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## **(POS-1) Low frequency acoustic waves in the atmosphere: A diagnostic for impulsive sources**

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Natural and artificial impulsive sources in the atmosphere can generate infrasound, or very low frequency ( $f < 20$  Hz) acoustic waves, that can travel over long distances with minimal attenuation. Traditionally confined to ground-based sensors, the domain of infrasound sensing has expanded in recent years to include airborne platforms (e.g., balloons). Unlike other sensing modalities that might have geographic (e.g., inaccessible regions), time-of-day (e.g., optical) or other limitations, infrasound can be utilized continuously (day and night) on a global scale. Volcanoes, lightning, chemical explosions, re-entry vehicles, space debris, and bolides are among the diverse sources producing infrasound phenomena. Among these, bolides present a particularly intriguing scientific challenge due to their varying velocities, entry angles, and physical properties. Theoretically, bolide infrasound signatures should carry information about the source (e.g., velocity, altitude, mass) but the dynamic changes in the atmosphere that occur on temporal scales of minutes to hours might lead to loss of that information. Therefore, to fully utilize infrasound towards characterization of bolides and sources alike, it is of essence to have both the detailed event ground truth and accurate atmospheric specifications. This information serves as the foundation for improving and validating models, with the ultimate goal of utilizing infrasound signatures alone to infer characteristics of the source. In this context, a succinct overview of bolide infrasound will be provided, complemented by notable examples, to elucidate its utility in atmospheric studies.

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### **Keyword-1**

infrasound

### **Keyword-2**

bolides

### **Keyword-3**

shockwaves

**Primary author:** SILBER, Elizabeth (Sandia National Laboratories)

**Presenter:** SILBER, Elizabeth (Sandia National Laboratories)

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