ESTEC Contract No. 12621/97/NL/RE

Study Observations and Modelling of Large-Scale Dust Environment in Comets in Preparation of the ROSETTA Mission

Intermediate Report
7 June 2000

1 Executive Summary

We present results achieved under ESTEC Contract No. 12621/97/NL/RE of our investigation of CCD images of the ROSETTA target comet 46P/Wirtanen acquired during its 1996 apparition.

A detailed description of the observational material and the basic data processing and archiving steps was presented by H. Böhnhardt et al. in their report to ESA-ESTEC of November 1997. The photometric evaluation of the CCD images was presented in an intermediate report of 7 April 1999 (report I). Report I also contained the calibrated absolute coma brightness of comet 46P/Wirtanen as determined from R filter observations using ring and full aperture photometry with radii ranging from 2000 km up to 50 000 km, for the period April through December 1996. In the following we present

- BVR light curves for the complete time span of available observations (April through December 1996);
- determination of the activity parameter n from the slopes of different lightcurve sections;
- radial coma intensity profiles and determination of coma gradients α;
- a newly arranged and condensed result table from our working database containing all results of the coma BVR aperture photometry;
- A·f·ρ as measure of the dust production rate of the comet;
- results of a power spectrum analysis investigating a possible short-term variability of the coma brightness; special emphasis was put on the impact of seeing variations on coma brightness measurements obtained through small apertures.

Contract and Payment Status

The work on this study contract started on 1 March 1998 at the Astronomical Institute of the University of Erlangen-Nürnberg, in collaboration with Dr. Hermann Böhnhardt (ESO, Chile). Dipl.-Phys. Peter C. A. Bär is being employed in this program on a level BAT IIa half-time position. His current contract, which is limited until 30 June 2000, will be extended until completion of the project. Payments from ESA amounting to ECU 20 000 and EURO 50 000.-, respectively, were received on 25 March 1998 and on 14 December 1998. During the progress of the study, five meetings (three of them during 1999) among the collaborators were held at Bamberg Observatory.

2 BVR lightcurves of comet 46P/Wirtanen

In addition to the R lightcurve of the comet presented in report I, B and V filter observations have been evaluated. The results presented here are based on *relatively calibrated* measurement values instead of raw measurement data. The measurement data for a given observation night are normalized to the flux of a reference image taken in the same night. The method, as described below, was applied to B and V images in the same way as previously to R images. We present the complete results for all three filters here, i.e. we include the R measurements here once again. Since report I we were able to improve the accuracy of the R measurement calibration slightly for a number of nights by choosing carefully selected samples of comparison stars. The calibrated values given here are still very close to the results of report I. But, though small and, in fact, insignificant for the long-term lightcurve, the differences are crucial for the short-term variability analysis discussed in section 4. Also, an attempt was made to determine the slope of the lightcurve during different sections of time.

2.1 Data processing

The B and V filter CCD images were processed in exactly the same way as already described for the R filter data in report I. First of all, the comet was identified in the images. Stars inside the photometric apertures were removed by replacing the star pixels by the same number of pixels with the average flux level of the background or coma pixels surrounding that star, and statistical noise was superimposed on the artificial pixel values. The images of a given night and filter were then corrected for temporal variations

due to the observing conditions, mainly atmospheric extinction. For this step we chose a number of comparison stars which were present in all images of that night and filter. Typically five comparison stars of adequate brightness per night and filter were found fulfilling this criterion. We then measured the total flux of the comparison stars in all images of the night. With the assertion that the better the observing conditions the higher the measured flux should be, we chose the image with the highest flux of the comparison stars as a reference image for the subsequent calibration steps. The cometary flux was measured in a set of apertures with radii ranging from 2000 km up to 50000 km. The measured fluxes were multiplied by the ratio of the total comparison star flux in the reference image relative to that of the respective image.

2.2 BVR lightcurves in 1996

Figs. 1 and 2 show the total brightness of the cometary coma measured in Bessell B, V and R filters through circular apertures of 10000 km and 15000 km radius, respectively. The R lightcurve can thus not directly be compared with the lightcurve found by Böhnhardt et al. in Munich. The Munich group used apertures of variable sizes in order to include all light from the whole coma at all observation dates. Our measurements were, in contrary, made with apertures of constant absolute size at the position of the comet. As the contribution of background pixels to the measured flux in a given aperture grows quadratically with increasing aperture radius, we tried to find aperture sizes encompassing a maximum fraction of the coma, and as little background as possible, at the same time. The radius of 10000 km was chosen as it includes not too much background at early observation dates on one hand, and still encompasses a large fraction of the coma at later dates. For comparison, Fig. 2 also shows the lightcurves for an aperture of 15000 km radius. As the radial intensity profiles (see subsection 2.4) show, there is apparently no detectable light from the comet beyond a distance of 15000 km from the brightness center. An aperture with a radius of 15000 km is therefore supposed to encompass almost the whole coma, thus enabling a comparison with the lightcurve of the Munich group, even though our fixed aperture data probably contain relatively more background flux than the Munich measurements with individually adapted aperture sizes.

The lightcurves are plotted against time for the whole observing interval from April to December 1996. The data points represent nightly averaged values and are normalized to a distance of $\Delta = 1$ AU from the Earth.

The overall shape of the long-term lightcurve is very similar for all three filters. It starts with a relatively flat part from April to about August 1996,

followed by a steeper increase of the coma activity starting in September 1996. Changes of the mean values on time-scales of days are probably not intrinsic to the comet, but reflect photometric uncertainties due to changing atmospheric conditions and low signal of the comet. This is in particular true for the early 1996 observations, when the coma was not yet well developed, and especially for observations from May, June and end of September 1996, when bad weather conditions were reported by the observers in their night logs. Therefore the apparent drop in the coma R brightness in June 1996 seems to be very unlikely due to an intrinsic variability of the comet. The number of B and V images was much smaller than that of R filter images. In particular there were no B and V images from May and June 1996 available. Hence the dip in mid-June cannot be correlated with a possibly corresponding feature in the B and V lightcurves. With the exception of November the lightcurves for the three filters are almost parallel which indicates that the colour of the coma did not significantly change during the whole observing period in 1996. The average colours B-V and V-R are similar to the solar ones (B-V $\sim$ 0.5 mag and V-R $\sim$ 0.4 mag).

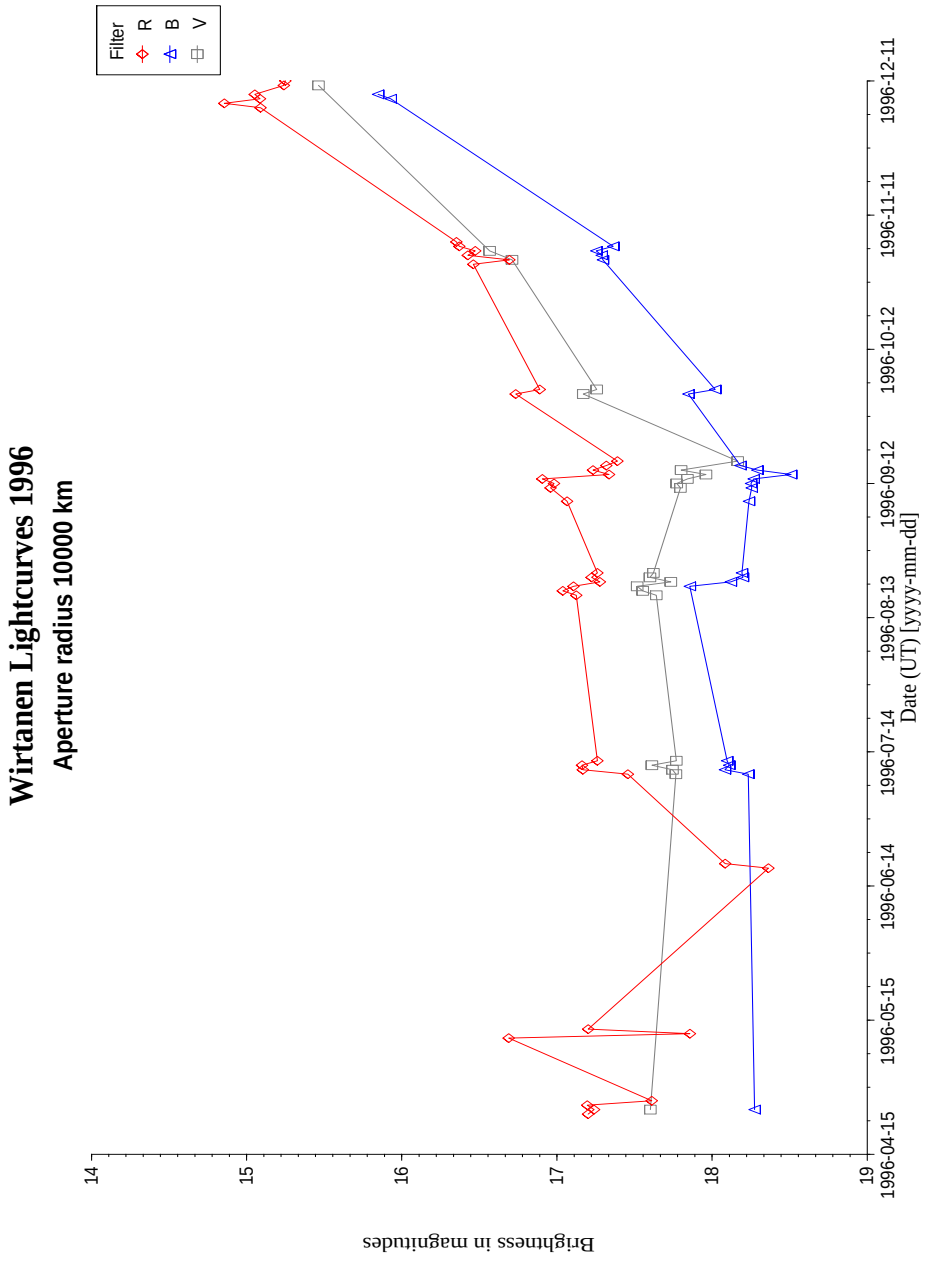


Figure 1: BVR lightcurves for the period April through December 1996, measured with an aperture of 10000 km.

