EAPS Planetary lunch Colloquium Series (PICS)

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Tuesday, December 5th
12:30pm
54-517

Listening for Bolides: Infrasound Detection of Small Earth Impactors

The Earth's atmosphere acts as a witness plate for incoming meteors. Flashes from bolides are reported at rates of a few per month (`https://cneos.jpl.nasa.gov/fireballs/`), and the infrasound disturbances produced by impactors have been sensed by ground-based microphone arrays over vast distances. In principle, the detection of these events can help us characterize the small end of the Near Earth Object (NEO) population.

In September 2016 and July 2017 we flew infrasound instrumentation on balloons and coordinated those flights with ground-based explosions. Our expectation was that infrasound signals would have reduced amplitudes in the stratosphere (roughly proportional to the square root of the ambient pressure), but, despite that attenuation, the signal-to-noise would be much better from balloon-borne platforms than from the ground. The lack of wind noise on the balloon platform greatly reduces the background (compared to the ground-based case), and the stratospheric duct should propagate infrasound signals effectively. Both of our balloon-borne experiments detected signals over large distances. We will discuss the details of the measured SNRs from balloons vs. ground-based sensors and the prospects for detection of bolides.

For more information, contact Jason Soderblom (jms4@mit.edu)

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