

Recent progress of infrasound studies and sensor developing activities

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Infrasound is one of the most important open fields to study the missing link from troposphere to upper atmosphere. In this decade, observation of the infrasound has been gradually improved with the progress of constructing the sensor network in all over the world for watching the nuclear explosions. On the other hand, many kinds of remote-sensing observing methods have been developed by many scientists for ionospheric plasma observation like the GPS-TEC mapping method to clarify the wide field disturbances like TID (Traveling Ionospheric Disturbance), indicating the importance of vertically propagating large wavelength waves to be projected and seen on the mapping results. Seismic, volcanic, atmospheric and oceanic observation regions are also deeply concerning with the infrasound studies.

Hence, not only the electromagnetic coupling processes but also neutral atmospheric pressure waves like the audible sound and infrasound should be studied. However, the observation of infrasound is currently less sufficient rather than the seismic and GPS sensor networks. As for the event studies, it has been reported that huge earthquakes like Sumatra (2004) or Tohoku-oki (2011) as well as their induced tsunami waves became clear wave sources of these kinds of pressure waves, suggesting the infrasound whose propagating velocity is faster than that of tsunami waves on the sea is important for the disaster prevention. Even the relatively small scale geophysical phenomena like volcanic eruptions, meteorite entries, land or snow slides, or thunders also creates clear N type infrasound signal at a time of arrival of the shock waves generated at the source region, possibly depending on its size and moving distance.

In order to measure such pressure waves in a few to several 100 km scale, arrayed sensors network is required, thus the cost of each pressure sensor is important to built. We recently developed a new infrasound sensor that include some weather monitoring sensors and seismometers, enables us to integrate several parameters information to create an independent emergency alert system by one sensor complex for any geophysical events just after the arrival of the sonic waves. In this paper, we will show the most recent progress of the infrasound studies as well as the development of infrasound sensors. Collaboration of science and engineering researches, manufacturing companies with their engineers and infrastructure management officers in regional governments are very important to open the new era of the infrasound applications useful into the society.

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