Calendar of meteor activity based on IMO video observations 2006–2015

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The IMO data of detected video meteors were used to calculate the average and maximum meteor activity throughout the year. This resulted in a very practical calendar of meteor activity, which can be a helpful tool for not only amateur astronomers but also for children and the general public—all those who wish to observe meteors.

1 Introduction

Meteor showers are phenomena of many meteors visible as light trails in the sky radiating from one point direction, in a time interval spanning from several hours to several days. These phenomena can be observed throughout the year and are mostly caused by small-scale particles named meteoroids, which represent residue of mostly cometary material as the Earth passes through. Meteors enter the atmosphere of the Earth at great speeds and leave a light trail which may be observed visually or by other techniques, from which the most popular one is by video cameras.

Data from video observations collected by the International Meteor Organization (IMO) were used to compile a calendar which would represent averaged and maximal meteor activity for each day of the year.

2 Method

In order to calculate the average daily meteor activity, data from video observations provided on the IMO web pages were taken from the period from 2006 to 2015. Daily observations are relatively balanced on an annual basis, and there are not too many data gaps. The IMO data are given as reports listing the number of observed meteors and the effective observing time. Dividing the two, we get the meteor rate expressed in meteors/hour. Therefore, using IMO data, the daily meteor rate for each year in the chosen time period was obtained. These were then used to calculate the maximum and average daily meteor rate for each day of the year (1–365), where leap years were included but without their "leap day", February 29th (activities for that date were recalculated for previous and the day to follow). As a result, a time series was obtained which represents the average and maximum expected meteor activity throughout the year.

3 Results

The average and maximum expected meteor activity throughout the year calculated from IMO data are presented in Figure 1.

The calendar has been built as a polar diagram containing data on averaged activity for each day of the year (blue line). Since the range of averaged data used covers 10 years, the differences in solar longitudes from day to day may be considered irrelevant, bearing in mind the particular purpose of the present calendar. Besides the averaged data, the maximal value on a given date is presented as a separate curve (red line) which might be found useful as a pointer to a date when an observer may expect some higher activity than the one stated on the calendar.

The most important meteors showers may be identified on the calendar, labeled with their respective abbreviations according to the IAU Meter Shower Database. There are obvious peaks on dates which are not usually found as maximum of the activity for some showers, which can be seen in the case of the Orionids and η-Aquariids, corresponding to activity caused by separate trails observed during the processed period.

The number of actual meteors seen (or observed by other means) will most certainly be different from the one read from the calendar for most of visual observers or video cameras, due to varying sensitivities and observers skills, but the ratio of meteors seen or detected from night to night would most probably be proportional to the values obtained from the calendar.

4 Conclusions

The IMO data of video meteors were used to calculate the average and maximum expected meteor activity throughout the year.

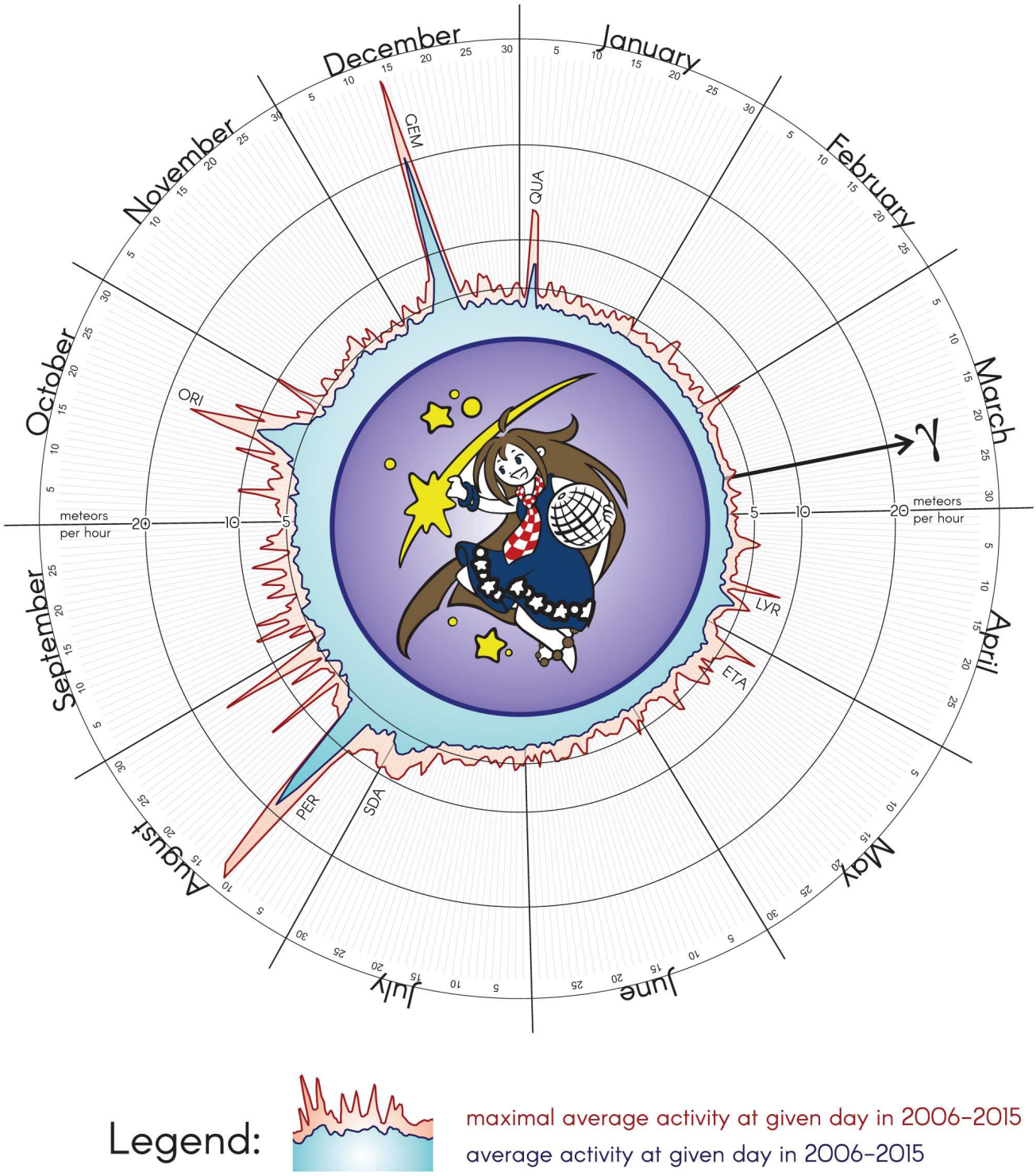

Figure 1 – Meteor activity calendar.

This resulted in a very practical calendar of meteor activity. The calendar shows when we may expect to see increased meteor activity, to which meteor shower this increased activity corresponds to, how many meteors we may expect to observe on average in one hour time, and what the maximum number of meteors is we may hope to observe in one hour time.

Therefore, the calendar of meteor activity can be a helpful tool for not only amateur astronomers but also for children and the general public—all those who wish to observe meteors and meteor showers.

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