

The October 2007 Outburst of 17P/Holmes. Colin Snodgrass¹, Alan Fitzsimmons², Hermann Boehnhardt³, Tim Lister⁴, ¹European Southern Observatory, Chile (csnodgra@eso.org), ²Queen’s University Belfast, UK, ³Max Plank Institute for Solar System Research, Germany, and ⁴ Las Cumbres Observatory, California, USA

17P/Holmes is a short period comet and a typical member of the Jupiter Family[1]. In late October of 2007 it was outbound (having reached perihelion in May 2007) and fading normally when it underwent another spectacular outburst, rising from $V \sim 17$ to $V \sim 3$ over the course of a few hours. Here we report the results of our observations of the comet in the weeks and months following this event, starting the night after the first reports.

Observations

The outburst of comet Holmes was first seen by amateur astronomers, beginning around October 24.0 UT. We began observing[2] with the 2.5m Isaac Newton Telescope on the island of La Palma at around October 24.9 UT. This was followed by two of the robotic telescopes of the Las Cumbres observatory, the 0.8m Tenagra telescope in Arizona and the 2.0m Faulkes Telescope North on the Hawaiian island of Maui, which obtained by far the largest part of the early data set. Further data was taken using the 3.5m at Apache Point Observatory, New Mexico, the 1.5m telescope at Loiano, Italy, and the robotic 2m Liverpool Telescope on La Palma, which was used to monitor the comet through to the end of January 2008. We obtained ~ 1000 images of the central coma region through a number of broad- and narrow-band filters.

Morphology

The outburst produced a bright coma that was remarkably circular at early times, before it was swept into the anti-solar direction to produce the ‘jelly-fish’ appearance that later wide field photographs recorded. Applying an adaptive Laplacian filter shows the sharp edge as an expanding circular cloud, with a supernova-shell-like appearance. Fig. 1 shows 5 example images taken on Nov 25, 28, 29, 31 & Dec 4 (Sun direction downward in each). The expansion of the edges of this ring show a constant expansion rate of 0.57 km/s perpendicular to the anti-Solar direction, with an origin at Oct 24.5 UT (after the outburst was first detected), while the effect of a constant [ac/de]celeration can be seen in the [anti-]Sun direction. At later times striations are visible in the inner coma, spread around the anti-Solar side of the nucleus.

Photometry

Fig. 2 shows how the brightness decreased in *BVRI* over the months after the outburst. While the comet’s

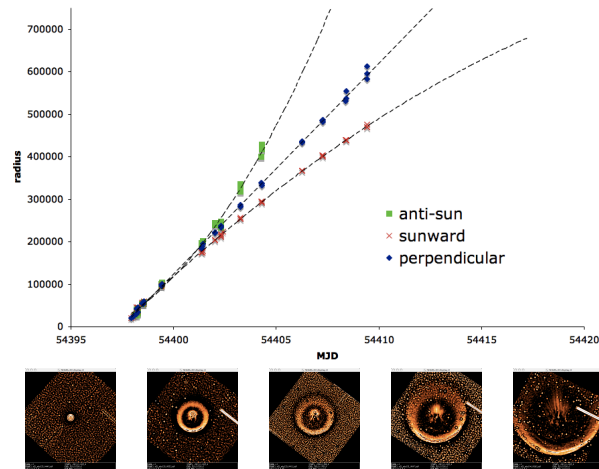


Figure 1: The expansion of the outer edge of the coma.

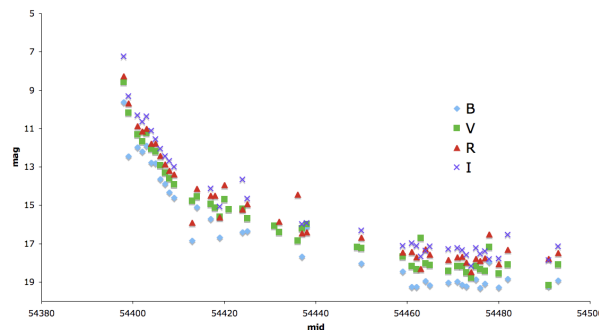


Figure 2: The *BVRI* light-curve measured within an aperture of radius 10^3 km at the comet.

total brightness (e.g. as reported by IAUCs) remained high, the magnitude within the inner coma returned to it’s pre-outburst level after ~ 2 months, as the contribution from the outburst material became negligible within the 10^3 km aperture chosen. The colours did not change during this time, and the value of $Af\rho$ decreased in a similar manner to the brightness. This suggests a single explosive event and no greatly elevated ongoing activity.

Notes/References

- [1] Snodgrass, C., et al, MNRAS, 373, 1590 (2006)
- [2] We thank the following observers for obtaining this data: T. Naylor & C. Bell at the INT, S. Galletti and colleagues at Loiano and the group led by J. Bally at APO.