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# Infrasound for global fireball monitoring

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## ABSTRACT

Very bright fireballs can attract a lot of public attention. These light phenomena are caused when large meteoroids or small asteroids impact the Earth's atmosphere. Fireballs can be detected with various methods, from ground-based meteor networks to satellite-based remote observations. While many such systems are available across the globe, they often lack coordination. This is the goal of a project called NEMO currently under development at the University of Oldenburg. For this system as much available data as possible is combined.

One data source to record fireballs information is infrasound. Extra-terrestrial objects which enter the Earth's atmosphere release energy when they travel through it, which can be detected with infrasound stations (see e.g. Silber et al. (2018)). The CTBTO (Comprehensive Nuclear-Test-Ban Treaty Organisation, Vienna, Austria)

operates the IMS (International Monitoring System), initially designed to detect nuclear explosions. The system includes infrasound stations spread all over the world. Due to the fact that the IMS yields world-wide information during day and night it is a promising source for fireball detection as shown for some famous fireballs by e.g. Silber et al. (2011), Brown et al. (2013), or Caudron et al. (2016). From the infrasound data it is possible to derive the source energy of a fireball event, and hence the mass of the impacting object.

This work presents the infrasound analysis of the Sulawesi (Indonesia) event from 2009, the Chelyabinsk superbolide from 2013 and some more recent fireballs which were picked up by the NEMO system in the last two years.

The project is a cooperation between ESA and the University of Oldenburg as well as CTBTO and BGR (Bundesanstalt für Geowissenschaften und Rohstoffe).

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