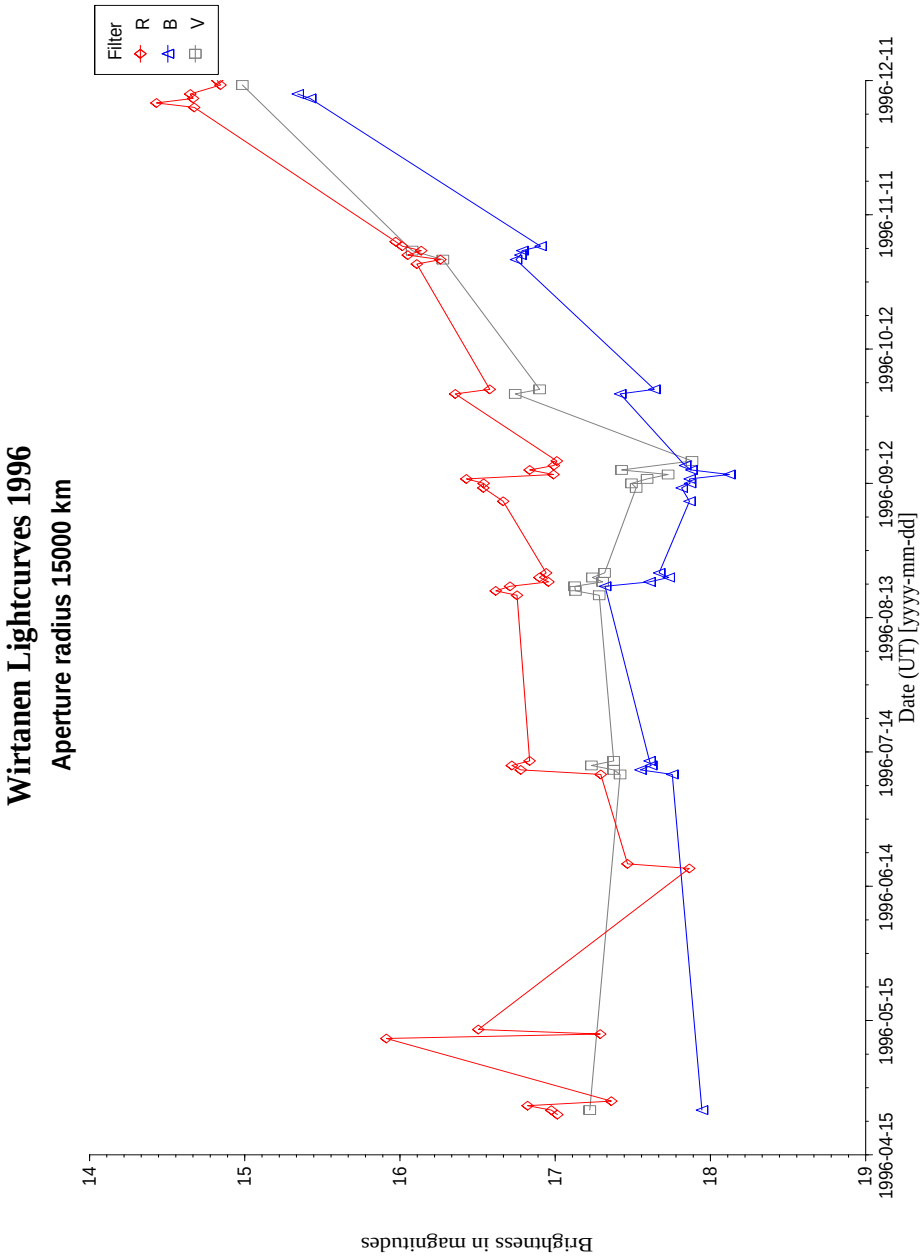


Figure 2: BVR lightcurves for the period April through December 1996, measured with an aperture of 15000 km radius; compared with the smaller aperture data of Fig. 1, the total brightness is increased, but long- and short-term brightness variations are very similar.

2.3 Slope of the lightcurve

From the shape of the lightcurve, we tried to determine the activity parameter n. In Figs. 3 to 5 we plotted $m - 5 \cdot \log \Delta$ versus $\log r$. n is the gradient of a given fraction of the trendline between two sections in the resulting curve. A number of cases has been tested, corresponding to different choices of sections in the curve. Scenarios with two to four sections were considered. As a result we favour a two section model with $n_1 = 1.86$ for solar distances of more than 2.29 AU (17 September 1996) and $n_2 = 12.80$ for later dates when the comet was closer to the Sun (for R curve). Correspondingly we found $n_1 = 0.70$ and $n_2 = 15.24$ for B, and $n_1 = -2.46$ and $n_2 = 16.20$ for V.

The rather small values of n_1 for B and V may be explained by the large amount of scattering present in the early lightcurves. If additional R measurements before April 1996 would be added, which were not available to us, but were shown by Böhnhardt et al. in their report to ESA of 8 July 1997 (p. 13), the trendlines with gradient n_1 would yield a steeper run of the R curve with a larger n_1 value. After September 1996, our n_2 values are in accordance with the average behaviour of other comets.

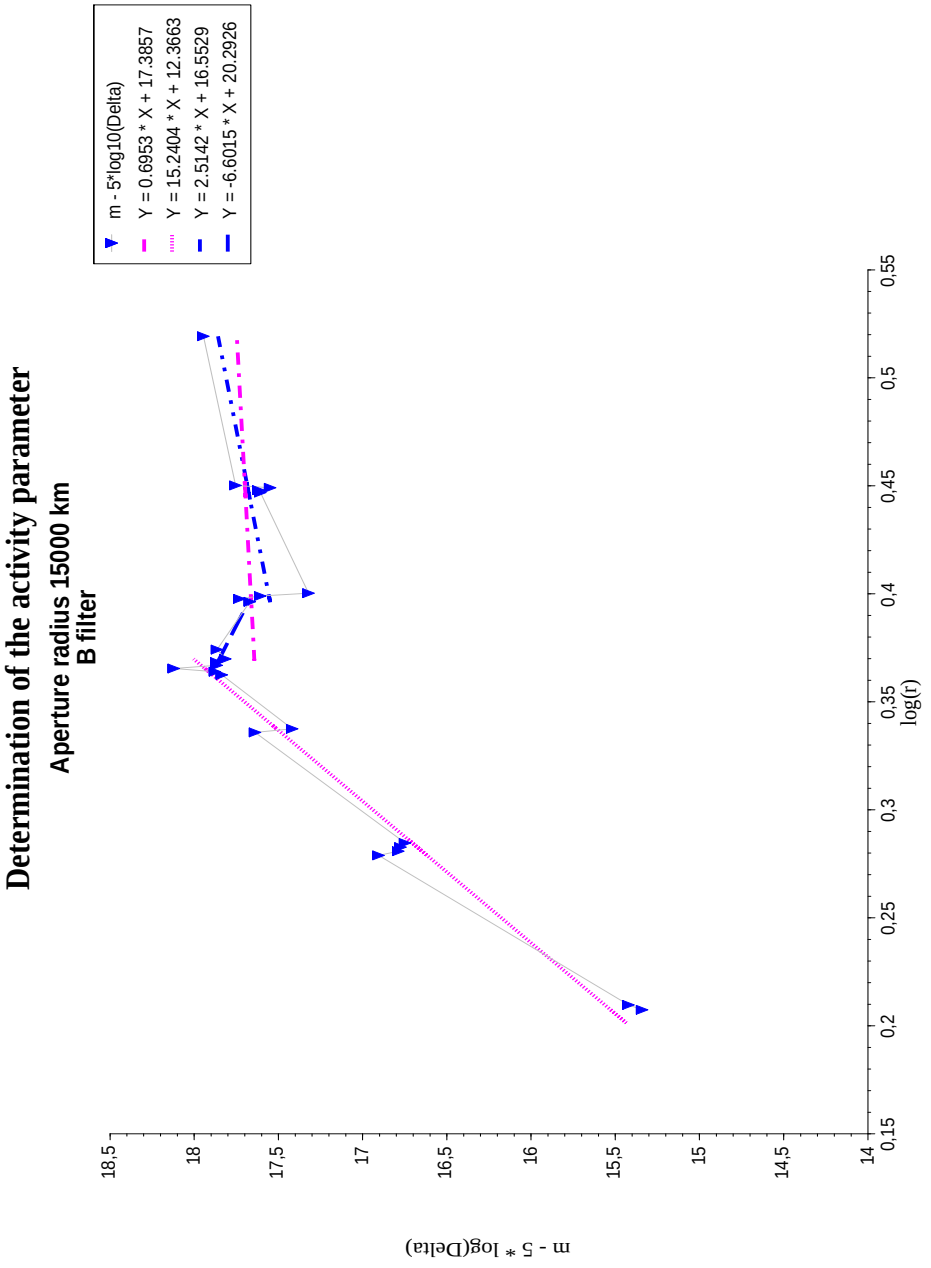


Figure 3: Activity parameter n for B curve. The fit curve equations corresponding to the chosen sectioning scenarios are given in the legend.

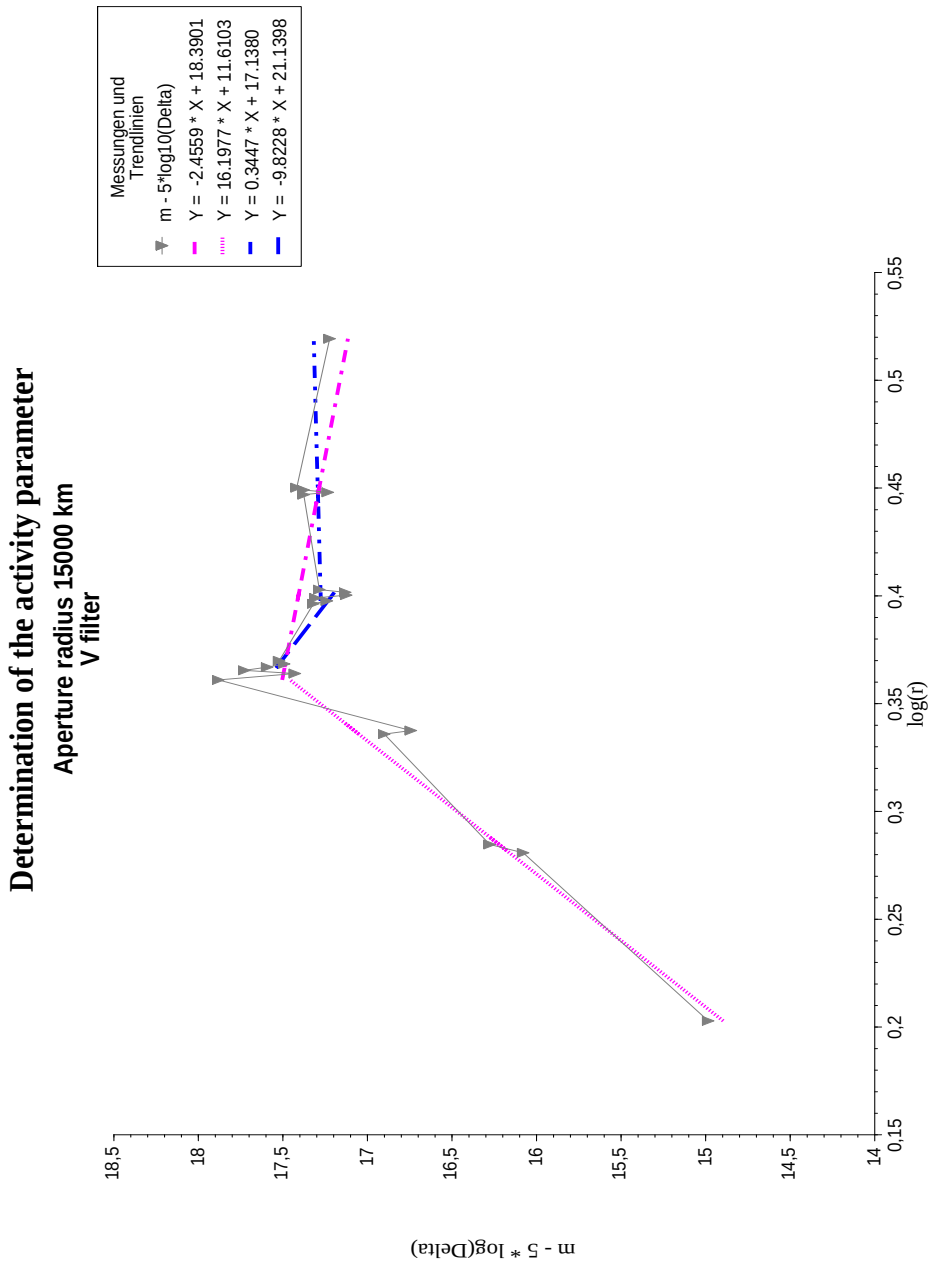


Figure 4: Activity parameter n for V curve. The fit curve equations corresponding to the chosen sectioning scenarios are given in the legend.

