

[Home](#)[Online Library ACP](#)

- Recent Final Revised Papers
- [Volumes and Issues](#)
- Special Issues
- Library Search
- Title and Author Search

[Online Library ACPD](#)[Alerts & RSS Feeds](#)[General Information](#)[Submission](#)[Review](#)[Production](#)[Subscription](#)[Comment on a Paper](#)

Impact
Factor
4.865

ISI
indexed

[Volumes and Issues](#) [Contents of Issue 4](#) [Special Issue](#)

Atmos. Chem. Phys., 4, 947-954, 2004

www.atmos-chem-phys.net/4/947/2004/

© Author(s) 2004. This work is licensed under a Creative Commons License.

Meteoroid velocity distribution derived from head echo data collected at Arecibo during regular world day observations

M. P. Sulzer

Arecibo Observatory, Arecibo, Puerto Rico

Abstract. We report the observation and analysis of ionization flashes associated with the decay of meteoroids (so-called head echos) detected by the Arecibo 430 MHz radar during regular ionospheric observations in the spring and autumn equinoxes. These two periods allow pointing well-above and nearly-into the ecliptic plane at dawn when the event rate maximizes. The observation of many thousands of events allows a statistical interpretation of the results, which show that there is a strong tendency for the observed meteoroids to come from the apex as has been previously reported (Chau and Woodman, 2004). The velocity distributions agree with Janches et al. (2003a) when they are directly comparable, but the azimuth scan used in these observations allows a new perspective. We have constructed a simple statistical model which takes meteor velocities as input and gives radar line of sight velocities as output. The intent is to explain the fastest part of the velocity distribution. Since the speeds interpreted from the measurements are distributed fairly narrowly about nearly 60 km s^{-1} , double the speed of the earth in its orbit, is consistent with the interpretation that many of the meteoroids seen by the Arecibo radar are moving in orbits about the sun with similar parameters as the earth, but in the retrograde direction. However, it is the directional information obtained from the beam-swinging radar experiment and the speed that together provide the evidence for this interpretation. Some aspects of the measured velocity distributions suggest that this is not a complete description even for the fast part of the distribution, and it certainly says nothing about the slow part first described in Janches et al. (2003a). Furthermore, we cannot conclude anything about the entire dust population since there are probably selection effects that restrict the observations to a subset of the population.

[Final Revised Paper](#) (PDF, 891 KB) [Discussion Paper](#) (ACPD)

Citation: Sulzer, M. P.: Meteoroid velocity distribution derived from head echo data collected at Arecibo during regular world day observations, Atmos. Chem. Phys., 4, 947-954, 2004. [Bibtex](#) [EndNote](#) [Reference Manager](#)

[Search ACP](#)Library Search [»»](#)Author Search [»»](#)[News](#)

- [Sister Journals AMT & GMD](#)
- [Financial Support for Authors](#)
- [Journal Impact Factor](#)
- [Public Relations & Background Information](#)

[Recent Papers](#)

01 | ACPD, 27 Feb 2009:
Effects of boundary layer particle formation on cloud droplet number and changes in cloud albedo from 1850 to 2000

02 | ACPD, 27 Feb 2009:
A product study of the isoprene+NO₃ reaction

03 | ACPD, 26 Feb 2009:
Discriminating low frequency components from long range persistent fluctuations in daily atmospheric temperature variability