

## Statistical distribution of the solar system dusts by meteor head echo observations with the large-aperture radar

ABE, Shinsuke<sup>1\*</sup> ; KERO, Johan<sup>2</sup> ; NAKAMURA, Takuji<sup>3</sup> ; FUJIWARA, Yasunori<sup>4</sup> ; WATANABE, Jun-ichi<sup>5</sup>

<sup>1</sup>Department of Aerospace Engineering, College of Science and Technology, Nihon University, <sup>2</sup>Swedish Institute of Space Physics (IRF), <sup>3</sup>National Institute of Polar Research (NIPR), <sup>4</sup>Nippon Meteor Society, <sup>5</sup>National Astronomical Observatory of Japan

A meteor head echoes is caused by radio waves scattered from the intense region of the plasma surrounding and co-moving with a meteoroid during atmospheric entry at about 70-130 km altitude. Meteor head echo observations were carried out using the high-power large-aperture (HPLA) Kyoto university Shigaraki middle and upper atmosphere (MU) radar in Japan (34.85deg N, 136.10deg E). Since 2009 the atmospheric trajectories and interplanetary orbital elements have been derived by the MU radar meteor head echoes (e.g.; Kero et al. (2012); Kero et al. (2011)). Approximately 120,000 orbital elements of meteors with excellent accuracy were obtained until January 2014. Typical error for velocity and semi-major axis are 0.3 km/s and 0.1 AU, respectively. Such a huge number of meteoroid orbits with the precise orbital accuracy has not been observed before. Here we report some results obtained by the statistical analysis of the database, such as orbital distributions and associations of comets and asteroids.

Keywords: meteors, dusts, meteoroids, comets, asteroids, MU radar