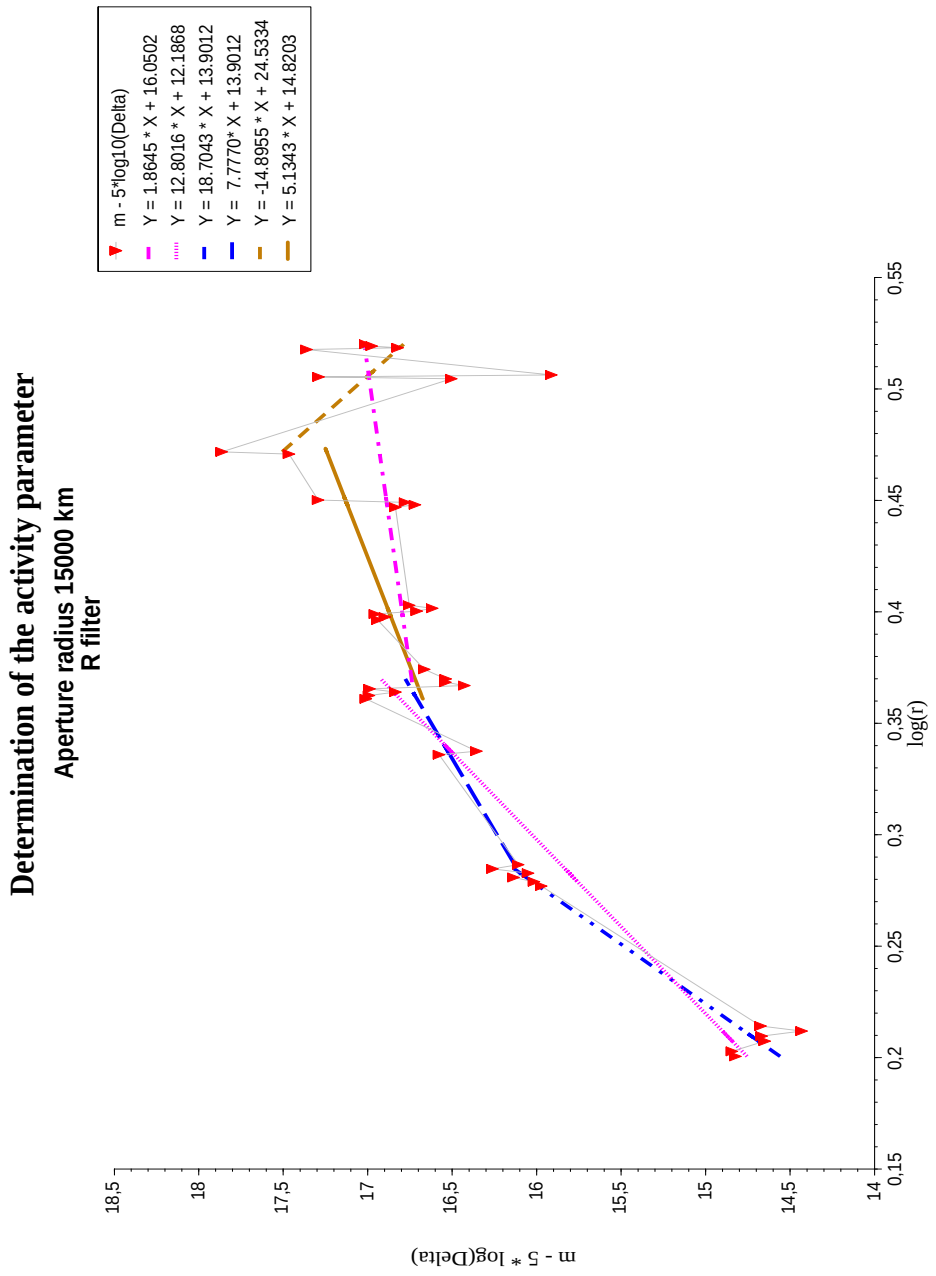


Figure 5: Activity parameter n for R curve. The fit curve equations corresponding to the chosen sectioning scenarios are given in the legend.

Table 1: Bessell filter calibration.

Filter	*Star of 0 mag*
Blue	$6.32 \cdot 10^{-9}$ erg/cm^2/s/AA
Visible	$3.63 \cdot 10^{-9}$ erg/cm^2/s/AA
Red	$2.18 \cdot 10^{-9}$ erg/cm^2/s/AA

2.4 Radial profiles of the coma flux

In this section we present the analysis of the coma structure in terms of brightness and intensity profiles. The latter ones are given as absolutely calibrated fluxes for the Bessell filters used (Bessell, A&A 333, 1998, and private communication, Bessell, 2000; see Table 1).

The radial profiles are given in logarithmic and linear form. While logarithmic plots are useful for determining the coma gradient α, a linear plot is more intuitive and more suitable if one is interested in the spatial coma extension. For the plots of full and ring aperture profiles we used as input the total flux measured in the respective full and ring apertures, depending on the application, normalized to Earth distance $\Delta = 1$ AU or per square km projected coma surface area.

2.4.1 Usefulness of a 1D analysis

It is important to note that the plots shown are one-dimensional profiles. The physical parameters derived are therefore valid under the assumption of a spherically symmetric coma. Usually, dust comae of comets are not symmetric; as seen in the images delivered with the ESA report by Böhnhardt et al., also the dust coma of comet 46P/Wirtanen is assymmetric during the whole observing period in 1996. The main asymmetry is the isophote extension into tail direction. Apart from this feature, no other coma structure could be identified (using coma enhancement techniques like adaptive Laplace filtering and wavelet transform techniques). Therefore, radial profiles as in our figures give at least a good representation of the average flux distribution in the coma of the comet. However, they do not properly represent azimuthal variations in the cometary coma.

2.4.2 Background

The background flux of the DFOSC images (the instrument mostly used for the observations of 46P/Wirtanen) shows appreciable local variations, which is due to the spatially variable and partially non-linear response of the CCD (caused by an irreversible damage of the detector during UV flooding).

There are areas with a background level close to zero, and others, where the background flux is comparable to that of outer coma pixels. During the pre-processing of the images in Munich (see Böhnhardt et al. in their report to ESA-ESTEC in November 1997), the overall (i.e. averaged over a wider pixel range) backround was subtracted from the image as a whole. Local background variations were not taken into account. Therefore, while the overall background flux level in an image is zero (or close to it), there were also pixels with negative flux values introduced. Due to the special detector characteristics these pixels are not spread statistically over the image, but are grouped in certain areas. It can (and does!) happen, that the coma is surrounded by high background in one part of the image, while negative flux is found in another sky region close to the comet.

Since negative fluxes make no physical sense, ring apertures with integrated fluxes less than zero were assumed to contain pure background and no coma flux at all. So instead of reducing the total full aperture flux from one radius step to the next bigger one, we simply added zero (actually a differentially small positive value, for numerical reasons) in these cases as a first order correction. This is, by the way, the reason, why the nightly averaged mininum values never fall below zero in the plots shown in section 2.4.4.

2.4.3 The coma gradient α

In Figs. 9 to 17, log F_{hc} is plotted against log ρ, where F_{hc} denotes the heliocentrically corrected cometary flux (i.e. normalized to Earth distance 1 AU), and ρ the aperture radius. The flux was measured in full apertures. For an ideal fountain model coma (i.e. for homogeneous, isotropic dust expansion with constant velocity), the intensity should vary like $I \propto \rho^{-\alpha}$, with α being close to -1 (frequently, one ignores the minus sign of α). The coma gradient α can be determined from these data.

The coma gradient α is shown in Figs. 6 to 8. Generally, α is found to be close to -1 most of the time. However, it is also obvious that the α values are variable with time and can also appreciably deviate from -1, indicating structural changes and non-uniformity of the coma.

Monthly averaged coma profile gradients α for different distance ranges in the coma for the BVR filters are listed in Table 2. Obviously, during April to September 1996 the α values at large distances from the nucleus differ considerably from the ones seen closer to the center (i.e. within 15000 km nucleus distance). This is due to the inclusion of more and more background pixels in the aperture flux, which do not contain light from the coma of the comet. Hence, the gradient will change with aperture size. Only during the last two observing runs (November and December 1996) the coma radius

became larger such that the α gradients of the outer coma are thus indicative for the flux attenuation with nucleus distance.

Therefore, at the end of the comet visibility in 1996, the α values for the inner and outer coma region become very similar, which indicates that the dust coma regime behaved rather uniform, and no major coma structures (as a result of localized active regions on the nucleus) should have been present. Only in December 1996 differences existed to some extent between the gradients in the inner and outer coma.

The temporal development of α shows values higher than 1 during April to June and in December 1996, below or close to 1 in between. With a few exceptions the α gradients seen in the BVR filters are very similar (see also Figs. 9 to 17).

Table 2: Average coma profile gradients.

BLUE	**Total coma**	**2000 - 6000 km**	**2000 - 8000 km**	**2000 - 10000 km**	**2000 - 15000 km**	**6000 - 50000 km**	**8000 - 50000 km**	**10000 - 50000 km**	**15000 - 50000 km**
April	-1.18	-1.55	-1.43	-1.35	-1.22	-1.12	-1.16	-1.23	-1.37
July	-1.27	-1.13	-1.11	-1.09	-1.09	-1.38	-1.44	-1.51	-1.62
August	-1.18	-1.00	-0.98	-0.98	-1.00	-1.30	-1.35	-1.40	-1.49
September	-0.94	-0.94	-0.91	-0.89	-0.88	-0.98	-1.01	-1.05	-1.11
October	-0.97	-0.87	-0.88	-0.88	-0.89	-1.03	-1.05	-1.08	-1.13
November	-1.14	-1.10	-1.08	-1.07	-1.08	-1.19	-1.21	-1.24	-1.28
December	-1.27	-1.70	-1.60	-1.52	-1.44	-1.14	-1.14	-1.13	-1.12
VISIBLE	**Total coma**	**2000 - 6000 km**	**2000 - 8000 km**	**2000 - 10000 km**	**2000 - 15000 km**	**6000 - 50000 km**	**8000 - 50000 km**	**10000 - 50000 km**	**15000 - 50000 km**
April	-1.13	-1.41	-1.33	-1.27	-1.19	-1.08	-1.10	-1.15	-1.25
July	-0.92	-0.83	-0.80	-0.79	-0.79	-1.01	-1.06	-1.12	-1.23
August	-1.07	-1.21	-1.17	-1.14	-1.08	-1.05	-1.07	-1.11	-1.20
September	-0.68	-0.80	-0.77	-0.74	-0.72	-0.65	-0.66	-0.65	-0.65
October	-0.95	-0.90	-0.87	-0.86	-0.86	-1.01	-1.05	-1.10	-1.17
November	-1.09	-1.06	-1.03	-1.02	-1.02	-1.14	-1.17	-1.20	-1.25
December	-1.34	-1.94	-1.85	-1.76	-1.63	-1.12	-1.10	-1.09	-1.09
RED	**Total coma**	**2000 - 6000 km**	**2000 - 8000 km**	**2000 - 10000 km**	**2000 - 15000 km**	**6000 - 50000 km**	**8000 - 50000 km**	**10000 - 50000 km**	**15000 - 50000 km**
April	-0.79	-1.38	-1.28	-1.20	-1.08	-0.59	-0.55	-0.54	-0.53
May	-1.51	-1.24	-1.26	-1.28	-1.33	-1.65	-1.69	-1.73	-1.80
June	-1.35	-1.37	-1.29	-1.26	-1.24	-1.41	-1.47	-1.52	-1.59
July	-0.91	-0.84	-0.82	-0.81	-0.80	-0.97	-1.01	-1.06	-1.16
August	-0.91	-0.87	-0.85	-0.83	-0.82	-0.97	-1.00	-1.05	-1.12
September	-0.96	-0.88	-0.86	-0.85	-0.85	-1.02	-1.06	-1.10	-1.17
October	-0.84	-0.86	-0.84	-0.82	-0.81	-0.86	-0.88	-0.90	-0.95
November	-0.90	-1.01	-0.97	-0.95	-0.92	-0.88	-0.88	-0.89	-0.89
December	-1.06	-1.48	-1.38	-1.32	-1.23	-0.93	-0.92	-0.92	-0.91

