Infrasound measurement with MEMS sensors

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MEMS sensors are small in size and low power consumption. Because of that, they are suitable for a sensor network which usually requires a large number of sensors as well as their distribution over a wide area. Recent smartphones are usually equipped with multiple MEMS sensors inside. Therefore, they could play a role of good sensor devices, However, we cannot expect that a single MEMS sensor alone achieves high precision. Evaluation of their ability in use for infrasound monitoring is necessary.

We conducted some experiments with different configurations. In an experiment, multiple MEMS pressure sensors are simultaneously used at one place to measure a sound signal. Variance of the observed signals and improvement in signal-to-noise ratio by averaging them are quantitatively discussed. Meanwhile, sound has been continuously recorded using different types of measurement devices, including a smartphone, in the field for a couple of months. The aim was to compare the infrasound signals obtained by different devices in a practical situation. Results of the experiments and some findings are presented.

In addition, an application of the infrasound measurement device using MEMS sensors to the estimation of sound localization for volcanic eruption is demonstrated.

Keywords: Smartphone, MEMS sensor, Localization

