Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07007, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07007
EGU General Assembly 2008

Accretion of matter by the Sun: influence on the solar corona

H. Lamy (1), J.Lemaire (1,2)

(1) Belgian Institute for Space Aeronomy, Avenue Circulaire 3, 1180 Brussels, Belgium, (2) Centre of Space Radiations, University of Louvain-La-Neuve, Belgium

A comparative study of single-body meteor ablation in the atmosphere of the Earth and in the solar corona will be presented for a wide range of masses and velocities of meteoroids. Several representative chemical compositions of meteoroids are considered. For the solar corona, as a first-order model, we use a one-dimensional ablation model similar to those developed by Campbell-Brown and Koschny (2004) for the Earth's atmosphere and by McAuliffe and Christou (2005) for the case of the atmosphere of Venus.

We calculate the amount of meteoritic material deposited in the upper layers of the terrestrial ionosphere and in the solar corona. Similarly we estimate the amount of energy deposited by dissipation of the kinetic energy of the meteoroids as a function of height and we compare it to the local thermal energy. In the Earth's upper atmosphere, it has long been known that the ablation of meteors gives rise to permanent layers of neutral and ionized metal atoms at altitudes between 80 and 100 km. On the other hand, the temperature of the terrestrial mesosphere is not significantly affected by the kinetic energy deposited by the meteoritic material, except maybe during the most intense meteor showers. The actual effects of infalling meteoroids on the coronal heavy ions composition and temperature distributions have not been investigated so far. As a first step, we consider only the ecliptic plane and use the heliospheric distribution of meteoritic material inflow at 20 solar radii as an extrapolation of the cumulative mass distribution of Ceplecha et al (1998) observed at 1 AU.

We also present calculations of the equilibrium charge state of small grains within 1

AU. This charge is then used to calculate the drag due to plasma and/or MHD waves emission felt by a charged grain embedded in the warm plasma of the solar wind. This drag is compared to the Poynting-Robertson (P-R) and “pseudo P-R” drags.