INVESTIGATION ON THE OCCURRENCE OF GROUND ULF AND ITS CORRELATION TO SPACE ULF PRIOR TO THE EARTHQUAKE EVENTS

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MOHAMAD HARIS BIN SALLEH
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM
SELANGOR

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ABSTRACT

This paper focuses on the occurrence of Ground ULF signal prior due to the fact that ULF frequency band is considered as most promising frequency range in ground base observation where electromagnetic earthquake precursors may be found hence the study of ULF magnetic wave is very significant. In order to reveal possible earthquake precursor through the changes of ULF Signal, 6 sets of real time data from California region is used as a study case. The observation was made on the day of the earthquake event occur. The data was taken from Quakefinder websites which owned magnetometer station along the California fault region. The results obtained, demonstrated the theory that magnetometer may detect anomaly in ULF signal several days or a few hours before main shock.

The result will be presented and broken down by the sets of data shown from previous chapter which is Set A, B, C, D, E and F. The data will be shown in the form of PC3/4 waveform and it will be broken down by the scale of the amplitude into 3 sets of graph. This graph then will be discussed on the spark in the ULF signal amplitude. The maximum and minimum amplitude will be taken from the graph which show a large anomaly and compared to the other research that have been made by researcher before to prove the existence of ULF signal anomaly before the earthquake happens.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

This project is emphasizing on detecting the occurrence of Ground Ultra Low Frequency signal prior to the earthquake events. An earthquake starts where rocks move against each other and break off. The movement of the rocks creates energy 10,000 more powerful than the first atomic bomb. Earthquakes are produced at plate boundaries where two plates sliding past each other. The movement of the Earth's plates bends and squeezes the rocks at the edges of the plates and puts great pressure on the rocks. If the pressures become too great, the rock layer will break and release the energy stored in it then causes seismic wave to be produced. This seismic wave that generate the destruction that can accompany an earthquake by shaking, and cracking the ground as they pass through an area.[1]

Researchers have believed for some time that there is a correlation between ULF magnetic field fluctuations and seismic activity. Many of the observations have been serendipitous due to the lack of an ULF sensor network. A remarkable collection of ULF signal data was observed by Tony Fraser-Smith, a Stanford professor, in conjunction with the magnitude 7.1 Loma Prieta earthquakes. Three hours before the earthquake there was a dramatic increase in the signal level. Power was lost for a couple of days after the quake, but when it was restored, the increased signal level continued for almost a month. The spikes in the data do not correlate to aftershocks.[2]