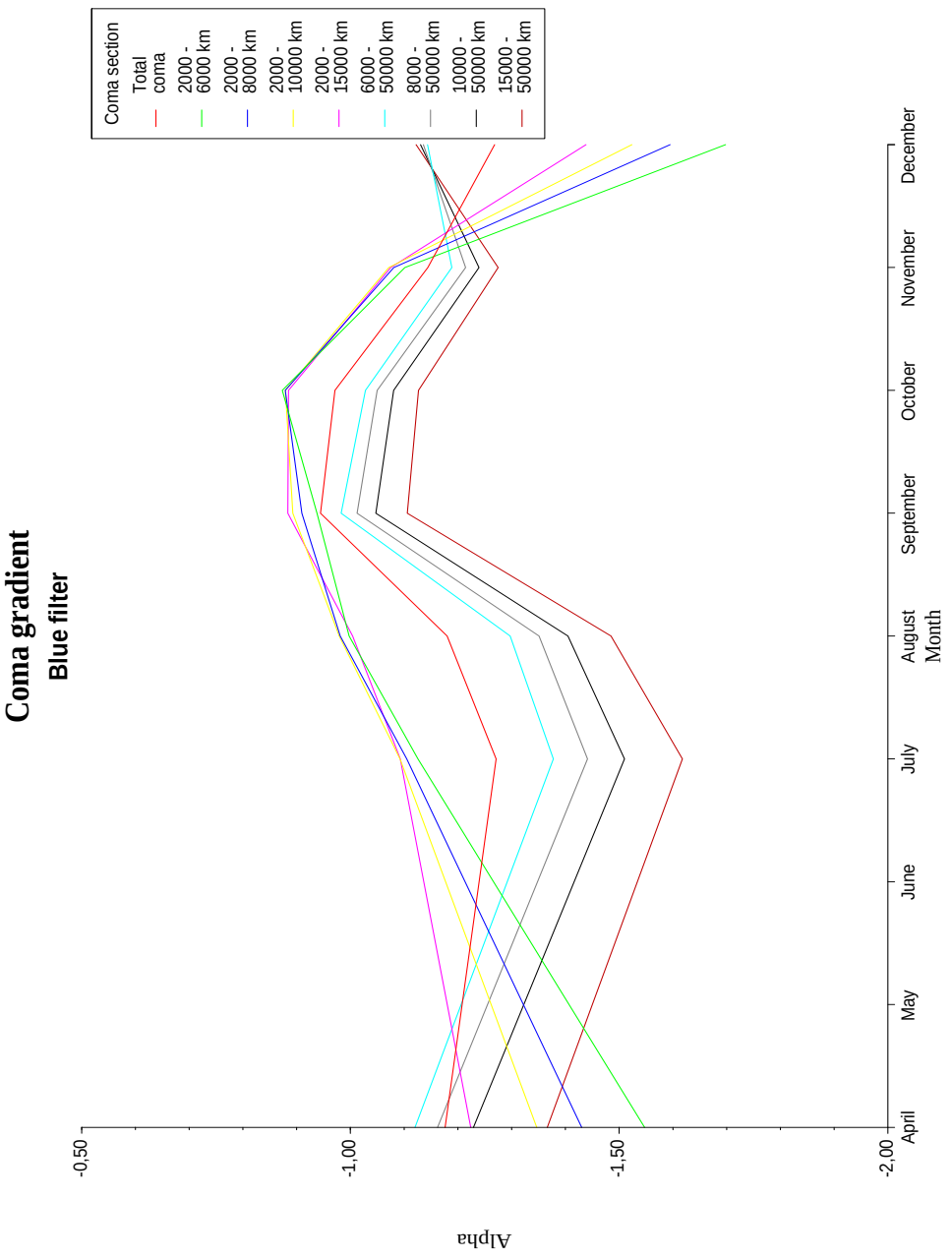


Figure 6: Development of coma gradient α with time, as determined for B filter measurements

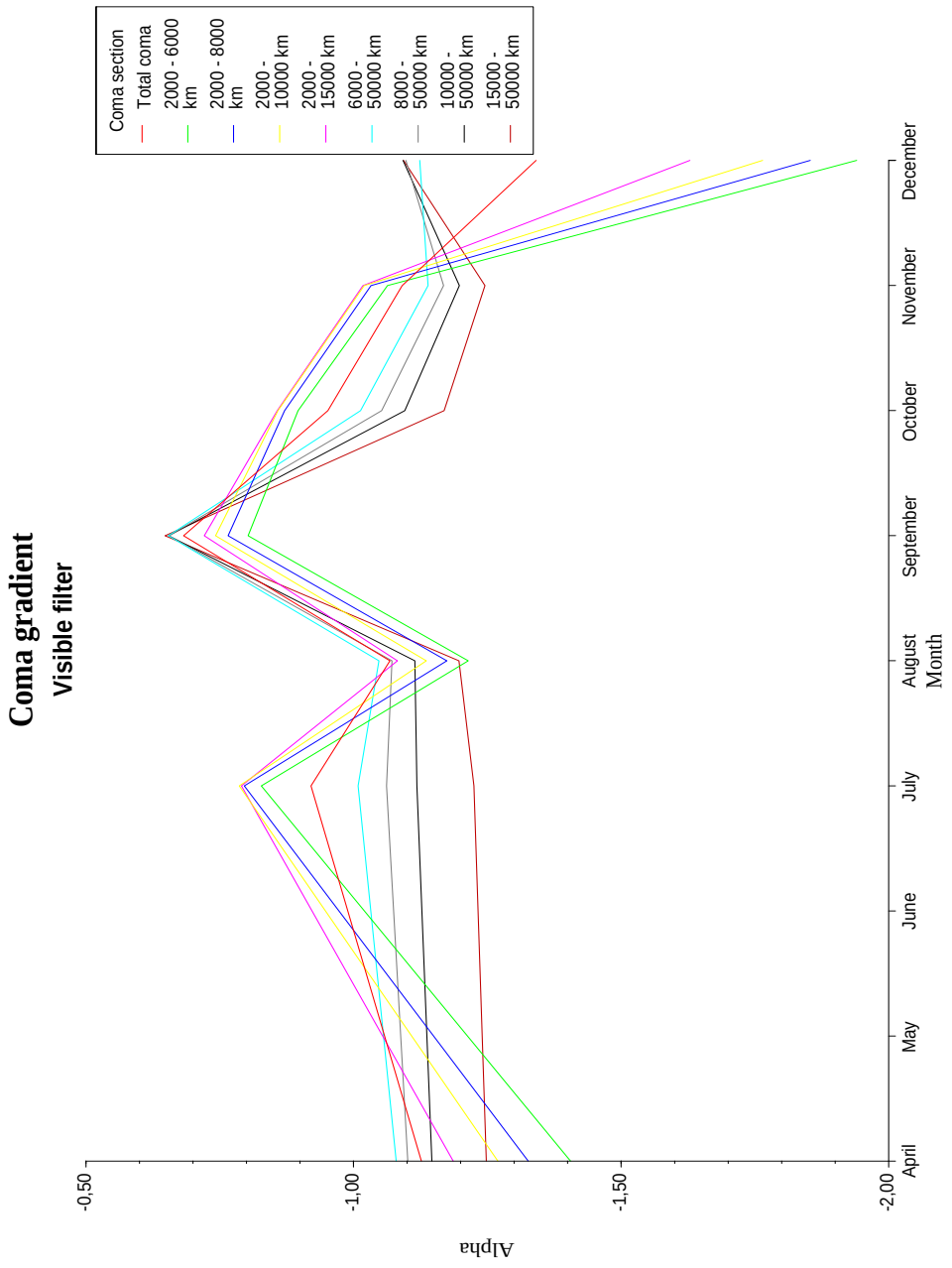


Figure 7: Development of coma gradient α with time, as determined for V filter measurements

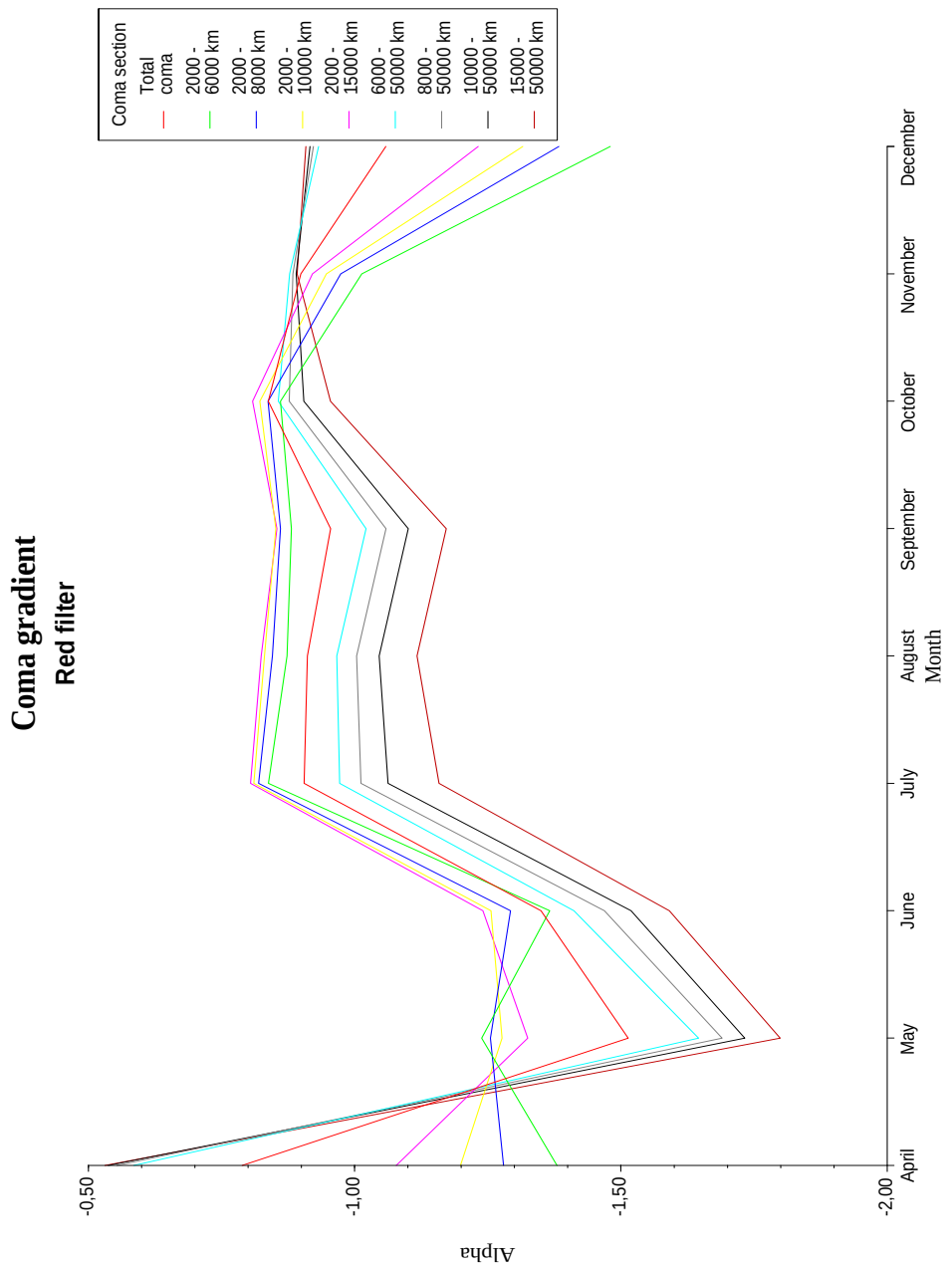


Figure 8: Development of coma gradient α with time, as determined for R filter measurements; $\alpha \approx$ -1 is found here for a rather extended time interval

