

Analysis Based on all-sky Cameras and Infrasonic Array for the Characterization of Small Fireball Events

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The entry meteoroids and meteorites into the earth's atmosphere is a powerful source of infrasonic waves. The generated infrasound can be recorded at the ground and, using an array of sensors, characterized in terms of wave parameters, indicative of the source and its position. This study presents the integrated analysis of ~15 small fireball events based both on images of the all-sky cameras of the PRISMA meteor surveillance network and on the infrasonic data recorded at two infrasonic arrays deployed by the University of Florence in Northern and Central Italy. Thanks to the analysis of the light signals recorded by multiple all-sky cameras, the detected events were physically characterized in terms of time of occurrence, observed optical trajectory and pre-atmospheric speed, mass, dimensions and kinetic energy. Using the occurrence time provided by the all-sky cameras, the recorded signals, analysed through array processing, are back-propagated using ray-tracing techniques to reconstruct the infrasound propagation, locate the fireball event and reconstruct its trajectory. Finally, the optically derived parameters are compared with the infrasonic amplitude retrieved at the source and with the frequency content of the recorded infrasonic signals, to investigate the potential of using infrasound to reconstruct the energy of the meteoroid events.

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Promotional text

A contribution on the potential of using infrasound to detect and to characterize fireball events.

Oral preference format

in-person

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