe Earthquake

1 Introduction

Earthquake precursor phenomena prior to the Kobe Earthquake on January 17, 1995 were retrospectively collected from citizens through a fax, phone and internet and published as "1519 Statements - Precursors of the Kobe Earthquake" with illustrations of earthquake lightning, clouds, elongated moon and anomalous animal behavior^[1]. The statements are mostly similar to old anecdotes, legends and proverbs which have been inherited from generation to generation in Japan.

Statements of seismic anomalous animal behavior (SAAB) of various animals constitute more than half, while those related with sky and atmosphere about 30%, the soil and land 11%. They are almost the same as those repeatedly described in newspaper articles and popular science books^[2-4]. New additions to the precursor catalogue in a modern city with little nature left are electromagnetic ones (9% of the total) related with home - electric appliances, such as TV, radio, car - navigator, air - conditioner, refrigerator, quartz clocks.

Seismologists are skeptical of citizen's statements of precursor phenomena and regard them as psychogenic symptom, mutating forms of mass hysteria originating from legends and amplified by modern communications of fax and internet. Psychiatric patients controlled by a fox (fox bearing) in the past are now suffering from electromagnetic waves from uncertain emitter like extraterrestrials. New additions of

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anomalous behavior of electric appliances gave the impression of the evolution from animals to materials. The tendency encourage some scientists to interpret that reported phenomena are just human mass obsession or hysteria under anomalous psychological conditions caused by the earthquake disaster. Selective recognition was intentionally correlated with the earthquake.

Most phenomena fall between disciplines, i. e. are in an interdisciplinary field. Modern scientists are too specialized in their narrow field and their ethic and training order them not to speak of other specialized fields. It is common sense in human anthropology that a taboo was born because of some reason. A strong prejudice against precursor phenomena indicates that scientists are reluctant to deal with problems which exist doubly in boundaries with other sciences and with general public. Most citizens have no skill and knowledge to clarify the phenomena scientifically. Unless scientists solve these problem, these stories would be inherited as new superstition related with a large earthquake.

The retrospective approach to collect statements from witnesses may be a step to document the phenomena. The phenomena must then be explained scientifically based on a hypothesis and a theory developed on the hypothesis and further duplicated in experiments. However, these statements and legends on earthquake precursors ended as records of phenomena with almost no serious scientific study. Here is "no man's land" in spite of the fact that citizens needed scientists to explain the phenomena. Precursor phenomena were recorded and published in a book by Musya^[2], by Rikitake^[3] and Wadatsumi^[1], but have not yet been scientifically elucidated.

This paper interprets the anomalies of electric appliances following the works on animal anomalous behavior^[5-6]. The phenomena were duplicated by using a Van de Graaff electrostatic generator based on the assumption that intense charges appear at the fault zone. No allegation is made on the possibility of earthquake prediction using these home electric appliances.

2 Reported Precursor Phenomena and Scientific Elucidation

2.1 Radio noise and TV image with snow noises and channel selection anomalies

Statement: Radio noises were noticed prior to the Kobe Earthquake. Some TV set showed ghost, color - tuning barber - pole and white speckle snow noises, which was recorded in a videotape. Channel setting troubles increased at the epicenter area^[1]. Radios in a radio - manufacturing factory could not receive any broadcasts before the Tangshan Earthquake in China which killed 240, 000 people. The radios worked normally after the earthquake.

Experiment: A transistor - radio placed on the high voltage metal sphere of a Van de Graaff generator became silent at a high voltage but worked normally when the sphere was grounded. Air - gap discharges caused interference on another radio in the vicinity.

A portable TV with a liquid crystal screen and a domestic TV set were placed on the sphere and 1 m apart from it, respectively. The screen as shown in Fig. 1 (a) showed channel setting anomalies as shown in (b). Noises were observed by discharges as shown in (c). A home TV apparatus placed 1 m away from the sphere showed snow noises as in (d) by the discharges.



Fig.1 A small portable color TV on the high voltage sphere. (a) A normal image ;(b) Automatic channel setting anomalies (vertical line) ;(c) Horizontal line and snow noises ;(d)Speckle noises and channel anomalies in an image on nearby home TV due to air - gap discharges

Reasons: The electric field close to the ground is so large as to disable the bias voltage of the transistors and silence radio and TV. Air - gap discharges produced electromagnetic noise in the radio - wave frequency range.

Noises in broadcasted TV images were suspected due to seismic electromagnetic waves and to disturbances in the ionosphere which reflect radiowaves. Another effects may be due to disturbances in the ionosphere by intense seismic charges on the ground in the epicenter area causing reflection of radiowaves. Detailed engineering analysis of noise recorded on a videotape before the earthquake will be published separately.

