

Statistical analysis of ionospheric and atmospheric disturbances associated with typhoons using HFD and a microbarometer

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It is reported that ionospheric disturbances are caused by earthquakes. Although the extreme climate phenomena, such as typhoons and tornados, also excites the ionospheric disturbances, the studies of these kind disturbances are very few. In this study, therefore, we have examined ionospheric and atmospheric variations associated with typhoons using HF doppler sounding system, which is maintained by The University of Electro-Communications, and microbarometers located at Sugadaira, Nagano Prefecture and Numata, Gunma Prefecture. This study utilizes HFD data where HFwave transmitted from Chofu Campus is received at Sugadaira observatory.

By dynamic spectral analyses of HF doppler data and microbarometers, it is found that spectral intensities of the disturbances at frequency from 5 MHz to 40 MHz were enhanced in 4 of 12 events where typhoons come closer to Japan. Those 4 typhoons approached the observation point more than 250 km.

These ionospheric disturbances were caused by the acoustic mode of internal gravity wave. The acoustic mode of internal gravity wave propagates vertically, and thus spectral intensity were enhanced when the typhoons were closed to the observation point. In this study, some typhoons which were closed to the observation point didn't caused ionospheric disturbances. In order to reveal this phenomenon, we make analyses of wind velocity of reanalysis data.

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