

infrasound detecting of the massive 2015 Tianjin explosions

A massive explosion in Tianjin erupted at a container port where flammable material was being stored. The explosion produced a mushroom with great shock waves that attenuated gradually and degraded into infrasound in far range. The infrasonic signals were registered by several IMS and domestic infrasonic stations several kilometers away. The signal detection algorithms based on slowness estimation and association algorithms based on signal envelope for the weak and low SNR infrasonic signals are present following a ray-trace processing to discuss the strange signal arrivals earlier than normal. The results of signal processing show that the fore algorithms are effective. The infrasonic signals of the event have a certain amplitudes and fair SNR 3500 kilometers away in downwind direction but cannot be observed clearly several hundred kilometers away in upwind direction. Signal characters of more than 6 sequential signal groups at I34MN, HTI and HMI infrasonic stations are particular compared to the presented explosive infrasonic signals and cannot be explained by the ray tracing even atmospheric profile data from NASA are used show 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.

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