2.2 Clocks whose hands move either slowly or quickly and natural switching of home electric appliances: Not Psychogenic Alice in the Wonderland Syndrhme

Statement: A lady living about 30 km away from the epicenter of the Kobe Earthquake told that her wall - hanging quartz clock stopped before the earthquake, but returned to a normal speed. No one trusted another report that the second hand rotated faster than normal as if in science fiction movies before the earthquake. Actually, anomalous time sensing was called by psychoatric art as Alice in the Wonderland Syndrhme.

Mysteries follow reporting faint lightning of fluorescent light, buzzer and alarm sounds in intercom and handy phones along with natural switching of radio and TV from a few hours to a few days before the

earthquake. Whether these retrospectively stated phenomena are psychogenic or scientifically real one depend on individual scientists. We show experimentally that they are caused electromagnetically by pulsed charges and discharges.

Experiment : A quartz clock was placed on the high voltage sphere. No change was observed soon after the sphere was charged to 250 kV. However, the alarm rang and then the hands stopped moving when air - gap streamer discharge were made from the clock to the high voltage sphere. The second hand rotated at the speed eight times faster than normal. Fluorescent lamp is naturally lighted by the electric field of the Van de Graaff generator and electromagnetic waves in a microwave oven.

Reason: A quartz clock moves following the pulses fed from the digital IC circuit. Electrostatic discharges make noises and disturb the digital circuit. In some case, the digital noises disturb the digital code resulting in the error. Sometimes, discharges in the printed circuit will result in short circuits and so electric appliances may be switched on automatically. Stopping of the second hand and ringing of the buzzer may be caused by the short circuiting.

Eight - fold increase in the speed of the clock suggests that three flip - flops in the digital IC circuit were short - circuited giving eight times large number of electric pulses to the pulse motor resulting in the fast movement of the second hand. These results suggest that intense pulsed charges appeared at the epicenter area and caused discharges in quartz clocks.

Fluorescent lamp was faintly lighted at the time of thunder due to the electromagnetic waves. It is no wonder that some precursor phenomena such as anomalous behaviors of dogs are quite similar to those at the time of thunder.

3 Charge Appearance at the Epicenter

Those who regard the old folk stories, anecdotes and precursor statements as superstition and psychogenic response might argue that intense charges and the electric field might produce anomalous behavior of electric appliances, but no clear physical reasons of the charge appearances at the epicenter have been presented. Seismologist may say that they do not believe unless charges were observed preseismically. There are some reports that electric charges were observed in Kobe and many reports of electromagnetic waves^[7-8]. Recent works to observe seismic EM waves at very low frequency (VLF) indicated that source is in the atmosphere suggesting atmospheric lightning (thunder) close to ionosphere^[8]. The electromagnetic waves emitted from epicenter area may propagate earth surface - ionosphere waveguide and so the reflection from the ionosphere might be observed.

Small discharges all over the epicenter area would generate EM waves and cause these anomalies. One might still argue that electrostatic charges in winter days in Kobe was misunderstood as earthquake precursors. The possibility can not be excluded if whole anecdotes related with earthquake precursors were not trusted. These observation would always be controversial as earthquake prediction by seismic electric signals (SES).

It is hoped that these precursor topics should be discussed more seriously by seismologists whether they can be used for earthquake prediction or not. In this paper, we leave the mechanism for future investigation and describe that electrostatic charges elucidate all these modern mysterious precursor phe-

phenomena related with electric appliances.

4 Summary

The puzzles of new earthquake precursor anomalies associated with home electric appliances in a modern city of Kobe were solved by duplicating the phenomena using a Van de Graaff electrostatic generator. Difficulties in radio and TV receivers and their noises as well as natural switching of apparatus would be caused by an intense charges appeared on the ground at the epicenter area. An ensemble of small dipolar charges, presumably released from the piezoelectric polarization by its disappearance, produces intense EM waves and charges at the fault zone. These cause misoperation of electric appliances. Hence, it can be concluded that most of precursors including animal anomalies are electromagnetic phenomena. It is hoped that new precursor phenomena of electric appliance behavior observed before the Kobe Earthquake reduce the causality of future earthquakes in modern cities.

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家用电器重复出现的地震前兆异常

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摘要 据有关报导, 1995年神户地震前家用电器出现了奇怪的异常现象。我们在实验室中利用范德格拉夫静电发电机用磨擦生电的方法, 证实了这些收音机和电视的噪音以及频道混乱现象的存在。另外, 我们还间接地发现, 当发电机处于高电平时, 可能是由于集成电路中的短促电流流动而产生的放电, 致使石英钟秒针以8倍于正常速度的频率转动。结果表明, 现代城市中这些地震前兆异常都是由于强烈的地震前兆电荷和电磁波引起的。

关键词: 地震前兆 异常现象 电磁波 神户地震

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