THE DETERMINATION OF THE SMALL METEORIC BODIES SIZES

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The dynamic method of the determination of the small meteoric body's parameters is based on the analysis of the trajectory shone site at movement in an atmosphere with use of the given observation of speed and height [1]. Dynamic method has essential restriction - impossibility of its application for small meteors which speed does not vary at an atmosphere movement, or varies it is not enough, as it is based on change of speed. The solution of a weight definition problem of small meteoric bodies with use of some principles of a dynamic method is considered in current research.

Movement of small meteoric bodies occurs in a free molecular mode and partially in a transitive mode at which the thin viscous boundary layer of the fused material of a body and it vapor is formed. The basic mechanism of destruction for small meteors is evaporation. The solution is based that at such flow of small meteoric bodies a blackout condition means full destruction. Expression for a determination of the body size at an atmosphere input turns out from a condition of zero weight in last point of an observable site of a luminescence. For constant speed this expression turns out from the equation of weight loss, and at little change of speed is used asymptotic expression at great values of the ablation parameter for the decision of the meteoric physics equations. For determination of the body size values of heat-transfer coefficient, drag coefficient and heat of ablation are calculated.

For calculations values of blackout height and speeds were used at movement in an atmosphere from the given observation Canadian and Prairie cameras networks [2, 3]. It is supposed, that meteoric bodies have the spherical form and the density corresponding a stone (3,73 g/sm^3). It is shown, that for small meteors the radius of a bodies does not exceed one centimeter, and at absence of braking - no more than 3 mm. The drag coefficient at a free molecular flow is equal to two, in a transitive mode varies from 1,5 up to 2. Thus the heat-transfer coefficient exchange in a range from 0,1 up to 0,2. All this allows to allocate small meteors in a separate class with following characteristics: movement in an atmosphere can be registered by photogauges, the entry speeds makes not less than 18 km/s, the blackout heights not below 66 km. Comparison of the results received in work with data about weights of the small meteors calculated on observable luminosity and resulted in tables of the Canadian and Prairie cameras networks supervision is lead [2, 3].

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1. *Стулов В.П., Мирский В.Н., Вислый А.И.* Аэродинамика болидов. М.: Наука, 1995. 236 с.
2. *Halliday I., Griffin A.A., Blackwell A.T.* Detailed data for 259 fireballs from the Canada camera network and inferences concerning the influx of large meteoroids // Meteoritics and Planetary Science. 1996. V. 31. P. 185-217.
3. *Мак-Кроски Р.Е., Шао Ц.И., Позен А.* Болиды Прерийной сети. Траектории и кривые блеска. Метеоритика. 1979. Вып. 38. С. 106-156.