FREQUENCY OF INTERSTELLAR METEOROIDS DERIVED FROM THE JAPANESE TV CATALOGUE. M. Hajduková, Jr.[1], L. Kornoš[2] and J. Tóth[2] ,[1]Astronomical Institute, Slovak Academy of Sciences, Slovak Republic, 059 60 Tatranská Lomnica, e-mail: astromia@savba.sk, [2]Faculty of Mathematics, Physics and Informatics, Comenius University Bratislava, Slovak Republic.

Introduction: A search for hyperbolic meteors and, among them, for interstellar particles has a long history. The substantial question whether interstellar meteors are present among the registered hyperbolic orbits and, if so, then how great is their frequency, is still open.

Analyses and results: Hyperbolic meteor orbits from the catalogue of 64 650 meteors observed by the multi station video meteor network located in Japan [1] have been investigated, with the aim of estimating the frequency of interstellar meteors arriving at the Earth.

The value of semimajor axis *a* is very sensitive to the value of the heliocentric velocity v_H, especially near the parabolic limit. The equation $da = 2v_H a^2 dv_H$ shows that, for a big value of the semimajor axis, even a small error in the velocity determination can change an elliptic orbit to a hyperbolic one.

Considering that error in the value of the heliocentric velocity of a meteor, especially near the parabolic limit, can create an artificial hyperbolic orbit that does not really exist, it was shown that the vast majority of the 7489 hyperbolic orbits from the catalogue has definitely been caused by erroneous velocity determination, and approximately 50 % of them belong to known meteor showers. The proportion of hyperbolic orbits decreased strongly (from 11.58% to 3.28%) using a subset of meteor orbits, selected from the SonotaCo network meteor data by [2], after an analysis of their qualitative aspects.

A further detailed analysis of a subset of the 14 763 most precisely determined video meteor orbits selected from the Japanese TV database set the frequency limit for interstellar meteoroids of masses which correspond to the video observations to 1.3×10^{-3}. Nevertheless, the hyperbolic excesses in all cases are about one order less than required from the velocity distribution of neighbouring stars. There are no cases with the velocity expected for interstellar meteors $v_H > 46{,}6$ km/s in the data. The analysis called the occurrence of interstellar meteoroids in the vicinity of the Earth into question.

References:

[1] SonotaCo (2009) *WGN, J. IMO, 37*, 55-67. [2] Vereš P. and Tóth J. (2010) *WGN, J. IMO, 38*, 54-57.

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