

A kappa-Pavonid campaign in southern Brazil.

Peter Jenniskens

Abstract

In July of 1986, Paul Stacey and Neil Inwood of western Australia reported an outburst of kappa-Pavonids. It is uncertain whether this event was of far-comet type. But being the only such event known to be due in the next five years, an attempt was made to observe the outburst with the help of Gilberto Klar Renner and colleagues of Porto Alegre, Brasil. Clear weather permitted observing on July 17, 1996, covering most of the window of opportunity. No outburst was recorded.

In July of 1986, Paul Stacey and Neil Inwood of western Australia reported an outburst of meteors radiating from a point near kappa-Pavonis [1,2]. They observed respectively 26 and 30 slow and bright meteors in a period of only about 1.5 hours during nearly full moon conditions. Undoubtly, this was a meteor outburst.

If this outburst was of far-comet type, such as the alpha-Monocerotid outburst of 1995, then a return is expected when the Sun's reflex motion around the barycenter of the solar system has a certain range of values [3]. The kappa-Pavonid shower in 1986 occurred at a time when the Sun's reflex motion was similar as in 1995 or 1996. Hence, a return was expected in one of these years.

The first observing effort was mounted in South Africa in July of 1995 with the help of Tim Cooper and colleagues of the meteor section of the A.S.S.A. Twelve observers operated 2 camera batteries in the nights of July 16 and 17, 1996 from evening twilight until midnight. No outburst of kappa-Pavonids was observed. In fact, the shower was difficult to recognise, with rates less than $ZHR = 0.5$ per hour.

1996 would offer another chance. It was a long shot, since no outburst of the shower had ever been reported before when planetary positions were the same and it is not certain that the 1986 meteor outburst was of far-comet type. However, this event was our last chance for as much as five years to see another outburst of a stream suspected



Kappa Pavonid campaign. Porto Alegre, July 15-17, 1996

of far-comet type outbursts.

Gilberto Klar Renner, who works at the planetarium of Porto Alegre, Brazil, was found willing to organise a group of local amateur meteor observers in a 15 person strong team that would operate three camera batteries and record the times and positions of bright meteors. Porto Alegre is in the southern most province of Brasil, close to the borders of Uruguay, Argentina and Paraguay and not far from the famous waterfalls of the Ignacu river.

I arrived in Brasil on July 15, shortly after the Asteroids, Comets, Meteors 1996 meeting in Versailles. I had travelled a long way, first stopping and collecting the camera batteries in San Francisco. It was late in the afternoon

when I arrived in Porto Alegre. Five people greeted me at the airport. We had coffee and went to the planetarium, where the camera batteries were assembled. Present were Gilberto Klar Renner and six photographers-to-be, who were instructed on how to operate the camera platforms.

Each battery consisted of twelve 35mm cameras in a low and high platform setup. At around 7 pm we left for dinner and returned around 8 pm to give instructions to the 15 assembled visual observers. While I gave a talk about the purpose and goals of the project, Luis Antonio Marcado did an excellent job in simultaneous translating my English to Portuguese. At 9:30 pm we left for a site just out of Porto



Figure 2 : One of three. Multistation image of a -1 meteor on July 17, 1996 2h49m06s UT. Pantano Grande, Brasil. Photo by Daniel Carlos Adib.

Alegre, where we stationed all three camera setups on a grass field under a nice clear sky. All three teams made serious attempts to run the systems and record the time of bright meteors. After solving many small and big problems, everybody was left with a strong sense of confidence. Whatever would happen the next night, the observers would be ready for it.

The next afternoon, Tuesday July 17 at 3:00 pm, all observers gathered again in the planetarium of Porto Alegre in order to discuss the events of the previous night and receive final instructions. At 4 pm, three caravans of cars left for observing sites at Mariana Pimentel in the south-east, Pantano Grande in the west, and General Camera in the north. These sites form a large triangle, some 70 km apart. Some cirrus clouds now threatened to spoil the night. Clouds became thicker as I approached Pantano Grande in the company of Carlos Abid and his son Daniel, Luis Antonio Marcado, and Luis Antonio da Silva and his friend. Our site was a small farmhouse in the vast countryside of southern Brasil. The scenery was that of waving hills,

dirt roads, cattle fields of rough and inhospitable terrain and some small forests. The farm was located at a most idyllic spot with a small grass field in the front that we could use to set up the camera platforms. Twilight fell and we enjoyed a hearty meal prepared by our friendly hosts.

Soon after nightfall, the cirrus clouds dissolved. A starry sky welcomed the observers, with the Milky Way, the southern cross, and the stars alpha and beta Centaurus. The zodiacal light was clearly visible in the west. Later in the night, the center of our Galaxy rose to the zenith!

