The 1999 Leonid Meteor Shower from NainiTal, India

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Observations of the 1999 Leonids as seen from Nainital, India, are described.

It is very encouraging that the IMO *receives more and more meteor observations from "less traditional" locations, improving the geographical distribution of the observations. The present article is therefore as much a presentation of a new observing group as an article on the actual meteor shower observed. Notice that the observations were not carried out according to the* IMO *standard method.*

Marc Gyssens, Editor-in-Chief

1. Introduction

From time immemorial, celestial events have been attracting mankind due to their eye-catching vision. With the progress of science, scientists and general people wait eagerly for such events to quench the thirst of curiosity, to broaden the horizon, and enrich the knowledge of science.

In this perspective, the astronomy of meteor showers is gaining momentum and interest among professional and amateur astronomers, scientists in other fields, and public in general, because of its spectacular perception.

A recent publication of R. McNaught and D. Asher [1], predicted good Leonid showers in 1999 and 2000, and strong storms in 2001 and 2002. There had been a global alert for the Leonid shower on November 18, with a predicted peak time of $2^{h}08^{m}$ UT, which favored observing sites in West Asia, Europe, and Africa. Though India is in the South of Asia, the promise of a bright meteor shower on a dark night had lured our enthusiastic team.

2. Brief introduction of the site

The *Uttar Pradesh State Observatory* (*UPSO*) was established in 1954 [2]. Research and developmental activities at the observatory have increasingly covered selected areas of astronomy and astrophysics. The observatory is well-known for its precise observations in the studies related to comets, ring formation in the solar system, variable stars, star clusters, stellar populations, photometry of galaxies, optical follow-up observations of radio and space-borne astronomical sources, as well as gravitational micro-lensing and milli-magnitude variations in rapidly oscillating peculiar A-type stars. The *UPSO* is located at longitude $\lambda = 79°27'.4$ E and latitude $29°21'.7$ N, at an altitude of 1951 m above sea level and around 9 km away from the city light and pollution.

3. Observations

It is difficult to observe meteors by telescopical techniques because of their very narrow and fast view. By the naked eye, we can easily carry out necessary observations, and it is very enjoyable and fun also to see meteors, especially meteor showers, in particular when in a team. So, our team of 5 research students (working in different fields of astronomy, and to be considered at present as amateur astronomers, because we are still infant in our research career) carried out observations of Leonids on the most promising night of November 17-18, 1999, for 2.5 hours ($0^{h}45^{m}$–$3^{h}15^{m}$ Indian Standard Time), from one of the topmost locations of the *Uttar Pradesh State Observatory* (*UPSO*), from where the entire sky was clearly visible, except for a small part in the southern direction. On the night of November 17-18, the sky was very clear, without even a single patch of cloud, and the Moon was in its First Quarter. In fact, we were fortunate to have an adequately dark night for this wonderful event. Now the team was primed with paper, pen, and torch. We envisaged our sitting plan in such a manner that one person was placed in the center, and the other four around this person, facing different directions to cover the entire sky.

The first Leonid was seen at 1^h15^m IST in the eastern part of the sky. We divided brightnesses of meteors in 6 categories by comparing them with stars of known magnitude. Those categories were *extremely bright* (EB, brighter than Venus, i.e., magnitude −4 or brighter); *highly bright* (HB, magnitude around −3); *very bright* (VB, between magnitudes −1 and −2, comparable to Sirius); *bright* (B, between magnitudes 0 and +2, comparable to Vega); *dim* (D, between magnitudes +3 and +4); and *very dim* (VD, between magnitudes +5 and +6).

Figure 1 shows the meteor activity during the observing period.

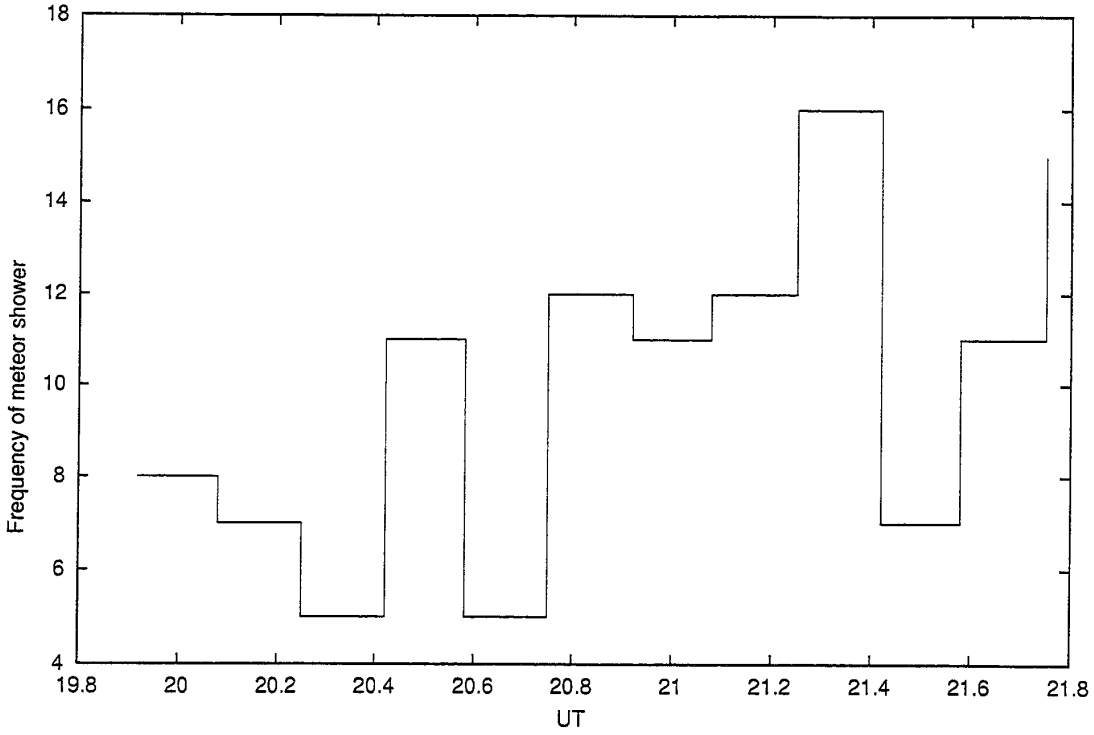

Figure 1 – Raw Leonid counts.

4. Results

In a period of 2 hours, in all, 120 meteors have been seen in all directions in the sky.

According to our visual inspection, we concluded that about 38% of the meteors were dim, 33% were bright, 19% were highly bright, and only one was extremely bright with a brilliant bluish tinge. This meteor appeared in the eastern direction just above the constellation of Leo, whose tail sojourned in the sky for about 2 minutes in vertical position and then turned horizontal towards the north while fading slowly. The rest of the meteors lasted for 1–2 seconds. On average, one meteor was seen per minute.

In comparison to last year's (November 18, 1998) observations, this year's shower was stronger and more prominent, as, due to clouds last year, we could see only 70 meteors in 4 hours (0^h30^m–3^h57^m IST), from the same sight, with an average of 0.3 meteors per minute.

In a nut-shell, it was an awe-inspiring experience to observe the meteor shower on the chilly night of November 17-18. We hope that, in the future, astronomers will generally be able to predict meteor activity more precisely with the help of world-wide data collection, and make the general public more aware of this stimulating subject.

References

[1] R.H. McNaught D.J. Asher, *WGN* 27, 1999, pp. 850–102.

[2] Ram Sagar, *Current Science* 77:5, 1999, pp. 643–651.