

## Interferometric measurement of pre-seismic atmospheric anomalies

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Studies of seismo-electromagnetics have been developed for a few decades. In particular, the ionospheric anomalies associated with earthquakes (EQs) have been investigated since the 1980s.

On the other hand, the VHF electromagnetic waves cannot usually propagate long distance because they penetrate through the ionosphere. They can reach far away receivers beyond the line-of-sight only when reflection and scattering due to ionospheric or atmospheric disturbances take place. Such disturbances include Sporadic E-layer and meteor generated plasma tubes. Therefore, VHF electromagnetic waves can be used for monitoring them. It is possible to investigate the transmission path of the waves through measuring their polarization as applied for VHF radars.

In this paper, appearance of anomalies in the atmosphere before earthquakes has been verified, through observation of anomalous transmission of VHF electromagnetic (EM) waves beyond line-of-sight. Anomalous increase of the received intensity for a few minutes - several hours on a day was identified by the previous 15-day running median and its inter-quartile range. The cross-correlation between the earthquake occurrences and the anomalies shows that the appearance of anomalies was significantly enhanced within 5 days before earthquakes (magnitude more than 4.8). The one-day average number of the anomaly appearance within 5 days was found 2.4 times larger than that of other days. Through the polarization measurement of the received EM waves, the anomalies were found to occur in the atmosphere. Therefore, temporal correlation between pre-seismic atmospheric anomalies and earthquakes was found.

Moreover, in order to verify the spatial correlation, we developed interferometer finding direction system. In our presentation, we will show our preliminary results.

### References

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