

Infrasound multi-site observation of thunders 2: test results for SATREPS

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Infrasound is considered as one of the remote-sensing method of lightning/thunders. Small but impulsive pressure changes caused by the rapid expansion of the heated plasma along the path of lightning strikes can be detected by infrasound sensors with higher sensitivity range of 1 mPa. Sensor network to be deployed for a SATREPS project in Philippine is planned in Manila region in 2018.

For the testing observation, since 2016, we installed infrasound sensors at three sites with a separation about 15 km in Kochi pref. and a lightning/thunder event was successfully detected simultaneously at the every three sites. Fortunately, the detected event was confirmed as lightning flash by a high sensitivity video camera and operated mainly for meteor orbit detection. Forward-scattering radio meteor observation at two sites also detected impulsive lightning signal at the same time. From the comprehensive observation, exact location of the lightning strike was calculated in detail with an error range within 300 m or less.

Moreover, we examined two data analyzing methods that can be applied for thunder source point determinations. We found, for the dense sensor network to be realized in Manila region, the grid search method usually used in seismic source point detection might be better for the whole data analyses.

The infrasound multi-site observation can reveal the lightning activities as close as 100 m scale when the infrasound sensors can be installed with a mesh of 10 km scale or shorter by using the speed of sound as a precise remote-sensing scale. In this talk, we will introduce a possibility of infrasonic remote-sensing for the coming era of internet of thing (IoT) even in the field of geophysical and disaster-prevention studies in the world.