32nd URSI GASS, Montreal, 19–26 August 2017

Meteor Shower Fluxes from Transverse Scatter Radar Observations

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1 Extended Abstract

The characterization and monitoring of meteor showers is of interest for a number of reasons. Scientifically, the meteoroid streams which produce the showers are the only meteoroids which can be linked directly to a parent asteroid or comet, so the past activity and ejection mechanisms of these remnants of the primitive solar system can be constrained with precise observations of shower activity. Very strong showers may also pose a danger to spacecraft above the background meteoroid hazard, and accurate observations of past showers are vital to predicting future activity.

Meteor radars are particularly usefor for monitoring shower activity because they can observe day and night in any weather. However, radar observations suffer from observing biases which must be corrected in order to obtain accurate absolute fluxes and activity profiles.

The Canadian Meteor Orbit Radar (CMOR) has been operating continuously for more than 15 years, at two different frequencies (29.85 and 38.15 MHz). More than 100 meteoroid streams have been identified in the data [1]. The activity profiles of the major showers have been corrected for observing biases, including initial trail radius attenuation, Faraday rotation, and transmitter power fluctuations. Some showers (including the Geminids, shown in Figure 1) show very little variation in activity from year to year; others, including the Eta Aquariids, show years of quieter activity and years with outbursts of activity much higher than average.

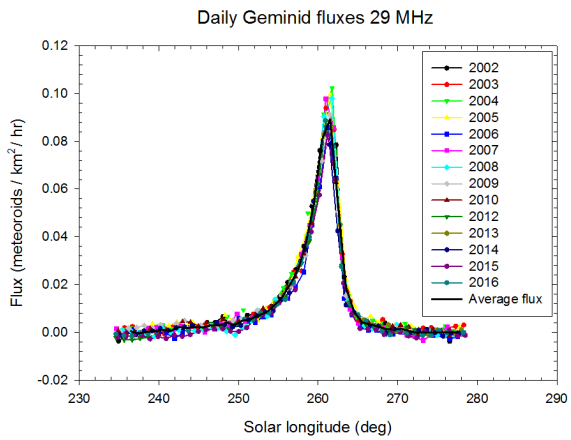

Figure 1. Daily fluxes of the Geminid meteor shower as measured by the 29 MHz CMOR system.

References

[1] P. Brown, D. K. Wong, R. J. Weryk and P. Wiegert, “A meteoroid stream survey using the Canadian Meteor Orbit Radar. II: Identification of minor showers using a 3D wavelet transform," *Icarus*, **207**, May 2010, pp. 66–81, doi:10.1016/j.icarus.2009.11.015.