

First full year meteor head echo statistics of a high power large aperture radar system

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The measurement of meteor head echoes with high power large aperture (HPLA) radar systems offers the possibility to gain a lot of information of the meteoroid particles entering the earth atmosphere in an altitude range from 70 to 120 km. In contrast to the classical meteor radar system, which detects the meteor only at the specular point, HPLA radars with interferometric capabilities have the ability to observe the trajectory of the meteoroid over several kilometers of its atmospheric flight. The advantages in comparison to optical measurement are the independence of weather conditions and the opportunity of observations during day time. So far, the drawback of meteor head echo measurements was the lack of continuous measurements due to the low number of HPLA radar systems and the high costs of measurement time.

MAARSY (Middle Atmosphere Alomar Radar System) is a HPLA radar operating at a frequency of 53.5 MHz on the North Norwegian island Andøya. The standard monitoring experiment of the radar allows the detection and analysis of meteor head echoes with about 70% daily coverage. We present the first whole year cycle of quasi continuous meteor head echo observations with a statistic of about 500000 meteors at polar latitudes. These statistics involves count rates, source distributions, radar cross sections, dynamical masses and ablations heights. The dynamical masses of the sporadic meteor sources and the corresponding count rates are compared and provide an estimation of the contribution of the different sources during various times of the year. The daily measurement time allows also a more detailed analysis of the evolution of meteor showers from day to day and mass comparisons of different showers.