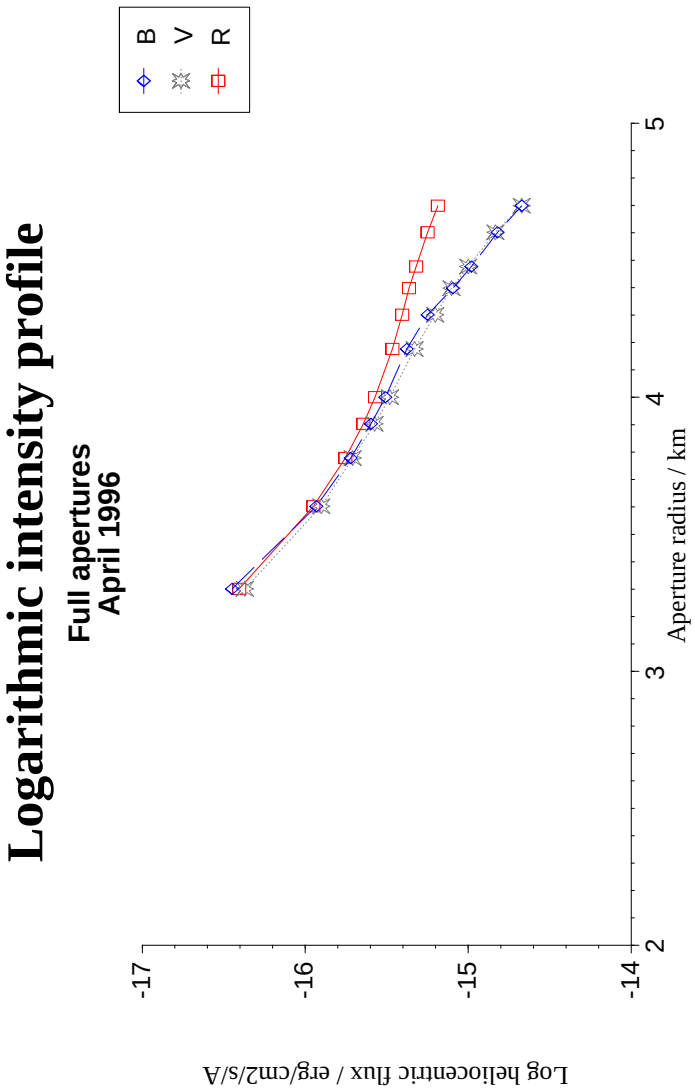


Figure 9: One-dimensional radial intensity profile for April 1996.

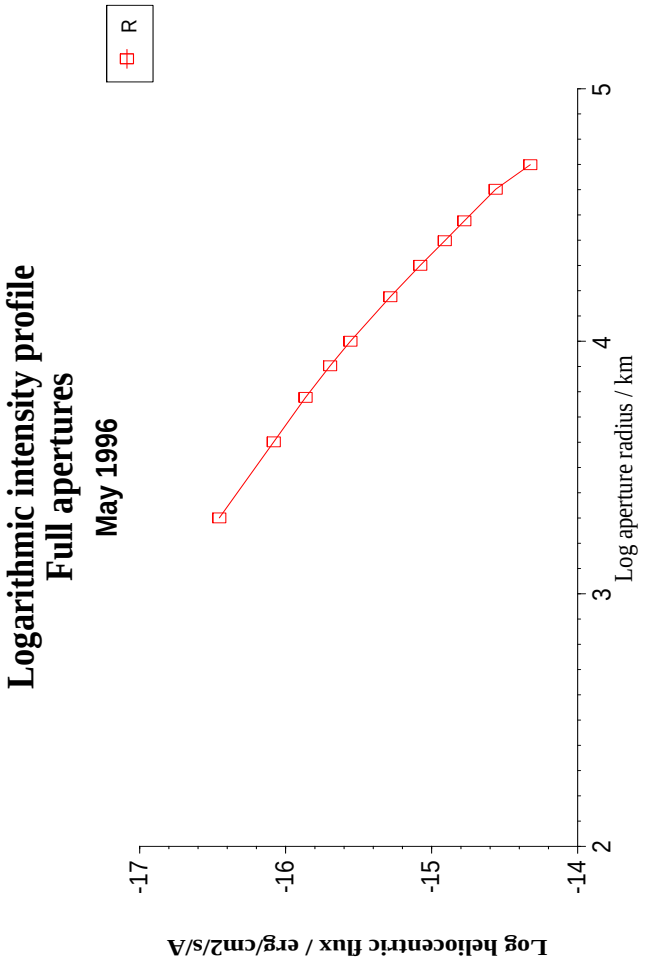


Figure 10: One-dimensional radial intensity profile for May 1996.

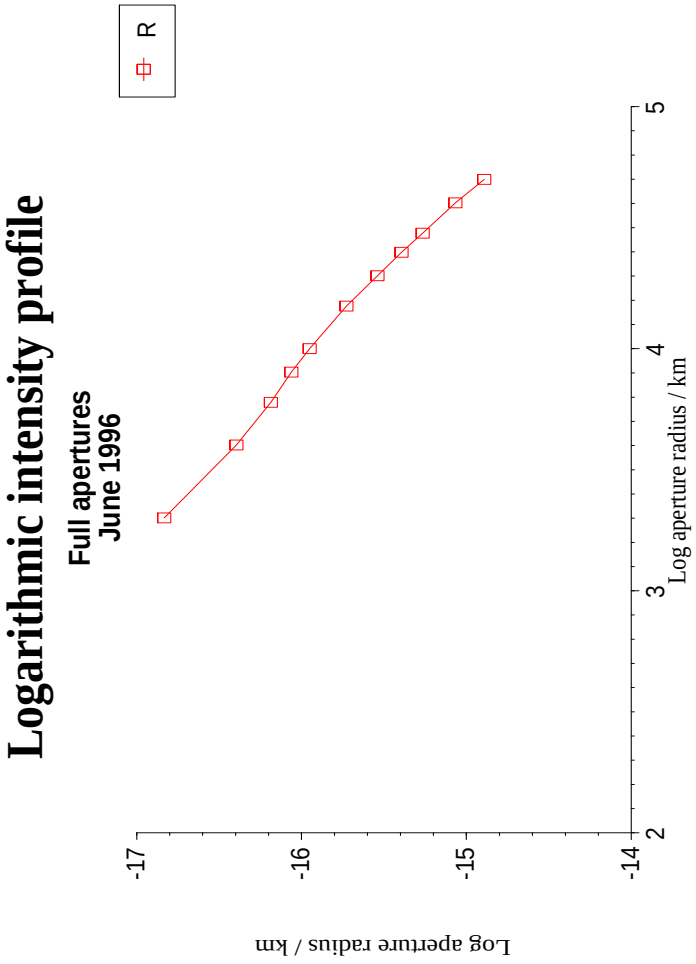


Figure 11: One-dimensional radial intensity profile for June 1996.

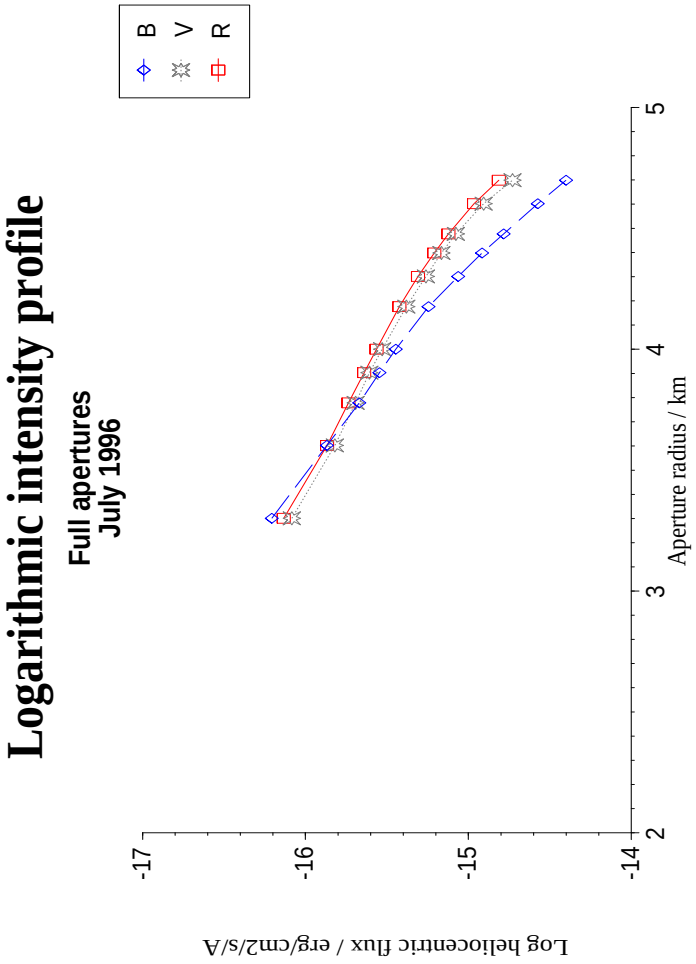


Figure 12: One-dimensional radial intensity profile for July 1996.

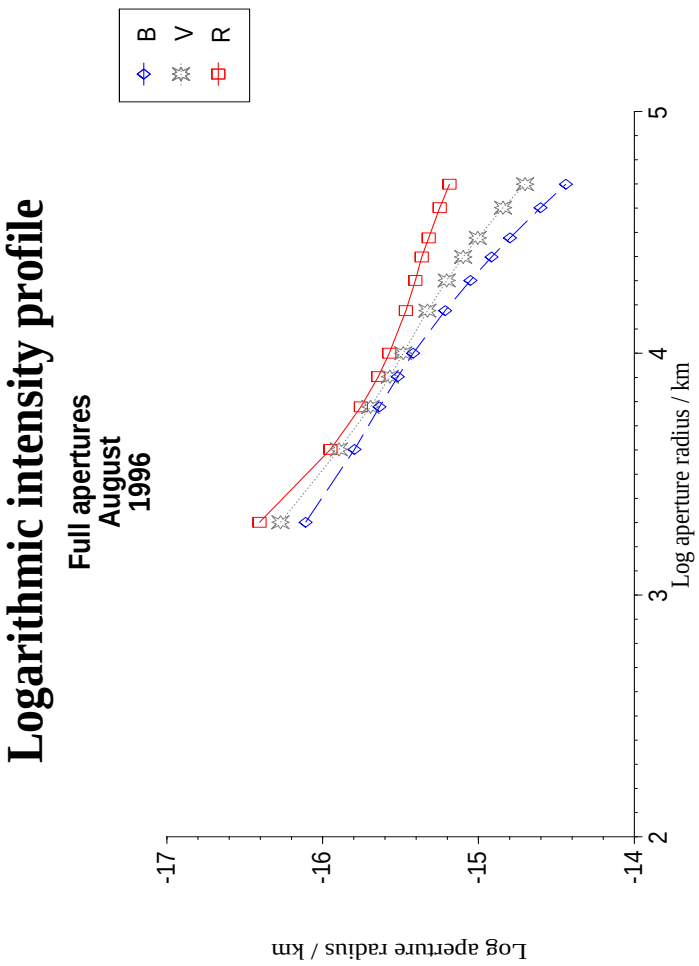


Figure 13: One-dimensional radial intensity profile for August 1996.

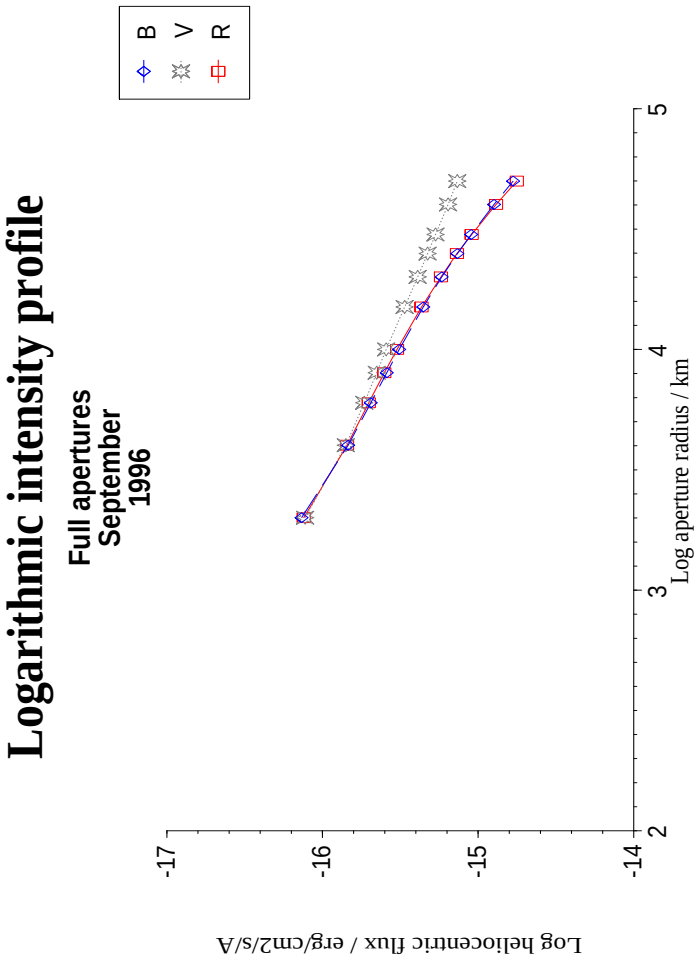


Figure 14: One-dimensional radial intensity profile for September 1996.

