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Room:Convention Hall

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Simultaneous observation of VHF radio wave transmission anomaly propagated beyond line of site prior to earthquakes in m

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The VHF radio wave transmission anomalies propagated beyond line of site prior to earthquakes (hereafter termed EQ-echo) have been observed more than 20 times from 2004 at the Erimo observatory (ERM) in Hokkaido, Northern Japan. A statistical relationship between magnitude of preceding earthquake (M) and total duration time of the EQ-echo (T_e) has been proposed in this area (Moriya et al.2009). To confirm a region where the EQ-echo observed for each earthquake, we installed another 3 observatories with approximately 5 km spacing in the surroundings of ERM ; Fuyushima (FYS), Rusaki (RSK) and Tohyoh (TYO).

In consequence, the EQ-echoes have been observed at least one observatories prior to 7 earthquakes (totally 9 earthquakes $M > 3.9$ occurred) between 2009 and Oct. 2010. The logarithm relationship between M and T_e for these 7 earthquakes showed similar relationship proposed by Moriya et al. (2009).

In addition, EQ-echoes were simultaneously observed at three observatories, ERM,RSK and FYS, before earthquake in Hidaka Mountains at 10 Mar. 2009 ($M=4.1$). Although the wave forms of the EQ-echoes were similar in each record, the initial time and duration time of each EQ-echo were different in some minutes each other. To detect arrival direction of the EQ-echo, six-ways antennas were installed at every 60 degree in FYS since 2009. By using this multi-way antennas, we estimated the arrival direction of EQ-echo before the earthquake that occurred at 14 Oct. 2010 ($M=5.5$). Although this method seemed capture changes of arrival direction of EQ-echoes in duration time (from 120 to 170 degrees from the north), this estimated directions were different from the direction of epicenter (about 0 degree) and the Hiroo broadcasting station (about 80 degree). These time lags of EQ-echoes and change of arrival direction may suggest the expanding or moving of scattering object which affects appearance of an EQ-echo.