Detecting and Analysis of Infrasonic Signal of the Massive 2015 Tianjin Explosion event.

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A massive explosion in Tianjin occurred at a container port on August 12, 2015. The explosion produced a strong infrasound of extremely high signal to noise ratio registered by domestic infrasonic stations several kilometers away. Different from the ordinary explosion infrasound, Tianjin explosion infrasonic signals appear as six consecutive groups of clear first arrival. This reveals the complexity of the infrasound signal propagation path. Detection algorithms based on slowness estimation and association algorithms based on signal envelope are presented following a ray trace processing to discuss the strange signal arrivals that were earlier than normal. The results of signal processing show that the four algorithms are effective. The infrasonic signals of the event have a certain amplitudes and SnR 3500 kilometers away in downwind direction but cannot be observed clearly several hundred kilometers away in upwind direction. Signal characters of more than six sequential signal groups at I34MN, HTI and HMI infrasonic stations are particular compared to the presented explosive infrasonic signals and cannot be explained by ray tracing. Atmospheric profile data from NASA are used showing the complexity of modeling of infrasound propagation. The yield of the explosion is estimated in the end that is equivalent to 400-600 tonnes of TNT.

E-mail

1211949981@qq.com

Promotional text

Verify and improve CTBT's ability to detect nuclear events with the precious explosion events;
CTBT technology is well applied to detect dangerous explosion events and improve public safety.

Oral preference format

in-person

Primary author: Mr CHEN, Hu Hu (Xi'an Eurasia University)

Presenter: Mr CHEN, Hu Hu (Xi'an Eurasia University)

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