

## The 1997 Eta Aquarids

While you were observing the dust tails of Comet Hale-Bopp and other comets, have you ever wondered about the ultimate fate of the dust and other particles erupted from comets as they neared the Sun? The answer is that this material stays in orbit around the Sun, not far from the original comet orbit, but scattered in a wider envelope around it. Slightly differing orbital periods cause the particles to become distributed around the orbit over time, but usually unevenly with concentrations preceding and following the parent comet. If this envelope intersects the orbit of a planet, the material can be swept up by the planet, and a meteor shower results.

A good example of this is the swarm of particles associated with the orbit of Comet 1P/Halley. This comet has in the past come as close to Earth as 0.0334 AU, and part of its envelope of debris intersects our orbit twice, to give us the Eta Aquarid meteor shower in early May, and the Orionids in October. These showers put on a reasonable show, though not as good as the best of the Northern showers.

The Eta Aquarids reach a peak during 4-6 May, although often they reach a plateau between 1-8 May with no real peak. The Zenithal Hourly Rate (ZHR) is usually 50-60, but varies from 30 to 110, the last value being recorded in 1980. Note, however, that actual observed rates will be less than these. The ZHR is a theoretical value obtained by recalculating the observed rate as if the radiant were at the zenith. Also, [the number of meteors seen by a particular observer is affected by the fact that only part of the sky can be seen at a given instant, and] moonlight and light pollution will hide the fainter meteors.

This year the shower occurred in the days leading up to New Moon, so Vello Tabur made arrangements for a meteor watch from a dark site for the early hours of Sunday morning 4 May (see April's Southern Cross). Although this was a bit before this year's predicted peak of 5/6 May, it conveniently allowed for sleeping-in afterwards, and should not have made much difference for a shower with near-constant activity over 8 days.

Near-total overcast the evening before, however, [apparently] caused intending observers to cancel plans to come. But surprise, surprise, a clearing had started by midnight, and by 1:30 am things were looking promising, so eventually I did go. At the observing site I found I was the only one there, but the sky was now 95% clear, and looked superb. The only remaining clouds hugged the southern and eastern horizons, and were feeble compared to the stunningly prominent star clouds of the southern Milky Way.

The meteors proved to be swift, short streaks. Apart from a yellow one of 1st magnitude, the rest were below mag. 2, and most of them considerably below. The majority in fact would have been too faint to see from light-polluted suburbia. Although the Eta Aquarids are supposed to be dominantly yellow, all but one turned out to be white or bluish-white. Maybe this had something to do with the low brightness of many of them -- it's not easy to determine the color (or magnitude) of a faint streak of light that appears for less than a second, especially when it's seen out of the corner of your eye.

Eta Aquarids are also described as often (25%) leaving smoke trains behind after the meteor itself has disappeared from view, some of these trains persisting for over 30 seconds. I saw only one that left a train, for just over 1 second. I get the impression that on this occasion many of the meteors represented the finer-than-average dust, perhaps because the observation was made a bit before the peak of the shower, when coarser debris might be expected at the core of the stream.

The number of Eta Aquarids averaged just over 8 per hour, and were counted as follows:

Time (AEST)	Eta Aquarids	Sporadics
3:30-4:00am	5	1
4:00-4:30am	3	1
4:30-5:00am	5	1

Sometimes two meteors would come within a minute or two of each other, to be followed by a long interval of nothing. After 4 am the crescent Moon rose, a pretty sight, but as it rose higher its light began interfering with the eastern part of the sky where the radiant was, though fortunately not in the optimal area for observation 45 degrees from the radiant.

The typical Eta Aquarid on this night can be summed up as short, fast, faint and infrequent. They were not the spectacle of the Geminids last December, but still quite respectable compared to the many minor showers around, for which a ZHR of 5 is considered "very active". Besides, it's a profound thought that what you're witnessing are bits of Comet Halley being incorporated into our planet.

*Postscript:*

*Just to illustrate that the shower probably varied from day to day, John Morland reports that he had a quick look in the dawn twilight on 8 May between 6:00-6:10 am (AEST), and in that short time saw three bright Eta Aquarids. One was as bright as Jupiter, the other two were about mag. 1. Two were bluish, and one was yellow with a bluish trail. The brightest one had a streak 40-50 degrees long.*

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