

Analysis and identification of meteor signals detected by the IMS infrasound stations in South America

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Celestial objects from space have long aroused curiosity and fear worldwide. According to NASA, scientists estimate that approximately 48.5 tons of meteoric material fall to Earth daily, penetrating the atmosphere at supersonic speeds, far exceeding the speed of sound. These outer space objects, which can be fragments of comets and asteroids, are referred to as meteoroids. The infrasound stations of the International Monitoring System (IMS), a global network designed to detect nuclear explosions in compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT), contribute not only to monitoring clandestine atmospheric nuclear tests but also to studying other natural and anthropogenic events. One such application is the study of meteoroids entering the atmosphere at high speeds, which can generate infrasonic waves ($f < 20$ Hz). This work analyzes data from IMS infrasound stations located in South America to identify infrasonic events generated by meteors. A catalog for the period of 2018-2024 is presented. Confirmation of these events was conducted using data from the Center for Near-Earth Object Studies (CNEOS) and the Brazilian Meteor Observation Network (BRAMON). This study can also be useful for verifying the IMS detection threshold and providing an approach to understanding celestial events, their dynamics, and their impacts on Earth.

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