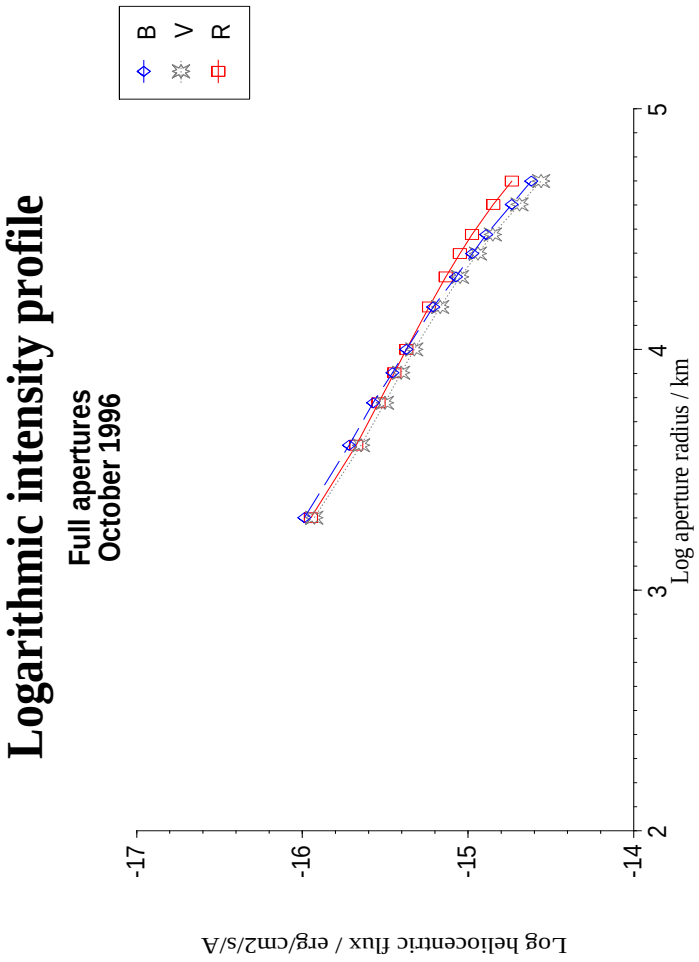


Figure 15: One-dimensional radial intensity profile for October 1996.

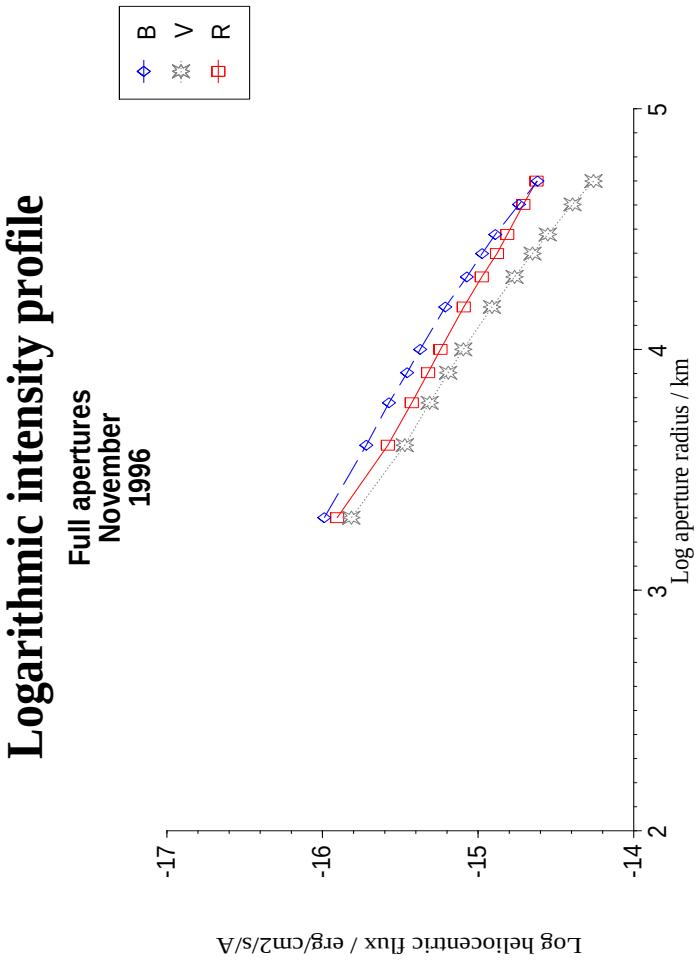


Figure 16: One-dimensional radial intensity profile for November 1996.

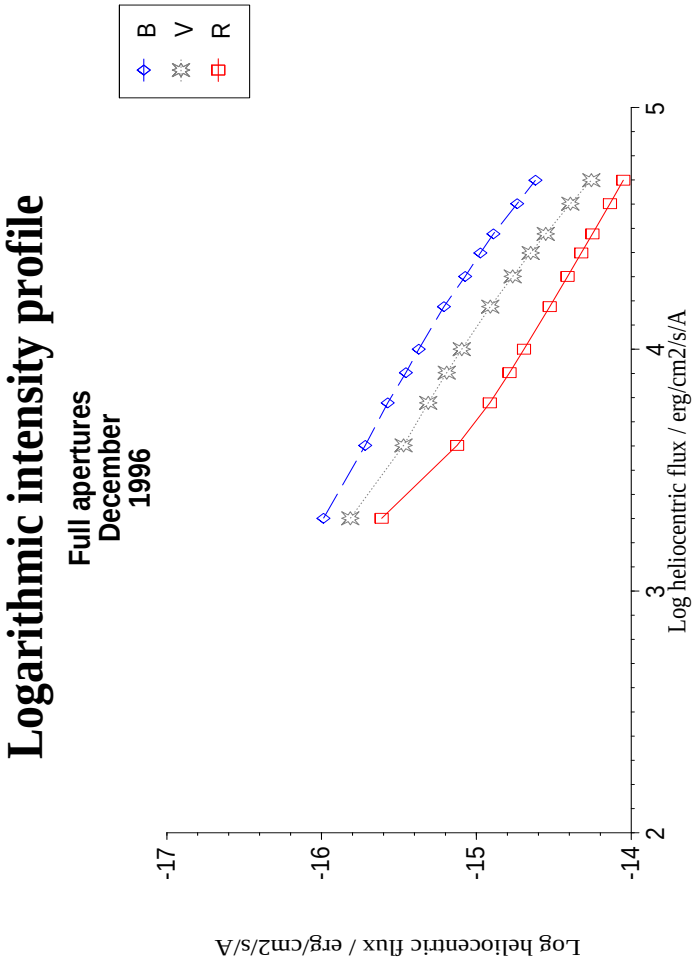


Figure 17: One-dimensional radial intensity profile for December 1996.

2.4.4 Linear ring intensity profiles

Figures 18 to 26 are linear intensity profiles. The profiles show the average brightness or flux in concentric rings around the brightness center of the coma. The intensity per projected square kilometre is plotted against the distance from the center of brightness. The horizontal axis denotes the outer radius of the ring, while the width of the ring is determined by the difference of its radius and the radius of the next smaller ring.

The 1D radial profiles can be very helpful in determining the maximum extension of the coma, or rather the extension of a coma of a spherically symmetric shaped comet of the same brightness. They may also provide hints regarding the image quality. In report I we already mentioned that the data points of the December measurements are widely spread, and that the quality of the December images was less good, which is confirmed by the behaviour of the radial coma profiles.

Our earlier report of 7 April 1999 contained already several plots of radial coma profiles. These plots showed the average flux per pixel during a given night. Here we present plots of the average monthly intensity per square km, instead. We investigated radial profiles for all individual observation nights, and found that they would not provide relevant additional information compared to the monthly plots. In order to reduce the number of diagrams we just provide the latter. The advantage of the normalization to 1 km^2 is that the plots for different epochs can directly be compared with each other.

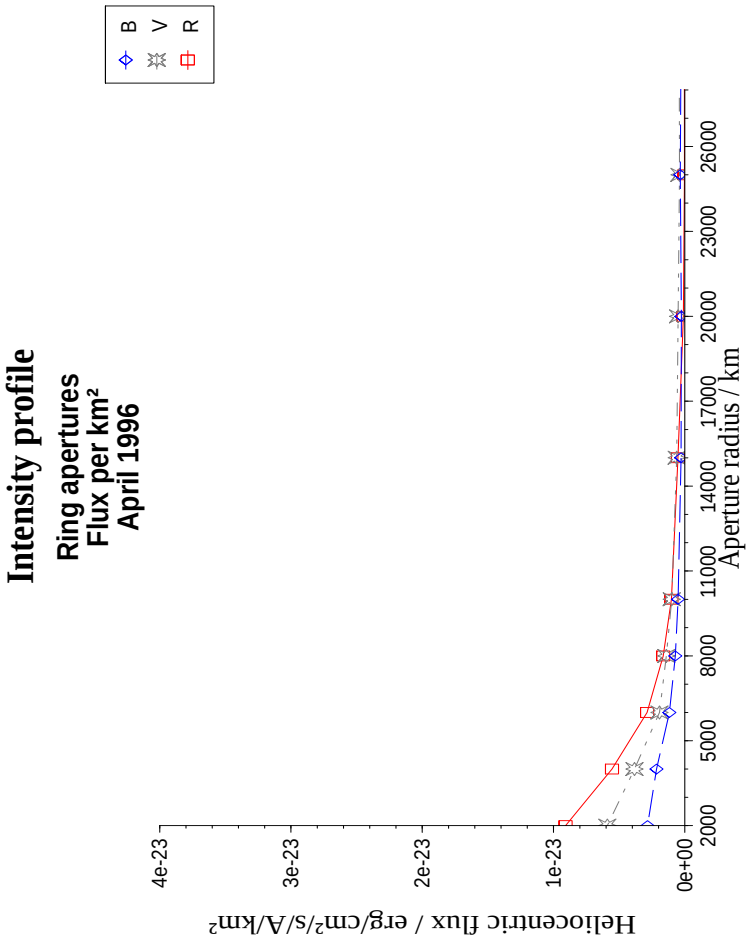


Figure 18: One-dimensional radial intensity profile for April 1996.

