Shigaraki middle and upper atmosphere radar meteor-head-echo database

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Introduction: Mass infux from space into the terrestrial atmosphere is mainly caused by meteors. Meteors deliver various elements into the atmosphere and the meteoric dust particles are of great importance in the terrestrial atmosphere. For example, they act as nucleus for condensation and clouds and affect various atmospheric phenomena both in physical and chemical aspects. Thus, to investigate the meteor flux, orbits and their interactions in the upper atmosphere is very important but at the same time the method of investigation is limited, especially for precise measurements. High-power large-aperture (HPLA) radar observation is a recent technique to provide useful information on meteor infux and orbits, as well as interactions with the atmosphere. Since 2009 orbital data of about 120,000 meteors [2] have been collected using a novel head-echo analysis algorithm for the lower VHF band [1]. The data was collected using the middle and upper atmosphere radar (MU radar) of Kyoto University at Shigaraki (34.9N, 136.1S). The MU radar is a large atmospheric VHF radar with 46.5 MHz frequency, 1 MW output transmission power and 8330 m^2 aperture array antenna. An open database (MU radar meteor head echo database: MURMHED) for research and education is now being created.

Database: The database currently holds 53 different parameters for each event and a number of associated time series consisting of range, height, radar cross section, signal to noise ratio, radial velocity and meteorid velocity. The database parameters are MJD, Year [UT], Month [UT], Day [UT], Hour [UT], Minute [UT], Second [UT], Duration [s], RA [deg], Dec [deg], Az [deg], Ze [deg], Az uncorr [deg], Ze uncorr [deg], Ze correction [deg], Obs initial vel [km/s], Geocentric vel [km/s], RCS [dBsm], SNR [dB], Start hgt [km], End hgt [km], Az of start point [deg], Ze of start point [deg], Az of end point [deg], Ze of end point [deg], Semimajor axis [au], Eccentricity, Perihelion dist [au], Lon of asc node [deg], Inclination [deg], Argument of periapsis [deg], Period [yr], Heliocentric vel [km/s], Radiant ecl lon [deg], Radiant ecl lat [deg], Sol lon [deg], RA error [deg], Dec error [deg], Az error [deg], Ze error [deg], Vel error [deg], Semimajor axis error [au], Eccentricity error, Perihelion dist error [au], Inclination error [deg], Argument of periapsis error [deg], Period error [yr], Heliocentric vel error [km/s], Ecl lon error [deg], Ecl lat error [deg], Hammer X and Hammer Y.

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