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Sonic Boom Energy from Atmospheric Models

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Abstract:

On September 24, NASA’s mission Origins, Spectral Interpretation, Resource Identification, and Security – Regolith Explorer (OSIRIS-REx) sample return capsule re-entered Earth at hypersonic speed. Infrasonic and acoustic sonic boom signatures were collected in collaboration with Sandia National Laboratories (SNL). We used atmospheric specifications from the 1976 NASA U.S. Standard Atmosphere, NRL Ground-to-Space (GS2), and fifth-generation European Centre for Medium-Range Weather Forecasts atmospheric reanalysis (ECMWF ERA5) for 2023-09-24 14:00 UTC (near the time of the event) to predict the energy and N-wave duration from hypersonic entry to subsonic quiescence.