

Infrasound multi-site observation of thunders: a preparation 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 rapid expansion of heated plasma/neutral particles along the path of lightning strikes can make shock waves, then it can be detected by infrasound sensors with higher sensitivity range of 10 mPa or less on ground. In 2016, we installed infrasound sensors at three sites with a separation about 15 km in Kochi prefecture and a lightning/thunder event was successfully detected simultaneously at the every three sites on Dec. 13, 2016. Fortunately, the detected event was confirmed as lightning flash by a high sensitivity video camera 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 for this example with an error range within 300 m or less. By using the speed of sound as a precise remote-sensing ruler, the infrasound multi-site observation could 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 denser. 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.

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