

Meteor shower forecast improvements from a survey of all-sky network observations

Althea V. Moorhead

NASA Meteoroid Environment Office,
Marshall Space Flight Center, Huntsville, Alabama 35812

Glenn Sugar

Department of Aeronautics and Astronautics,
Stanford University, Stanford, California 94305

Peter G. Brown

Department of Physics and Astronomy,
The University of Western Ontario, London N6A3K7, Canada

William J. Cooke

NASA Meteoroid Environment Office,
Marshall Space Flight Center, Huntsville, Alabama 35812

ABSTRACT

Meteoroid impacts are capable of damaging spacecraft and potentially ending missions. In order to help spacecraft programs mitigate these risks, NASA's Meteoroid Environment Office (MEO) monitors and predicts meteoroid activity. Temporal variations in near-Earth space are described by the MEO's annual meteor shower forecast, which is based on both past shower activity and model predictions.

The MEO and the University of Western Ontario operate sister networks of all-sky meteor cameras. These networks have been in operation for more than 7 years and have computed more than 20,000 meteor orbits. Using these data, we conduct a survey of meteor shower activity in the "fireball" size regime using DBSCAN. For each shower detected in our survey, we compute the date of peak activity and characterize the growth and decay of the shower's activity before and after the peak. These parameters are then incorporated into the annual forecast for an improved treatment of annual activity.