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Video Observation of Perseids meteor shower 2016 from Egypt

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Abstract

The results of single television observations of Perseid meteor shower in 2016 are presented. The Perseid shower occurs from 17 July to 24 August, peaking on or around August 12 every year. In 2016, the peak of the Perseids was Night of Aug 11 to the morning of Aug 12. The meteor video observations in Egypt are carried out at The National Researcher Institute of Astronomy and Geophysics (NRIAG). The system consists of TV - cameras Watec -902H Ultimate with the lens DV10x8SA-1 (8-80 mm (10x)) capable of recording the rapid motion of meteors entering the Earth atmosphere.

Keywords: Meteor video observations, single television observations, Perseids meteor shower.
AMS 2010 codes: 85A04, 70F15.

1 Introduction

Meteors as an astronomical phenomenon have been studied since the XVII century. Now we know that meteors (shooting stars) are the light phenomena which appear during the invasion of cosmic particles of small size in the Earth atmosphere. The meteors are observed when penetrating the Earth atmosphere, influenced by gravity and cause friction with the atmosphere of the Earth to the high temperature resulting in a streak of light. Meteoroids are ranging from approximately 0.005 - 10 cm in diameter. The meteors start to burn up at an altitude between 80 and 120 km in the Earth atmosphere lasting for a few seconds to minutes See [1] and [4].

The meteors are usually distributed along the orbital path of the comet and fall into the Earth atmosphere when the intersection of the Earth's orbit with comets. The Comet Swift -Tuttle, which was identified in 1862 is the source of Perseids meteor. It has an orbital period of about 120 years and was last seen in 1995.

The Perseids are named relative to constellation Perseus because the direction, or radiant, from which the shower seems to come in the sky lies in the same direction as the constellation Perseus, which can be found in

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the north-eastern part of the sky. The Perseids, one of the most active and the brightest meteor showers of the year, occurs every year between July 17 and August 24. The shower tends to peak around August 9-13. The best time to monitor the most meteor showers is when the sky is cloudless dark far from light pollution.

The most effective way to conduct research of the meteoric phenomena at present is television observations. This type of observation has many advantages which other methods possess too. However, it has its essential advantages. Among them may be mentioned a high sensitivity and shooting speed, the possibility of operating the received results in real time, compactness, mobility, low cost of the equipment and some others See [4].

2 Observations

The Perseids meteor shower August 2016 was observed from a single station at Egypt (Lat: 30.3° N, Long: 31.3° E) on the outskirts of the city of Cairo. The site provided a dark night sky with minimal light pollution. The observations were performed during the activity of the Perseids (from August 5 to August 13) in 2016. The observation system consists of CCD-cameras Watec -902H Ultimate with the lens DV10x8SA-1 (8-80 mm (10x)). These cameras have the field of view (FOV) $44.2^\circ \times 33.25^\circ$ and the limiting magnitude above +5.0 mag for meteors. The camera is oriented to the zenith area (the center FOV: Azimuth 44.24° , Elevation 45.43°) at the altitude 25 m.

The UFO Capture software was used for capture the video stream from the camera. We reviewed the captured video segments to delete unwanted recordings (usually insects, passing low altitude aircraft, and satellites). The UFO Analyzer was used for data analysis. There are 53 effective links in 53 masks, an average of error between the center of the brightness points and reference stars coordinate is 0.258 pixels (0.015°), max of them is 0.515 pixels (0.033°) See [2] and [3].

3 Results and discussions

The total number of meteors detected were 100 meteors the number of the Perseids were 51 Table 1. The maximum number of meteors occurs on August 11 (with solar longitude 139.4°) figures (1, 2) our system detected meteors brighter than +5.0 mag. The absolute magnitude distribution of observations meteors was presented in Figure (3). According to our observations, the distribution of absolute magnitudes of the Perseids has the maximum at +2.0m.figure (4, 5) shown a trail map and a ground map respectively.

Table 1 results of meteors observation during (August 5 to August 13) in 2016.

