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Disturbing Incidents Signal Character Analysis in Nuclear Explosion Infrasound Detection

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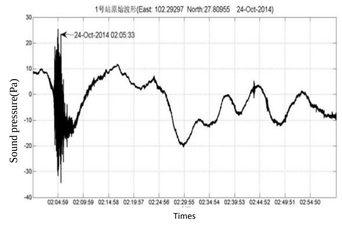
Infrasound is sound wave of frequency lower than 20Hz. Infrasound nuclear explosions detection technology is an effective technology to get explosion basic parameters and it is very practical approach for atmospheric and underground nuclear explosions .Some natural phenomena and human activities also produce infrasound signal , such as lightning, chemical explosion, satellite launch. These atmospheric infrasound signal become disturbing incident signal in the nuclear explosion infrasound detection system.

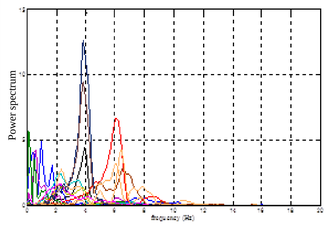
This paper analyzes the characteristics of disturbing incident in the infrasound detection of nuclear explosions. After data preprocessing, such as mean removal, atmospheric disturbance removal, filtering and normalization, etc., the infrasound signal characteristics of lightning, chemical explosion and satellite launch events are analyzed through spectrum and statistical methods. Spectrum characteristics of disturbing incident infrasound signal are obtained according to statistical conclusions. After removing background, filtering and normalization of the lightning, chemical explosion, satellite.

characteristics of Infrasound signal satellite launch event



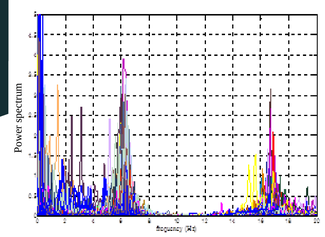
The frequency locals mainly in 7-12Hz at about 50km, as the distance increases, the main frequency down.

characteristics of infrasound chemical explosion signal



The power spectrum of the infrasound signals of 7 chemical explosion tests is roughly distributed around 4Hz~6Hz.

characteristics of the Infrasound lighting signal



The power spectrum of lightning infrasound signals from July to August in Beijing is roughly distributed 6Hz and16.5hz.

acquisition technology of Infrasound nuclear signal

power

- Infrasound signals
- Infrasound sensor
- Signal acquisition
- Data storage and transmission
- Infrasound signal data

Launch infrasound signal, the spectrum characteristics of measured signals are analyzed by using spectral calculation and statistical theory. It is concluded that frequency characteristics of lightning infrasound signal power spectrum on July and August in Beijing distribute in two areas
roughly. One of two areas is [5-7]Hz whose center frequency is 6Hz, the other is [15-18]Hz whose center frequency is 16Hz; Chemical explosion infrasound signal power spectrum is about[4-6]Hz; Satellite launch infrasound signal power spectrum is mainly at [7-12]Hz. This eigenvalue can be used as one of the eigenvectors for nuclear explosion infrasound detection and identification.