MTT43-P01 Room:Poster Time:May 1 18:15-19:30

High resolution barometer array in Palau, Western Pacific

ISHIHARA, Yasushi[1*] ; FUKAO, Yoshio[1] ; SHITO, Azusa[2] ; OBAYASHI, Masayuki[1] ; SHIROOKA, Ryuichi[1]

[1]JAMSTEC, [2]Institute for Geothermal Sciences, Kyoto University

The Variety of waves is propagating in the atmosphere, ocean and solid earth. And there are interacting between each layer. For total and integrated understanding, multi parametric measurement over different field is required. We target Palau islands, western Pacific for multi parametric measurement. We are operating broadband seismic station in a station of Pacific Geophysical Network (OHP network). And another seismic station is also under operation due to removing of seismic station. Meteorology group of JAMSTEC has their station including meteorological radar. We think that Palau is fine condition to construct integrated geophysical measurement field. So that we deployed high resolution barometric small array in Palau.

Palau locates tropical zone and its daily weather condition is similar and relative more stable than middle latitude zone and polar area that have some day's variation and passing of front. In our research, one of mail focuses is very low frequency band of barometric variation; the ambient condition has merit to get accurate detection of signal.

As for observation system, sensor is quartz oscillation type high resolution barometer and recorder is Linux Box via serial communication. We set to be sampling of 2 sps to get high resolution data. We installed Five(5) stations in Palau whose station interval is about 20km. Two stations of them locate at seismic stations and another station is same area with weather station. The array is operating from August, 2013 and is under operation.

The tentative data review shows atmospheric gravity wave is frequently recorded in longer period of 200sec. Sometimes event pulse-like signals are detected. Apparent velocity of these waves is 20 ? 30 m/s and direction of propagation varies daily. Most signal arrives from outside of this array. We report character of these wave and relation with meteorological condition.

Keywords: atmospheric gravity wave, micro seism

Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

MTT43-P02 Room:Poster Time:May 1 18:15-19:30

Improvement and evaluation of optical-type infrasound sensor for multi-site observation

IKEHARA, Kousuke[1*] ; YAMAMOTO, Masa-yuki[1] ; KAKINAMI, Yoshihiro[1] ; ISHIHARA, Yoshiaki[2]

[1]Kochi University of Technology, [2]JAXA Space Exploration Center, Japan Aerospace Exploration Agency

Infrasound is applicable for remote-sensing methods for detecting geophysical phenomena in the atmosphere. There have been developed and used many types of infrasound sensors, however, typically used infrasound sensors are almost developed by foreign countries, resulting high cost situation in Japan. If we can develop low cost infrasound sensors, multi-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 prefecture 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). In 2013, 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 (Manabe et al., 2013). Here, we improved the PSD optical-type infrasound sensor by using 3D printer technology to make many tiny parts designed with 3D CAD software.

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 space chamber, precise measurement of artificially generated infrasonic signals could be realized. The waves were measured by both of the developed PSD sensor and 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 paper, we will introduce the new design and obtained calibrating datasets.

Keywords: infrasound, multi-site observation, sensor development, optics, measurement, low-cost

Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

MTT43-P03 Room:Poster Time:May 1 18:15-19:30

Pressure sensors detected wind noise produced in wind tunnel

IWAKUNI, Makiko[1*] ; YAMAMOTO, Masa-yuki[2] ; TANIMOTO, Saki[3] ; KAKINAMI, Yoshihiro[2] ; IKEHARA, Kosuke[2] ; OKADA, Kazumi[4] ; ARAKI, Keiji[3] ; KURIHARA, Yasushi[3] ; ARAI, Nobuo[1] ; MURAYAMA, Takahiko[1] ; NOGAMI, Mami[1]

[1]Japan Weather Association, [2]Department of systems engineering, Kochi University of Technology, [3]Railway Technical Research Institute, [4]Imstitute of Seismology and Volcanology, Hokkaido University

As infrasound and pressure disturbance induced by local wind around infrasound sensors are partially in the same frequency range, amplitude of the infrasound signal is sometimes lower than that of pressure disturbance by strong wind. Thus, obtaining the infrasound signal by analyzing software from the observation data with such wind noises is one of the technical objectives to solve. Usually, some porous pipes connected with the infrasound sensors have been used in order to reduce such local wind disturbances.

To evaluate such system for wind noise reduction, we conducted experimental study by using a wind tunnel with wind speed up to 60 m/s. We used nano-resolution pressure transducer (6000-16B manufactured by Paroscientific Inc., USA) and microphone type infrasound sensors

(Chaparral physics, Model25 manufactured by Univ. of Alaska Fairbanks) in the wind tunnel of the Railway Technical Research Institute (RTRI), Japan. In this presentation, we will show the relationship between the wind speed and porous pipe configuration installed in the wind tunnel.

In this presentation, we show the relation between wind speed and pipe direction.

Keywords: Infrasound, wind noise reduction, pipe reduction system, wind tunnel