



# Observations of the 2001 Leonids' Storm from Northern Australia with "TIMES"



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## ABSTRACT

We present the preliminary results on the scientific mission of the Instituto de Astrofísica de Canarias (Spain) to observe the 2001 Leonid meteor storm. Observations were made using image-intensified video cameras in double-station from the Northern territory of Australia. We will also introduce the TIMES (Teide Intensifier Meteor System) experiment, which is operating in the Teide Observatory (Tenerife, Canary Island, Spain). It is composed by two fixed automated image-intensified video cameras and it is based on the MetRec meteor detection and analysis software, which allows for efficient video observations of meteor with only a minimum of human interaction. It is the first video cameras ever that operates on a regular basis in Spain and it is expected that collects meteor data throughout the full year.



## THE TIMES EXPERIMENT IN THE TEIDE OBSERVATORY

**TIMES (Teide Intensifier Meteor System)** is operating in the Teide Observatory (longitude 16° 30' 35" West, latitude 28° 18' 00" North, altitude 2200 m), located in the island of Tenerife (Canary Island, Spain). It deploys two fixed automated video-intensified video cameras (see Table 1).

The data acquisition and reduction is based in the MetRec meteor detection software, which allows for efficient video observations of meteor with only a minimum of human interaction. In addition, it is possible to carry out double station observations in collaboration with amateur astronomer operating a similar equipment from La Palma, a nearby island situated at 100 km from Tenerife. In addition, our equipment was portable and could be operated using standard power supply. TIMES was used in this way in the observations of the 1999 Leonid storm from Vilaflor (Tenerife; Molau, Rendtel & Bellot 2001) and the 2001 Leonid storm from the Northern Territory in Australia.

The main scientific target of TIMES is to build the complete survey of the meteoroid particle population along the orbit of the Earth. This includes to determine the space densities (Bellot-Rubio 1994) and orbital parameter of the different meteoroid streams in the Earth neighbourhood.

Instrument	Optics	FOV (deg <sup>2</sup> )	Lim. Mag.
TIMES 1	50 mm f/	20	+8
TIMES 2	50 mm f/	20	+8

TABLE 1

## OBSERVATIONS OF THE LEONIDS STORM 2001

Observations of the 2001 Leonid meteor storm were obtained from the Northern territory in Australia during the nights of November 17th and 18th, 2001. Two locations 100 km apart were used for the video observations in double station: TIMES1 was situated in Devil Marble's and TIMES2 in a location close to Tennant Creek (see geographic coordinates in Table 2). Both cameras were aligned so that the center of view aimed at a height of 100 km.

The preliminary analysis presented here has been obtained from visual inspection of the video tapes covering only the Asian Leonid storm period. The total number of registered Leonid meteors and time interval (in Universal Time) of TIMES 1 and TIMES 2 are given in Table 2. The definitive data analysis using MetRec software is in progress.

Instrument	Latitude Longitude	Time interval	Leonids meteors	Sporadic meteors	Lim. Mag.
TIMES 1	20° 33' 54" S 134° 15' 45" E	17:56:34 19:11:22	95	6	7.5
TIMES 2	19° 51' 42" S 134° 12' 00" E	17:46:55 19:18:00	106	9	7.5

TABLE 2



## RESULTS

Figure 1 shows the preliminary activity profile of the Asian Leonid storm obtained from the mean of the number of meteors registered by each camera in interval of 5 minutes. From this profile, we conclude that the highest activity was at 18h 17m ± 3 m UT, confirming the peak of activity reported by IMO (Art et al. 2001). This is in excellent agreement with the predictions of the theoretical model by Lyttinen, Nissinen & van Flandern (2001) for the dust trail 4-revolution ago (perihelion passage in 1866).

In addition, our observation a second peak at 18h 02m ± 3 m UT, in good agreement with the visual IMO observations too (Art et al. 2001). This additional enhancement is also predicted by Lyttinen *et al.* (2001) for the dust trail from 9-revolution ago (perihelion passage in 1699). However, we cannot confirm the additional peak at 18h 30m UT reported from visual observers (Art *et al.* 2001) visual observations, which was not predicted by any available model.

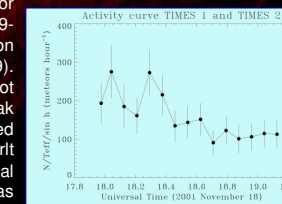


FIGURE 1

Figure 2 displays the magnitude distributions for each camera. The distribution is unexpected flat and strikingly different from the visual magnitude distribution. A more detailed analysis is necessary to confirm this.

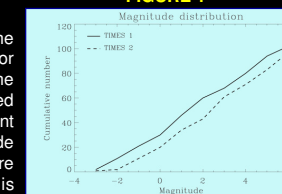


FIGURE 2

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