Balloon Based Observation of Sporadic Meteors from the Stratosphere

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Meteors are small bits of material that enter the atmosphere at high speed and leave a trail of ionized gas. The objective of this work is to observe sporadic meteors from a platform in the stratosphere. At high altitudes, clouds and city lights should not interfere with the observations. Furthermore, meteors should appear about four times brighter when viewed from the stratosphere since the distance from the camera to the meteor is reduced by a factor of two. A package of instruments including a high sensitivity, monochrome video camera with a fisheye lens was assembled and flown on a helium filled weather balloon at night. Telemetry of the GPS coordinates, altitude, and temperature was sent once per minute during the flight via a 2-m radio. The telemetry was received on the amateur radio network and then posted online. Three hours of balloon based video was successfully recorded over the course of the flight. Examination of the video footage shows that observing conditions improve significantly as the altitude increases. Although, the brightest stars and the planet Jupiter are visible in the video, no meteors were found in the data from this flight. This work is a good first step toward the observation of meteors from the stratosphere. Ideally, the next flight will be conducted during one of the annual meteor showers at a time when the Moon is not visible to hamper the observations. The addition of a ground based station would make it possible to perform simultaneous observation from two locations, making it possible to use triangulation to obtain the meteor altitude.

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