

Infrasound waveforms excited by volcanic eruption

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1. Outline of Station

Infrasound monitoring station (IS30) is located in Isumi-Town, Chiba pref., about 60km southeast of Tokyo. It is one of the 321 Monitoring Stations of various methods that constitute the International Verification System established by the provision of the Comprehensive Nuclear-Test-Ban Treaty. This station is array designed 6 sensors, pentagon (1.2km on a side) + 1 (center).

Each array element has a wind-noise-reducing pipe array, a microbarometer sensor, a digitizer unit, a GPS receiver and antenna, a power supply, and radio communications equipment. The infrasound microbarometer sensor, GPS receiver and digitizer unit at each array element are installed in a small shallow surface vault located in the centre of the wind-noise-reducing array. We installed a security fence (20m x 20m) to prevent access by man or animal at each element. And meteorological sensors are installed at H1.

Radio telemetry system is used for transmission of data between array elements and the central processing station. The infrasound central processing system at the central facility formats data for transmission to the International Data Center (IDC) in Vienna and also controls various functions connected with authentication, command management, system calibration and control. The observed data is transmitted to NDC-1 (JWA) by using a dedicated line and monitored and analyzed.

2. Waveforms observed by sensors

These infrasound sensors are used for the monitoring of explosion in violation of CTBT, ranged from 0.02 to 4hz. These sensors enable to observe the waveforms excited by explosions with more than 1kt in the atmosphere. And the noises caused by volcanic eruptions, earthquakes, atmospheric fluctuations, auroras, bolides, supersonic aircrafts, rocket launches are observed.

The figure shows the observed infrasound waveforms excited by the small eruption of Miyake-volcano, which occurred on 2nd December 2004. According to JMA, the Miyake volcano erupted on 16:45 (JTC), and the low frequency earthquake accompanied the aerial vibration occurred. The infrasound station observed the infrasound waveforms around 16:56 (JTC). In the future, we analyze the waveforms in more detail and quantitatively compute the azimuth and apparent velocity of signals.

