

## Long distance propagation of 47-76MHz TV broadcasting wave

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In order to research the relationship between earthquakes and electromagnetic phenomena, we started regular observations in the VHF band in 1999 at Tateyama, Chiba prefecture.

We used four Yagi and LPDA (Log-Periodic Dipole Array) antennas which toward to west direction, and a spectrum analyzer to investigate spectral characteristics of observed signal at 47~76MHz.

In the spectrogram, two TV broadcasting waves were sometimes observed. These waves are TV-broadcasting waves of China (CCTV-1, 49.75MHz) and Malaysia (Radio TV Malaysia, 48.25MHz). If we assume one-hop reflection at certain layers in ionosphere, these would be reflected at F2 and E layer, respectively.

The receiving level of the TV wave at 48.25MHz decreased temporarily before and after several earthquakes of Magnitude 4.5 or more. We presumed that the sporadic E causes the relationships between the anomalies and the earthquakes, which is possibly associated with earthquakes.

However, sporadic E, disturbance of the ionosphere is generated even when normal conditions. Therefore, we investigated spectrogram over one year in more detail. As a result, we found that the phenomenon of long-distance propagation can be classified into three kinds.

1) It is generated from 8:00~20:00JST in spring and autumn. The maximum frequency which can be spread is observed in 50~60MHz.

2) It is generated from 8:00~20:00JST in summer. The characteristic of the frequency can't be observed.

3) It is generated from 20:00~20:00JST in spring and autumn. The characteristic of the frequency can't be observed.

About (1), the receiving level is decreasing significantly beyond the maximum frequency and changing dynamically with time. These facts suggest that variation of ionospheric conditions strongly affect to the propagation of VHF radio waves.