

The analysis for environmental electromagnetic field measurement

Yutaka Emoto[1]; Chihiro Yamanaka[1]; Motoji Ikeya[2]

[1] Earth and Space Sci., Osaka Univ.; [2] Earth and Space Sci. Osaka Univ.

Network system using web technology for environmental electromagnetic field measurement was started in April, 2003. A number of unusual phenomena appearing a few days or a few hours before large earthquakes have been reported by citizens from old times. Many precursors were also collected in the case of the Southern Hyogo Prefecture Earthquake (Jan. 17, 1995, $M = 7.3$). One of the convincing physical mechanisms to explain these phenomena is EM effect considering that unusual electromagnetic signals observed before earthquakes from DC to VHF bands. We attempt to detect EM pulses before earthquakes at wideband range simultaneously. Unusual intense EM pulses were observed in Osaka, 8 days before the Western Tottori Earthquake (Oct. 6, 2000, $M = 7.3$). Unusual intense EM pulses (over 3.5 V/m) were observed in Shimane only one day before the Geiyo Earthquake (Mar. 24, 2001, $M = 6.7$) through one year of observation period.

We have developed a computer network system to achieve continuous and automatic detection of environmental EM fields at plural points. Knowing the power of EM pulses enables us quantitative estimations on source power and attenuation of EM field to the distance. We use three-dimensional EM-field meters (EMC-300, Narda S.T.S) covering a wide frequency range from 100 kHz to 3 GHz. Daily EM field is observed at 50 Hz sampling, and recorded as an average and peak intensity at every 10 seconds for data compaction. In case of unusual intense EM pulses, which are judged by the variations from standard deviation, all the data of 10 seconds with 20 ms intervals (3 seconds for pre pulse, 7 seconds for post pulse) were separately collected to investigate the characteristics of pulses. Now we have observed at Asaka city in Saitama, Ichikawa city in Chiba, Toyonaka city in Osaka and Kobe city in Hyogo.

In this presentation I report the method and result of the direction determination by the 3 direction data of an unusual signal. From the simultaneous generating signal in two nearby observing points I analyzed about pinpointing of a generating region.

Observed data of this network is put on the site (<http://plusepower.ess.sci.osaka-u.ac.jp/>).