

Stanford Meteoroid Environment and Effects Workshop abstract

Optical observations session

Meteoroid Flux from Lunar Impact Monitoring

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The flux of kilogram-sized meteoroids has been determined from the first 5 years of observations by NASA's Lunar Impact Monitoring Program (Suggs et al. 2014). Telescopic video observations of 126 impact flashes observed during photometric conditions were calibrated and the flux of meteoroids to a limiting mass of 30 g was determined to be  $6.14 \times 10^{-10} \text{ m}^{-2} \text{ yr}^{-1}$  at the Moon, in agreement with the Grun et al. (1985) model value of  $7.5 \times 10^{-10} \text{ m}^{-2} \text{ yr}^{-1}$ . After accounting for gravitational focusing effects, the flux at the Earth to a limiting impact energy of  $3.0 \times 10^{-6}$  kilotons of TNT ( $1.3 \times 10^7 \text{ J}$ ) was determined to be consistent with the results in Brown et al. (2002). Approximately 62% of the impact flashes were correlated with major meteor showers as cataloged in visual/optical meteor shower databases. These flux measurements, coupled with cratering and ejecta models, can be used to develop impact ejecta engineering environments for use in lunar surface spacecraft design and risk analyses.

Brown, P.G., Spalding, R., ReVelle, D., Tagliaferri, E., Worden, S., 2002. The flux of small near-Earth objects colliding with the Earth. *Nature* 420, 294-296.

Grun, E., Zook, H.A., Fechtig, H., Giese, R.H., 1985. Collisional balance of the meteoritic complex, *Icarus* 62, 244-272.

Suggs, R.M., Moser, D.E., Cooke, W.J., Suggs, R.J., 2014. The flux of kilogram-sized meteoroids from lunar impact monitoring. *Icarus* 238, 23-36.