

Recent meteor showers – models and observations

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Abstract

A number of meteor shower outbursts and storms occurred in recent years starting with several Leonid storms around 2000 [1]. The methods of modeling meteoroid streams became better and more precise. An increasing number of observing systems enabled better coverage of such events. The observers provide modelers with an important feedback on precision of their models. Here we present comparison of several observational results with the model predictions.

1. Introduction

The double station observations using video technique are carried out by the Ondřejov observatory team for many years [2]. Besides the regular observations of the meteor showers the campaigns are also dedicated to predicted meteor storms and outbursts. The team participated to several international campaigns during recent Leonid meteor shower return as well as on the Draconid airborne campaign in 2011. The main goal of this experiment is the determination of the meteor trajectories and orbits and the meteor shower activity is also measured and compared with predictions.

2. Method

To construct the meteor shower activity curve we calculate the number of shower meteors in certain time intervals – usually 10 minute long. Then the correction on the zenith distance of the radiant is performed. Finally using this corrected number we calculate the corrected hourly rate of meteors as well as its error. An example is given in Figure 1. In this case the data from different video cameras as well as the visual data were available what allows us to distinguish some interesting features of the 2011 Draconid meteor shower outburst [3].

3. Meteor showers

Among the most studied meteor showers is the Leonids due to recent return of their parent comet. Outbursts and storms between 1998 and 2002 and also another event in 2009 were observed and analyzed. The Draconid outbursts in 2005 and 2011 were also covered. Especially the latter was observed intensively using different instruments onboard two aircraft [4].

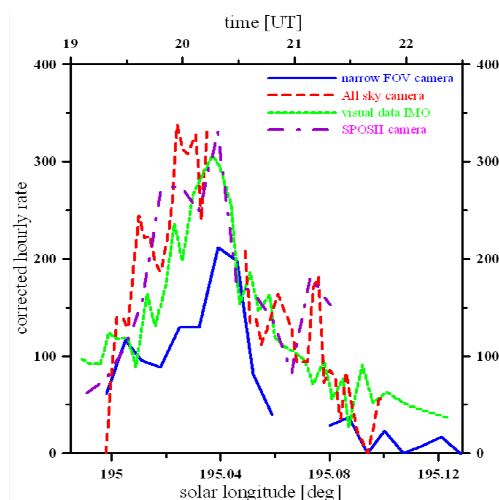


Figure 1: Comparison of activity profiles recorded by different cameras during 2011 Draconid outburst.

On the other hand there were also several unsuccessful campaigns – for example Phi Cassiopeiids on December 2012 when the prediction failed and the outburst did not occurred.

4. Summary

The observations show that in the case of established meteor showers (Leonids, Draconids...) the predictions are very successful in terms of the time. In many studied cases the peak of activity occurred within few minutes around predicted time. The rate of the meteors remains rather unpredictable.

On the other hand predictions are less successful in case of less known meteor showers when the data on parent comet are uncertain or even unknown.

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References

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