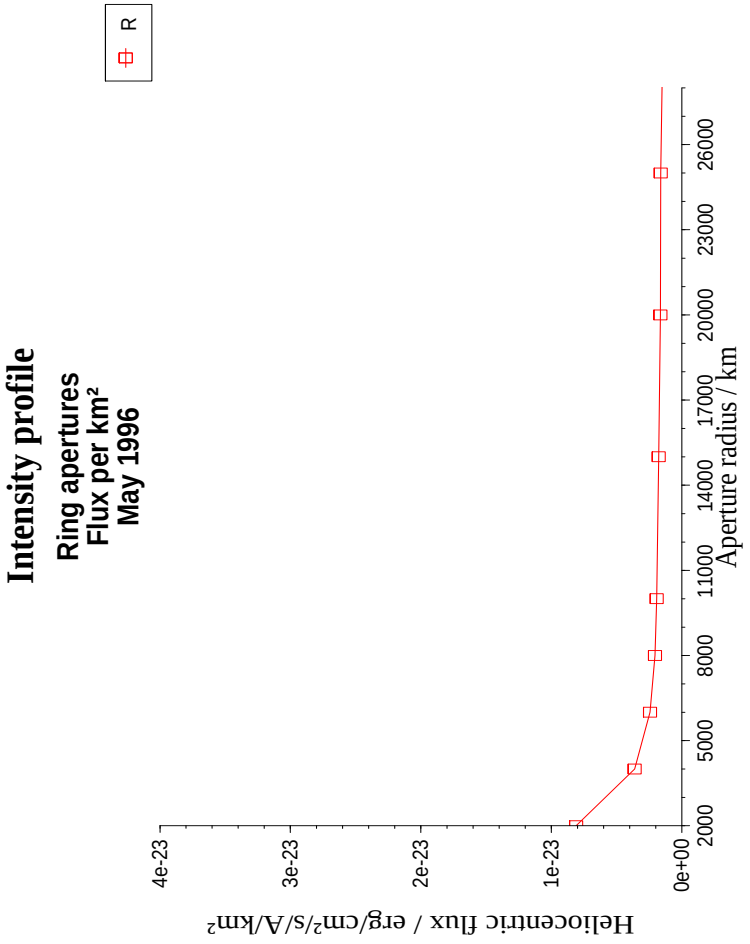


Figure 19: One-dimensional radial intensity profile for May 1996.

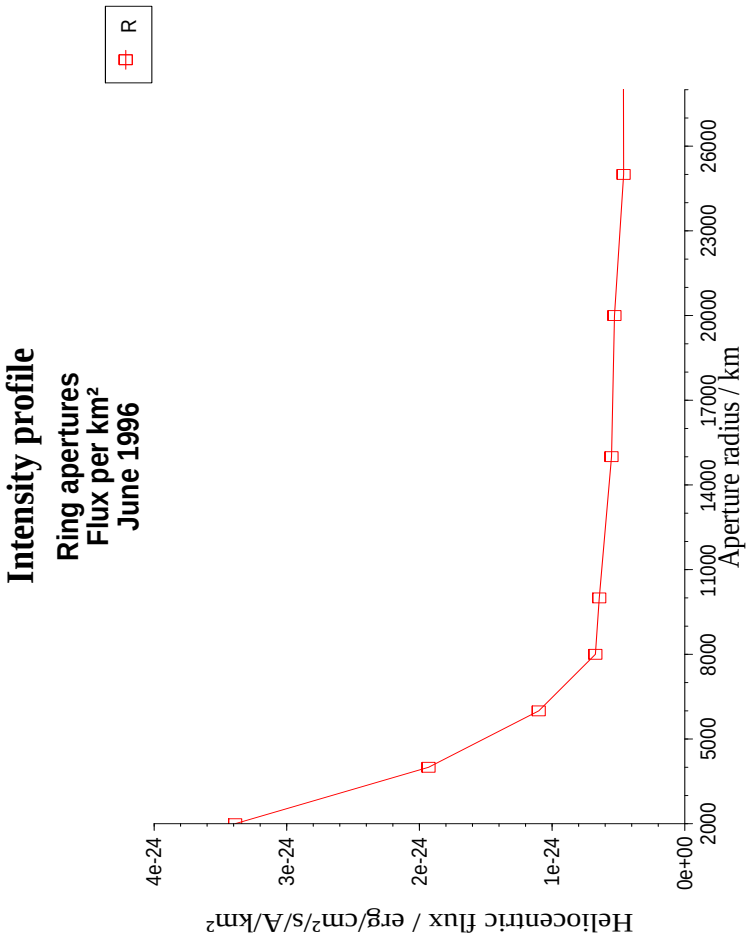


Figure 20: One-dimensional radial intensity profile for June 1996.

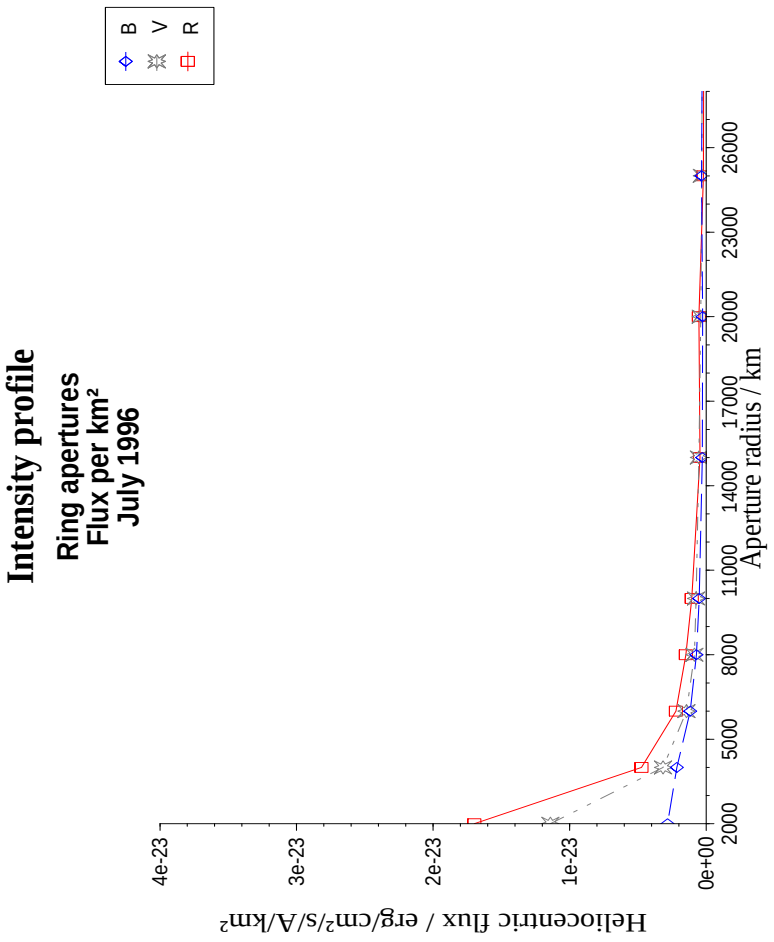


Figure 21: One-dimensional radial intensity profile for July 1996.

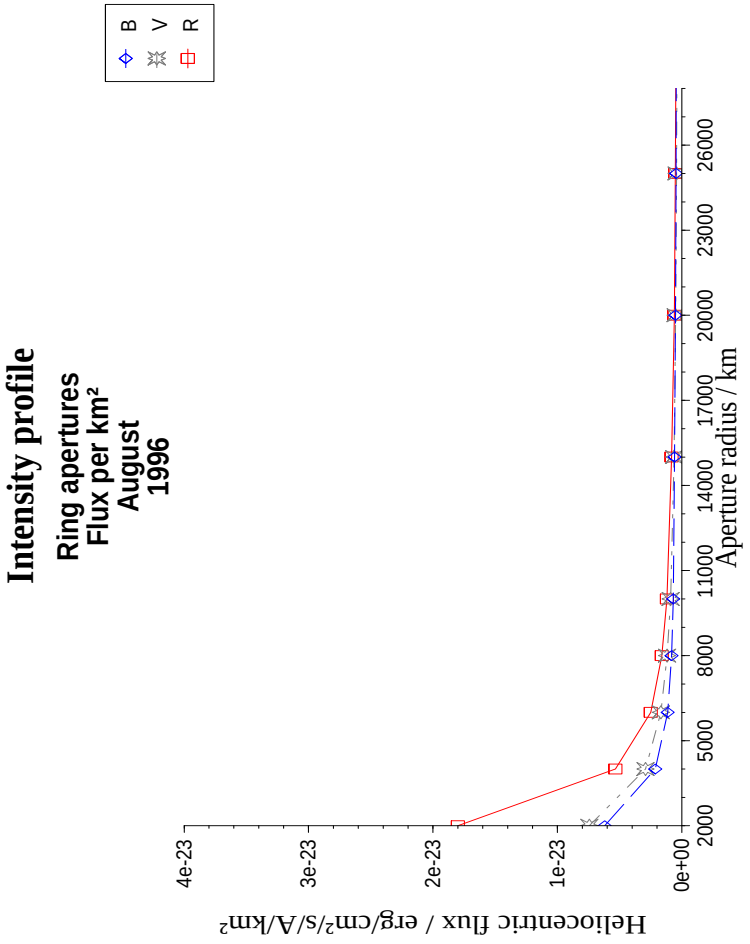


Figure 22: One-dimensional radial intensity profile for August 1996.

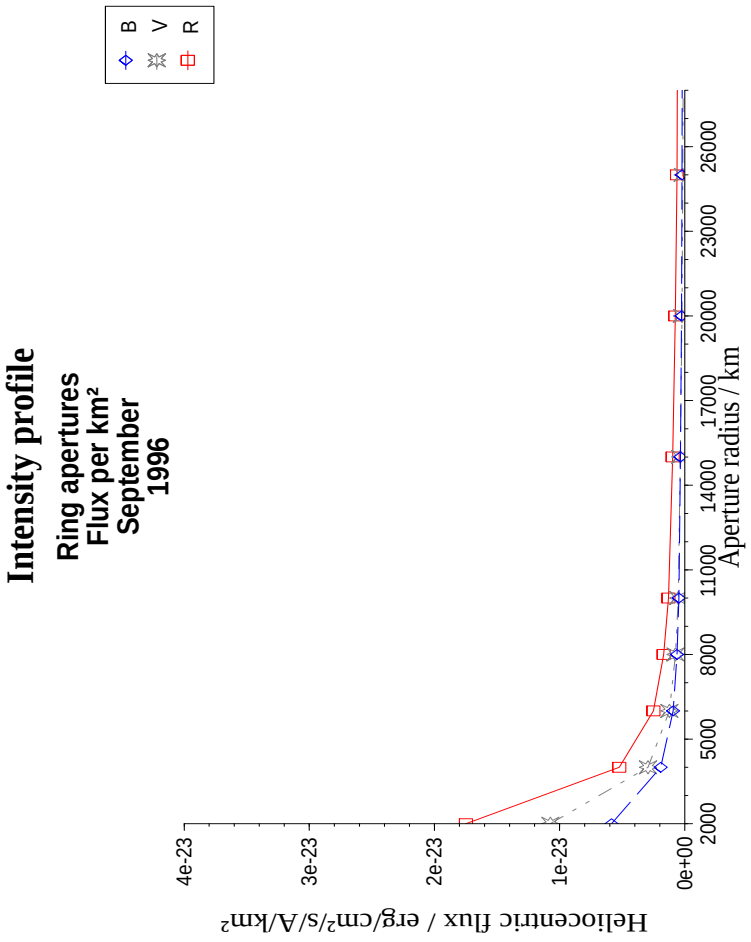


Figure 23: One-dimensional radial intensity profile for September 1996.