An occasional meteor crossed the sky. Each was plotted on a star chart by the visual observers who had now gathered in the field, recording time and brightness. Carlos operated the camera battery and made one exposure after the other, while Daniel kept a log.

Around 11 pm (02 h UT) a number of meteors appeared that could have been kappa-Pavonids. Remembering the previous year in South Africa, I was surprised to see kappa-Pavonids at all. But where they? Some where perhaps a little too fast, others a little too long.

In all likelihood, no outburst did occur that night.

One bright meteor at 02:49:06 UT caused some cheers. That, too, appeared at first glance a kappa-Pavonid viewed from our site, but the meteor was too long for being so close to the radiant. That meteor was photographed at all three stations and the orbit could be calculated (see photo). The result shows that it was not a Pavonid: the radiant is much farther to the east.

The observing continued until 2 am, when the window of opportunity for observing a possible kappa-Pavonid outburst had passed. Some 30-40 meteors had been logged. We spend the night at the farm and rose the next morning, pleased that nature permitted us a clear sky that night. Quite fortuitous, because the previous week had been cloudy, and another week would follow with no more than clouds.

The success of the observing campaign was celebrated with a traditional barbecue dinner, the churasco, and with live Brazilian music. Later that week followed many pleasant excursions to downtown Porto Alegre and the tourist towns of Gramado and Canela, as well as a visit to the town of Nova Petropolis, the site of a local iron meteorite find. The week passed with discus-

sions, while sipping the local Erve Mate thee, wondering what kept the Pavonids from reappearing.

Tim Cooper sent notice by e-mail that the shower had also not been observed in the hours prior to our observing run from locations in South Africa. Hence, we are certain that the kappa-Pavonids did not return this year. I suspect that these trails are really very narrow and some factor of luck is involved for the Earth to cross the trail of dust. We have to try again one day. Five years from now...

Leaving me with thanking all the visual and photographic observers that participated in the kappa-Pavonid campaigns of 1995 in South Africa and of 1996 in Brasil, especially those which I did not mention in the text by name, each of whom was essential to the success of this effort. These campaigns were made possible by Tim Cooper and Gilberto Klar Renner who organised the local effort and were gracious hosts.

References

- [1] Wood, J. (1986), NAPO-MS Bulletin 157 (July)
- [2] Jenniskens, P. (1987), Radiant 9, 79
- [3] Jenniskens, P. (1996), Meteor Stream Activity. IV., Astron. Astrophys. (in press)

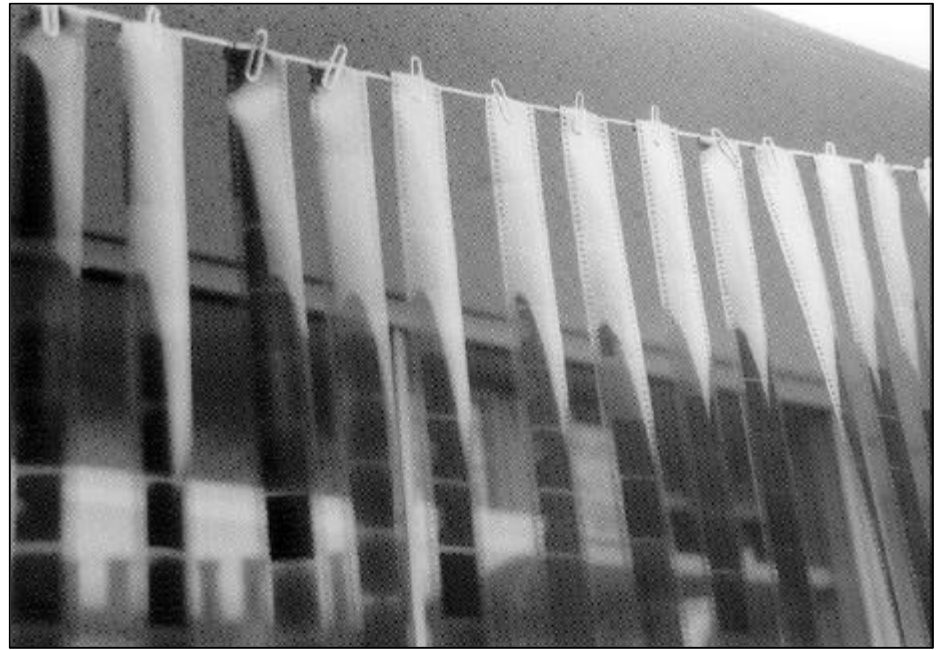


Figure 3 : *Photographic “results” from the Brasil kappa Pavonid expedition.*