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**Airburst Detection Capability of the Infrasound Segment of the CTBTO  
International Monitoring System**

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**ABSTRACT**

The International Monitoring System (IMS) of the Comprehensive Test Ban Treaty Organization (CTBTO) is a global network of hydroacoustic, seismic, radionuclide and infrasound sensors designed to detect any nuclear explosions with yield in excess of 1 kiloton TNT. The infrasound component of the IMS, planned to consist eventually of more than 60 stations, is particularly well suited to detection of atmospheric explosions, including airbursts produced by NEO impacts.

In this study we examined 344 airbursts reported on the JPL CNEOS website (<https://cneos.jpl.nasa.gov/fireballs/>) between 2007-2018 and attempt to correlate these with infrasound detections. We found 206 of these bolides were detectable by at least one infrasound station while only 42 were automatically registered as part of the Reviewed Event Bulletin (REB) issued daily by CTBTO. However, this global REB detection rate of ~10% averaged from 2007-2018 is less than the “modern” rate (from 2014-2018) which approaches 20%. The principle difference is the maturity of the IMS infrasound network: software processing is more efficient and the total

number of operational stations has increased from 37 stations in 2007 to over 50 as of 2018.

Above the 1 kT CTBTO design threshold, we find that 40% of airbursts are recorded in the REB, while more than 90% are detectable at one or more infrasound stations.

All airbursts with energy > 2 kT reported on the JPL fireball site since 2007 have been detected infrasonically. However, the REB is only complete above 15 kT with the automated detection system not having reported at least four airbursts with energies between 8 – 14 kT during 2007-2018. Among these non-detections by CTBTO are two recent events : an 8 kT airburst over the Southern Ocean on Aug 23, 2014 and a 13 kT airburst in the South Atlantic on Feb 6, 2016.

We will present details of the IMS airburst detection efficiency by season, airburst energy and other detection variables.

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