

## Recent corrections to meteoroid environment models

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The dynamical and physical characteristics of a meteoroid affects its behavior in the atmosphere and the damage it does to spacecraft surfaces. Accurate environment models must therefore correctly describe the speed, size, density, and direction of meteoroids. However, the measurement of dynamical characteristics such as speed is subject to observational biases, and physical properties such as size and density cannot be directly measured. De-biasing techniques and proxies are needed to overcome these challenges. In this presentation, we discuss several recent improvements to the derivation of the meteoroid velocity, directionality, and bulk density distributions.

We derive our speed distribution from observations made by the Canadian Meteor Orbit Radar. These observations are de-biased using modern descriptions of the ionization efficiency and sharpened to remove the effects of measurement uncertainty, and the result is a meteoroid speed distribution that is skewed slower than in previous analyses. We also adopt a higher fidelity density distribution than that used by many older models. In our distribution, meteoroids with  $T_J < 2$  are assigned to a low-density population, while those with  $T_J > 2$  have higher densities. This division and the distributions themselves are derived from the densities reported by Kikwaya et al. (2009, 2011).

These changes have implications for the environment. For instance, helion and antihelion meteors have lower speeds and higher densities than apex and toroidal meteors. A slower speed distribution therefore corresponds to a sporadic environment that is more completely dominated by the helion and antihelion sources than in previous models. Finally, assigning these meteors high densities further increases their significance from a spacecraft damage perspective.