

Development and downsizing of a PSD type infrasound sensor

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Infrasound is one of the open fields for remote-sensing methods of geophysical phenomena in the atmosphere. There have been developed and used many types of infrasound sensors, however, typically used infrasound sensors are almost manufactured by foreign countries, resulting high cost situation in Japan. If we can develop low cost infrasound sensors, multiple-site arrayed observation will be realized in near future. Recently, infrasound signal generated by tsunami was clearly detected by many CTBTO infrasound stations (Arai et al., 2011), suggesting a new era for establishing a dense infrasound sensor network in every part of Japan for preventing or reducing catastrophic disasters. Because the nature of pressure waves with large wavelength, amplitude of infrasound generated by tsunami might be proportional to the size of the disasters. Combination with sensor networks of seismometers on ground and ocean floor, GPS-buoy type wave recorders, and water manometers on ocean floor, establishing a dense network of infrasound sensors with arrayed configuration is desired.

Since 2006, we have been developing new sensing method of infrasound by using piezo film and PSD (Position Sensitive Detectors), achieving frequency range between 0.001 Hz and 10 Hz as well as minimum pressure level of 0.01 Pa (Yamamoto and Ishihara, 2009). Here, we tried downsizing the PSD type infrasound sensor developed in 2008 into a size of 0.15 m x 0.15 m x 0.25 m height with calibrating it by using space chamber (0.8 m length x 0.58 m diameter) as an accurate volume pressure reservoir. By pushing and pulling a small amount of air by a small syringe, calibrating pressure waves with extremely weak amplitude (10 Pa to 0.01 Pa) can be generated in the chamber, precise measurement of artificially generated infrasonic signals could be realized. The waves were measured not only by the developed PSD sensor, but also by Chaparral Model-2.5 infrasound sensor at the same time. Comparison with output signals by two types of sensors, the downsized PSD type infrasound sensor was carefully studied. In this poster, we will show the new design and obtained calibrating datasets.

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