

Evaluation of electromagnetic wave measurement system for pre-seismic VLF signals

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We develop the VLF electromagnetic wave location system to study lightning,, transient luminous events, and pre-seismic electromagnetic emission. In this presentation, we introduce our evaluation of this system, comparing other lightning location systems. Our final goal of this study is to verify and understand the pre-seismic VLF emission.

Keywords: VLF, Lightning location system, Earthquake

Ionospheric disturbance in D region possibly related to pre-earthquake activities observed by the DEMETER

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A decrease of electric field at the 1.7 kHz, i.e., VLF electromagnetic waves, within 4 hours before neighboring earthquake (EQ) with the magnitude of more than 4.8 was statistically shown through the data set of in-situ satellite measurement according to French groups. We found that the intensity originating from the whistler waves in the frequency of more than cutoff decreased in the orbit near the epicenter. The interpretation of the intensity decrease is due to the electron density increase in D region over the epicenter.

Keywords: Earthquake, Ionosphere, DEMETER

Study of ionospheric precursor using the DEMETER ELF data

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A decrease of electric field at the 1.7 kHz, i.e., VLF electromagnetic waves, within 4 hours before neighboring earthquake (EQ) with the magnitude of more than 4.8 was statistically shown through the data set of in-situ satellite measurement according to French groups. In this study, we apply the DEMETER ELF data to our previous analysis for VLF data. We apply this method to ELF data. Our preliminary analysis showed that the intensity of electromagnetic wave was enhanced around 700 Hz near the epicenter 40 hours before the earthquake.

Keywords: Earthquake, Ionosphere, DEMETER

Precursory electric field observation cubesat demonstrator: Prelude

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Small satellites have already been used for earthquake precursory phenomena observation in other countries, but CubeSat-class satellite has not existed yet. The French seismo-electromagnetic satellite DEMETER reported statistically the reduction of the radio wave intensity 4 hours before earthquakes, but its mechanism and dependence on local time is unknown.

The 3U CubeSat "Prelude" under development is aimed at verifying the reduction of radio wave intensity 4 hours before earthquakes by installing only one pair of electric field probes which is already proven by DEMETER in the vertical direction, constructing the satellite constellation in a low cost.

Keywords: Prelude, CubeSat, DEMETER

We were able to predict a foreshock and a main shock in an FM observation network by Kumamoto earthquake.

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JYAN society for the study's chairperson Hidemitsu Kunihiro

We were doing an earthquake study while expanding an observation network including construction of a direct radio observation point of FM broadcasting into the whole country from 8 years before, targeting the earthquake prediction. A big abnormal change showed in the FM broadcasting radio wave which has propagated the sky around the seismic center on April 6 and April 9 because of the Kumamoto earthquake in April of last year. And a main shock occurred on April 14 of about 1 week later (a foreshock) and April 16. Our observation network is a FM broadcasting radio wave, an observation was always continued, but a big change was for the first time like this except for E-SUPO phenomena. Our research council is doing a study and data analysis/analyses of an electromagnetic observation and is piling up the empirical rule which becomes earthquake prediction. When there was a big abnormal change, an earthquake occurred about 1 week later, but an earthquake also occurred on April 14 and April 16 on the empirical rule street this time. A route and the suburb from a sender of an FM radio wave (Kumamoto-City Kinpousan) to a reception point (Taketa-City) were an epicenter from these presage on April 6 and empirical rule, and the scale of the earthquake could expect a big earthquake from the abnormal level of the radio wave. You could expect to continue twice because big unusualness also showed on the 9th. I shook in an earthquake on the prediction street in Taketa-City of a reception point at night on the 14th with that, and an observation and an empirical rule confirmed the right thing, and an epicenter found out Mashiki-Town near the route. But, the Meteorological Agency was announcing "Please be careful about an aftershock for 1 week from now on.", so for me who predicted the 2nd time of big earthquake to tell "A big earthquake came again.", I ran to Kumamoto-Pri Mashiki-Town next early morning. But while an aftershock continued at a disaster area, I fully realized that almost earthquake prediction information which also has no agreements with media is of no avail. So electromagnetic observational data of our workshop is developed at this JGU academic meeting, and it's announced that an electromagnetic observation is very effective in earthquake prediction. (For an observation chart, the transverse = hour and vertical axis= the electric field strength and the color = observation radio wave)

Keywords: Foretelling earthquake, Electric wave observation , FM electric wave, Kumamoto earthquake

熊本地震でのJYAN研電磁観測は「余震」まで判りました。

