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Structure of area of radiation of Geminids meteor shower and its vicinities on celestial sphere. One or many showers? (ESA SP-500)

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Abstract

By using of new discrete solution of a quasi thomography problem of determination of a meteor spatial distribution from radar goniometer data as in [1], the Geminids meteor shower and the part of celestial sphere near the main area of Geminids activity were analyzed to get the radiant structure. The celestial sphere was divided in 2°×2° cells. The meteors, which belong to each cell were determined if the rate was more than 4-5 meteor per day. The Geminids activity in 1993, 1998 and 2001 was analyzed. The mean velocity, the mean radiant coordinates and mean time and rate for each cell and each day of Geminids activity are calculated. The history of daily development of a shower is submitted. It was determined the main area of activity in 1998 was at most 4°×4° Starting time of shower action is from December 3, its intensity slowly increases by December 12 and very sharply decreases near December 15-17. Similarities and distinctions in dynamics of Geminids activity development in different years are discussed. Near to area of Geminids radiation we have found out some small meteoric showers with velocities and time of action conterminous with Geminids. However affinity of their angular position to Geminids and identical velocities allow to assume their branches from Geminids. But the largest congestion of such small showers also adjoining to Geminids and adjoining to each other and having similar velocities demands special discussion. Parameters of orbits of these small showers are calculated. Whether they are connected with Geminids or to other more old formation requires to find out still.