Features of sporadic hyperbolic meteors observed in the period 2007-2009

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We have analyzed 238 hyperbolic meteors observed within the framework of the Japanese SonotaCo program in 2007–2009. A variety of eccentricities was noticed as well as irregular distribution of angular orbital elements. Also no cases were found with domination of perihelia near the ecliptic. The derived eccentricities are distibuted exponentially ranging from 1 to 1.31. A possible errors in determination of meteor orbits could partly explain these results. It was found that perihelion of these orbits are concentrated close to the anti-apex of the Sun. Additionaly we consider a distribution of orbital elements in the galactic coordinate system, however no regularity was found. Distribution of distant nodes and MOID of hyperbolic meteors relatively to the orbits of planets-giants were investigated as well. However, in majority of cases the hyperbolic excess of speed was not possible to explain with the gravitational influence of the giant planets. Thus the question of interaction with 14 known transneptunian planetary bodies (TNOs) brighter than $3\overset{m}{.}5$ was also considered. This investigation of distant nodes and MOID values specified 3 TNOs (2003 MW12, 2007 OR10 and Qaoaor) most influencing the system of hyperbolic meteors.

In the next stage we evaluated 78 TNOs with absolute brightness up to $5\overset{m}{.}5$. From these objects we identified 9 additiobnal TNOs influencing the system of hyperbolic meteors. Based on our results we conclude that distant planetary bodies may have more significant effects on the system than giant planets.