

# Anomaly prior to 2018/4/9 Tottori West M5.8 and other earthquakes appeared on Ionosphere Perturbation observed by Terminator Time of AM Broadcasting Wave

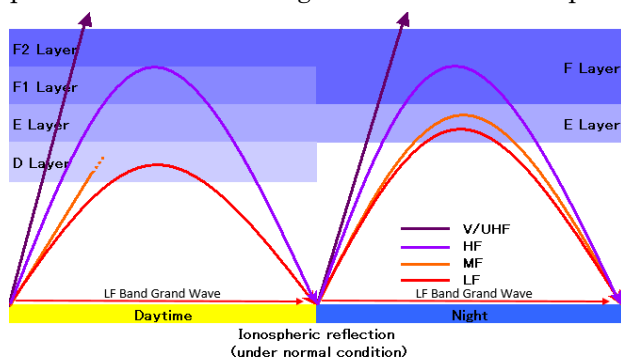
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This paper is to report experiment result as to Ionosphere Perturbation observed by Terminator Time of AM Broadcasting Wave (here in after TT) of AM Broadcasting Wave instead of VLF/LF band measurement method which was discovered by Dr. Hayakawa of Electric Communication College.

## 1. Anomaly prior to 2018/4/9 Tottori West M5.8 Seismic Intensity 5+

Fig. 1 shows Ionospheric reflection. AM broadcasting wave is absorbed in daytime and reflected at E layer in night time, therefore, it is possible to receive at long distance observation post.



Source: <https://commons.wikimedia.org/w/index.php?curid=>

Fig. 1 EM wave Propagation through Ionosphere

Fig. 2 shows recent graph for standard deviation of TT which was observed broadcasting wave from Kagoshima at Numazu observation post prior to 2018/4/9 Tottori West M5.8. Anomaly appeared on about two weeks before the earthquake.

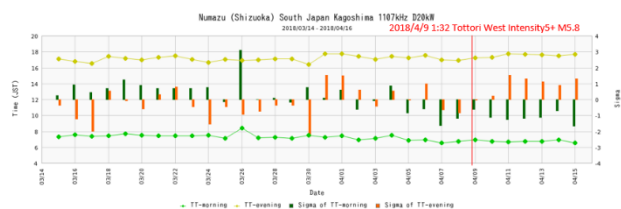


Fig. 2 Anomaly from Kagoshima to Numazu

## 2. Anomaly appeared on Ionosphere Perturbation observed by Terminator Time of AM Broadcasting Wave

Fig. 3, 4, 5 show graphs for standard deviation of TT which was observed broadcasting wave from Kumamoto and Koriyama at Sagamihara

observation post prior to some EQs. Anomaly appeared on about two days to two weeks before.

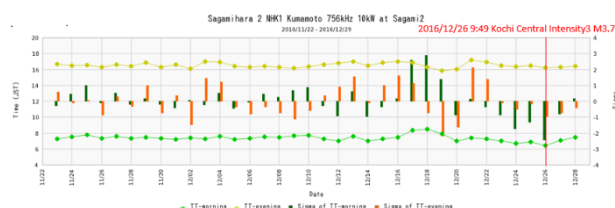


Fig. 3 Anomaly from Kagoshima to Sagamihara

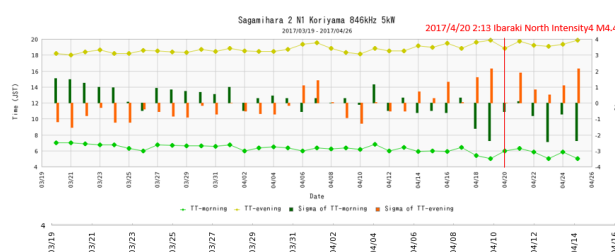


Fig. 4 Anomaly from Koriyama to Sagamihara

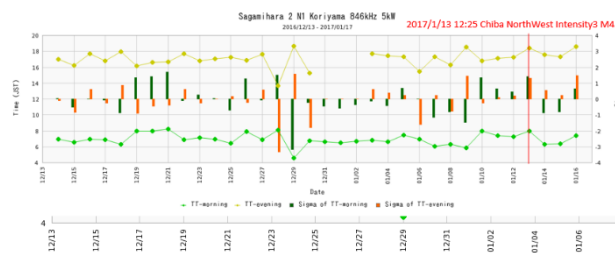


Fig. 5 Anomaly from Koriyama to Sagamihara

## 3. Earthquake Forecasting Experiment

EQ forecasting experiment is performed since 2016 May based on TT measurement which has been measured at several observation posts. 43 times of forecasting were performed when  $\sigma$  was exceed 2. Hitting rate is 46%, semi-hitting rate is 31%, sold run rate is 13% and missing rate is 10%.

## References:

VLF/LF signals method for searching of electromagnetic earthquake precursors M. Hayakawa