Draconids 2012 – Unexpected Outburst

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In the paper, observations and preliminary results of the unexpected Draconids' 2012 outburst are presented.

1 Introduction

Draconid meteor shower surprised scientific community by a short outburst of activity in Oct, 8, 2012 following the predicted outburst in 2011 (Maslov, 2011; Vaubaillon, 2011; Vaubaillon et al., 2011) which had been covered by the airborne mission (Vaubaillon et al., 2013) and ground observations (Tth, et al., 2012; Trigo-Rodriguez et al., 2013). The unexpected outburst in 2012 was only partially recorded in Europe just after the sunset on October 8, around 17 UT (IMO, 2012). Nevertheless, low level activity of Draconids' had been predicted by Maslov (2011) for October 8, 2012 15-17 UT caused by the 1959 and 1966 trails.

2 Observation

Several stations of the Slovak Video Meteor Network (SVMN), Central European Meteor Network (CEMeNt), Hungarian Meteor Network (HMN) and Polish Fireball Network (PFN) were operating during the critical night on October 8, 2012. The video stations, as a part of a new initiative of joining local observations to wider European network EDMONd, covered the Draconids' 2012 outburst from about 17:00 UT. Altogether 36 simultaneously observed Draconids could be extracted from the data and an application of video orbit quality criteria, described in Kornoš et al. (2013), resulted in 28 unique orbits of the Draconids 2012. Details of the observational setup are described, for instance, in Tóth et al. (2012).

3 Results

Precision of orbit depends on the accuracy of radiant and velocity determination. Due to a considerable fragmentation of the Draconid meteoroids in the atmosphere and following deceleration, the measurement of meteor velocities was problematic and could be determined with a relatively large uncertainties. The initial velocities were underestimated in some cases due to insufiecient number of measured frames, especially for short meteors. That is why geocentric velocities, eccentricity and perihelion distance of observed Dracodins are slightly shifted compared to model particles released from 1966 trail of the parent comet 21P/Giacobini-Zinner.

On the other hand, distributions of radiants and other orbital elements compared to model particles are in quite good agreement.

Preliminary modeling explains the Draconids 2012 outburst primarily by the encounter with 1966 trail. The trails from 1959 or 1907 are not ruled out from the explanation, but they are not sufficient alone as a source of the outburst.

4 Conclusions

We present successful observations of an unexpected Draconids' 2012 outburst. After the careful inspection, 28 orbits obtained from multi-station observations by the video cameras setup in Central Europe were selected. The Draconid orbits and their comparison with the proposed 1966 trail of the parent comet indicate a very close similarity. These results were obtained by the cooperation of professional and amateur video networks within EDMONd initiative, which monitor regular and exceptional meteor activity.

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