

bolide energy through infrasound analysis: A case study of the 2023 Australian event

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Utilizing infrasound stations of the International Monitoring System (IMS) network has become increasingly prevalent over the past decade due to their ability to detect bolides. Infrasound data are often complemented by optical observations, providing essential ground truth information. We present infrasound detections of a bolide that exploded over Australia on 20 May 2023. The bolide entered the atmosphere over Queensland at a speed of 28 km/s. It disintegrated catastrophically at an altitude of 29 km, saturating ground-based cameras, thus hindering efforts to determine its full trajectory and obtain photometric measurements. The bolide deposited energy of ~7.2 kilotons of TNT equivalent, ranking it among the top 20 most energetic events reported in the JPL/NASA CNEOS database since 1988. The bolide was so bright that it was visible at a distance of 600 km. Infrasound signals from this event were detected at IMS stations located up to 6000 km away, with energy estimates derived from infrasound analysis aligning closely with values reported in the CNEOS database. We will present detailed infrasound observations of this energetic bolide event and discuss its implications for planetary defense and the characterization of similar events.

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