Total time of observations (day)	9
Number of meteors	100
Number of the Perseids	51

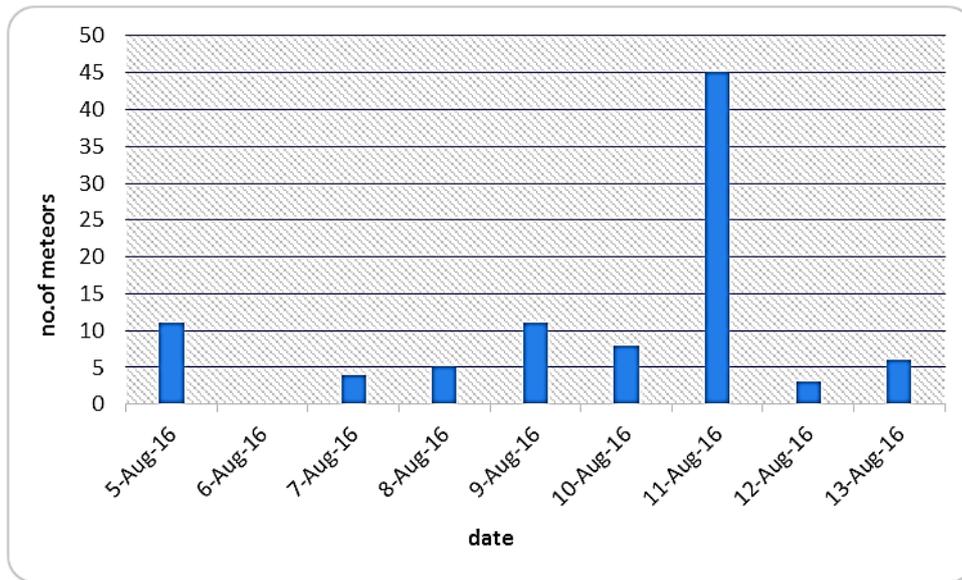


Fig. 1 The distribution of the number of the meteors detected during 5-13 August 2016.

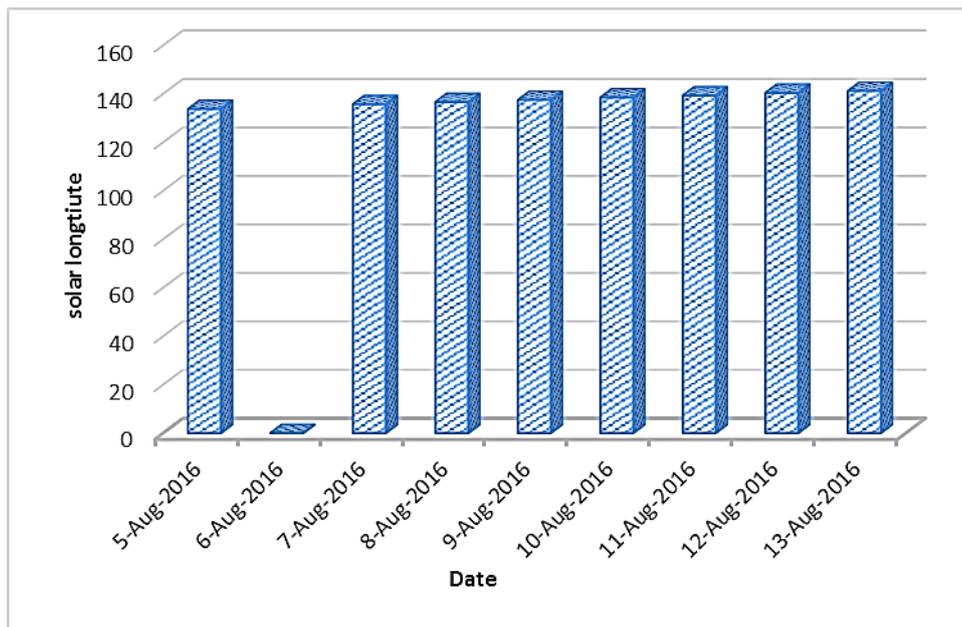


Fig. 2 The solar longitude distribution during 5-13 August 2016.

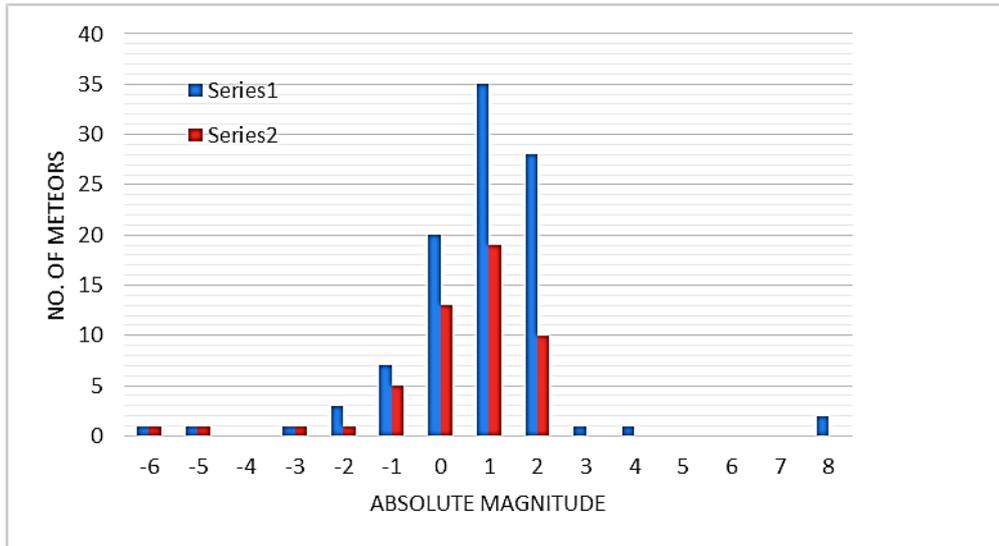


Fig. 3 The absolute magnitude distribution of the meteors observation during 5-13 August 2016. Series 2 represented Perseids meteors.



Fig. 4 Trail map for meteors observation during 5-13 August 2016e.

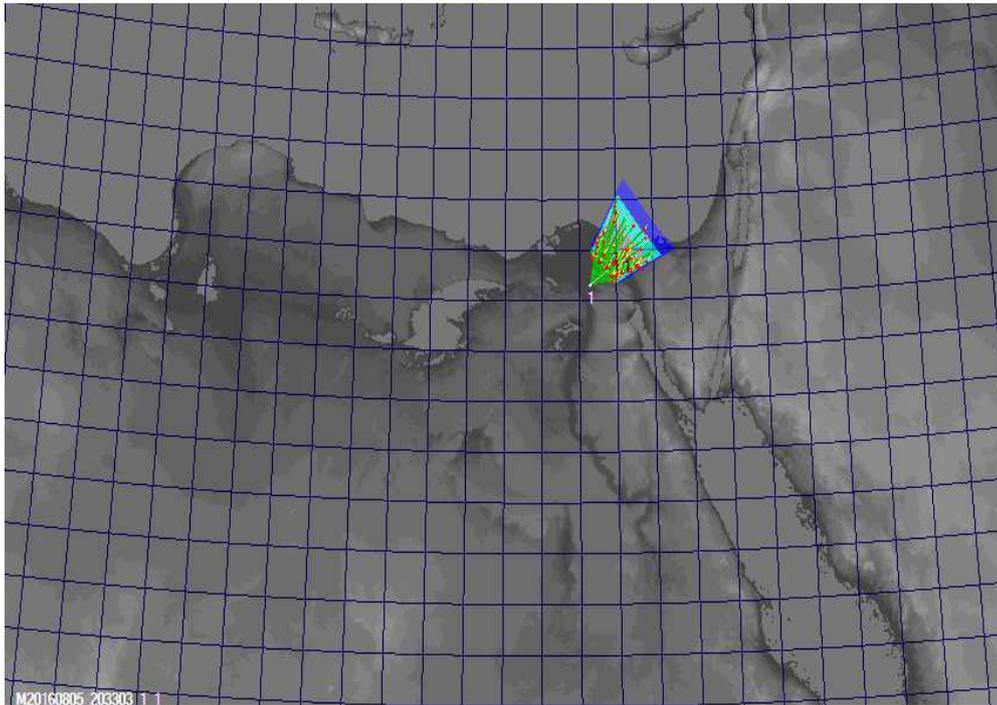


Fig. 5 Ground map for meteors observation during 5-13 August 2016.

4 Conclusions

Video observation of meteors using a portable video system was successfully carried out. The system was used to observe Perseids meteor shower in August 2016 from outskirts of Cairo, Egypt. The analysis of Perseids data for 2016 presented here is based on the single station observations. The character of the activity in these years was ordinary for the Perseids shower with maximum activity on August 11 (with solar longitude 139.4°). SonotaCo software was used for detection and analysis of the meteors observations.

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