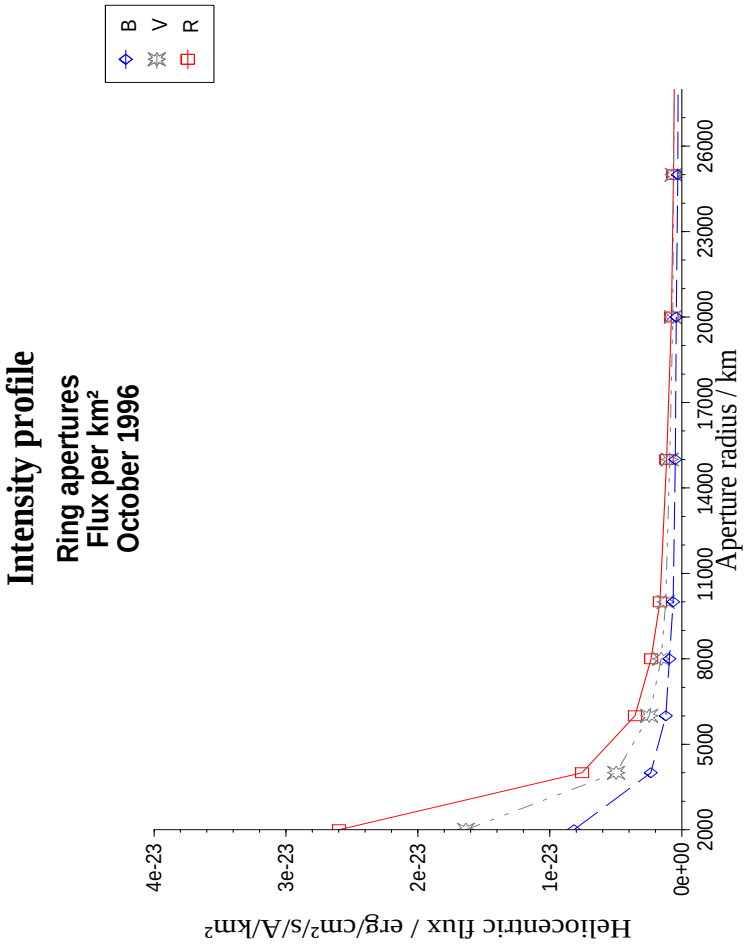


Figure 24: One-dimensional radial intensity profile for October 1996.

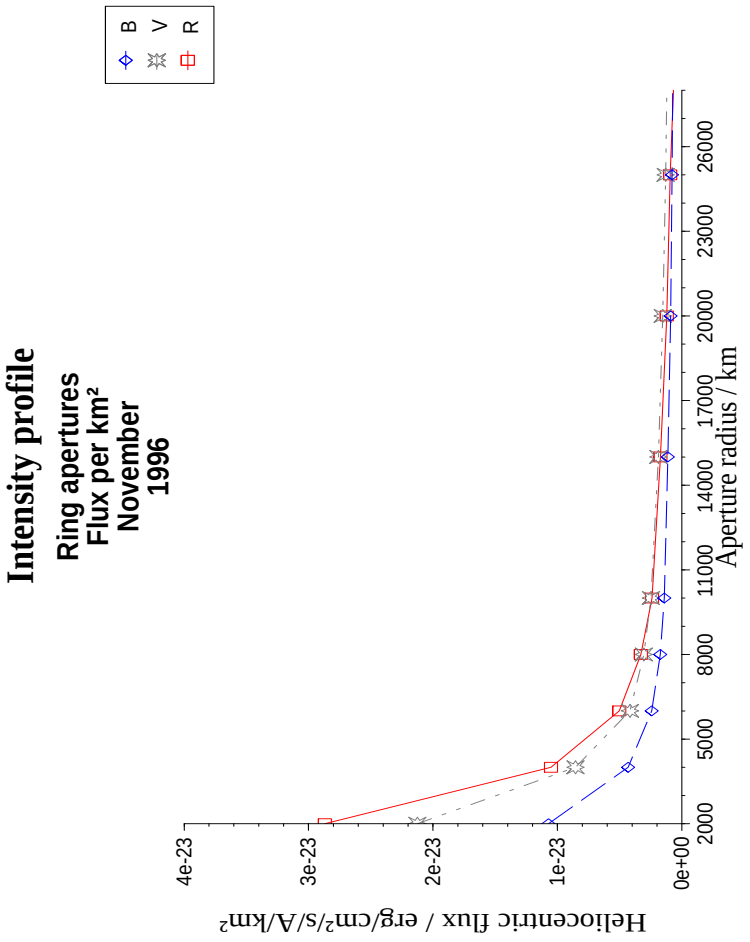


Figure 25: One-dimensional radial intensity profile for November 1996.

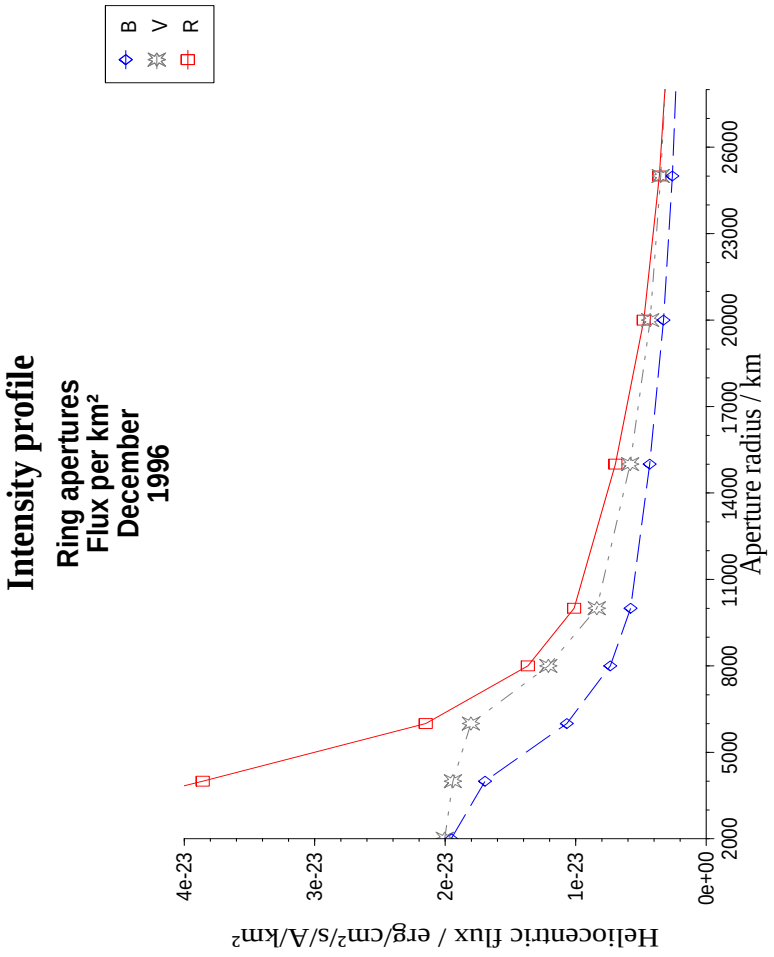


Figure 26: One-dimensional radial intensity profile for December 1996.

2.4.5 Linearity of flux profile

For an ideal comet with homogeneous, isotropic dust emission and constant velocity, a relationship of the type $F(\rho) \propto \rho$ is applicable. The linearity can therefore serve as a measure for the pecularity of a given comet. Figures 27 to 29 show the monthly averaged flux as a function of aperture radius for the BVR filters, respectively. It is evident that a linear relationship is roughly confirmed. Note that here the measured, absolutely calibrated flux for the full aperture was used. The flux was also not corrected for an Earth distance $\Delta = 1$ AU.

Obviously, in the inner coma the flux increases almost linearly with aperture size, while at larger distances from the nucleus deviations occur. From a comparison with the images we conclude that these deviations from linearity are due to the presence of more and more background pixels in the measurement aperture.

Hence one can obtain a very approximate value for the coma extension from the distance until which the radial flux profiles are almost linear with ρ. The following coma radii were found from R images of the comet:

April-July	$\approx$ 15000 km
August + September	20000 to 25000 km
October	$\approx$ 30000 km
November	$\approx$ 40000 km
December	more than 50000 km

3 Dust productivity in A·f·ρ

Despite the fact that in comet 46P/Wirtanen the coma gradient α is not always close to -1, and that the flux grows only approximately proportional to the aperture radius in km, we nevertheless tried to assess the dust production of the comet in terms of A·f·ρ. In Figs. 30 and 31 we show A·f·ρ as a measure of the dust production of the comet during the observation period for 10000 km and 15000 km apertures, respectively. The curves are very similar in shape to the long-term lightcurves for the same aperture radii. The plots suggest a drop in activity in June in R, however, as mentioned in report I, there were problems with the images taken then. B and V images cannot confirm the drop, because there were no B and V images available for May and June 1996. From July through October the plots suggest a low but constant dust production, followed by a steep increase starting in November.

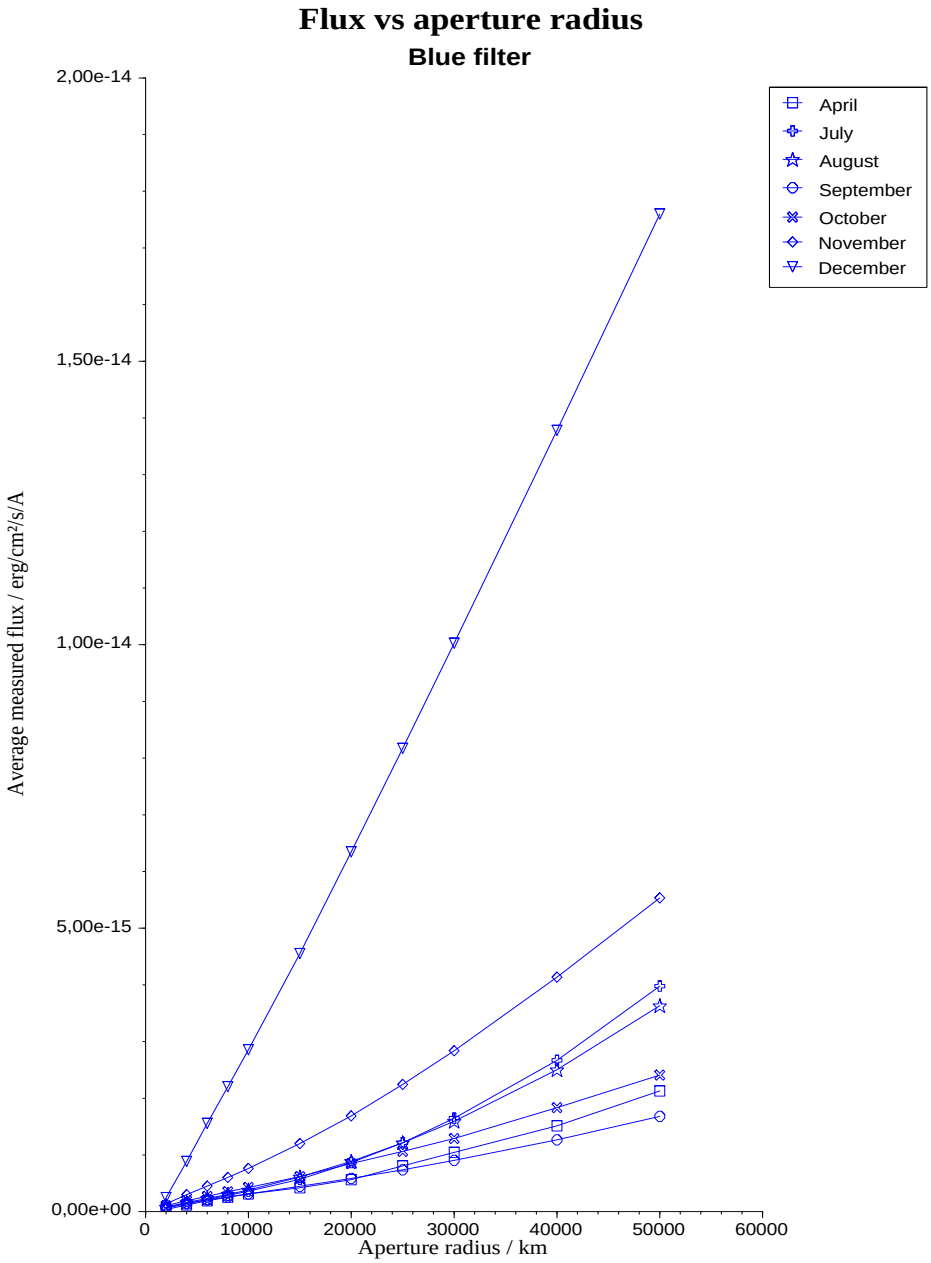


Figure 27: Measured absolute flux as a function of aperture radius ρ for B filter measurements; especially late in the year, fluxes are approximately proportional to ρ.

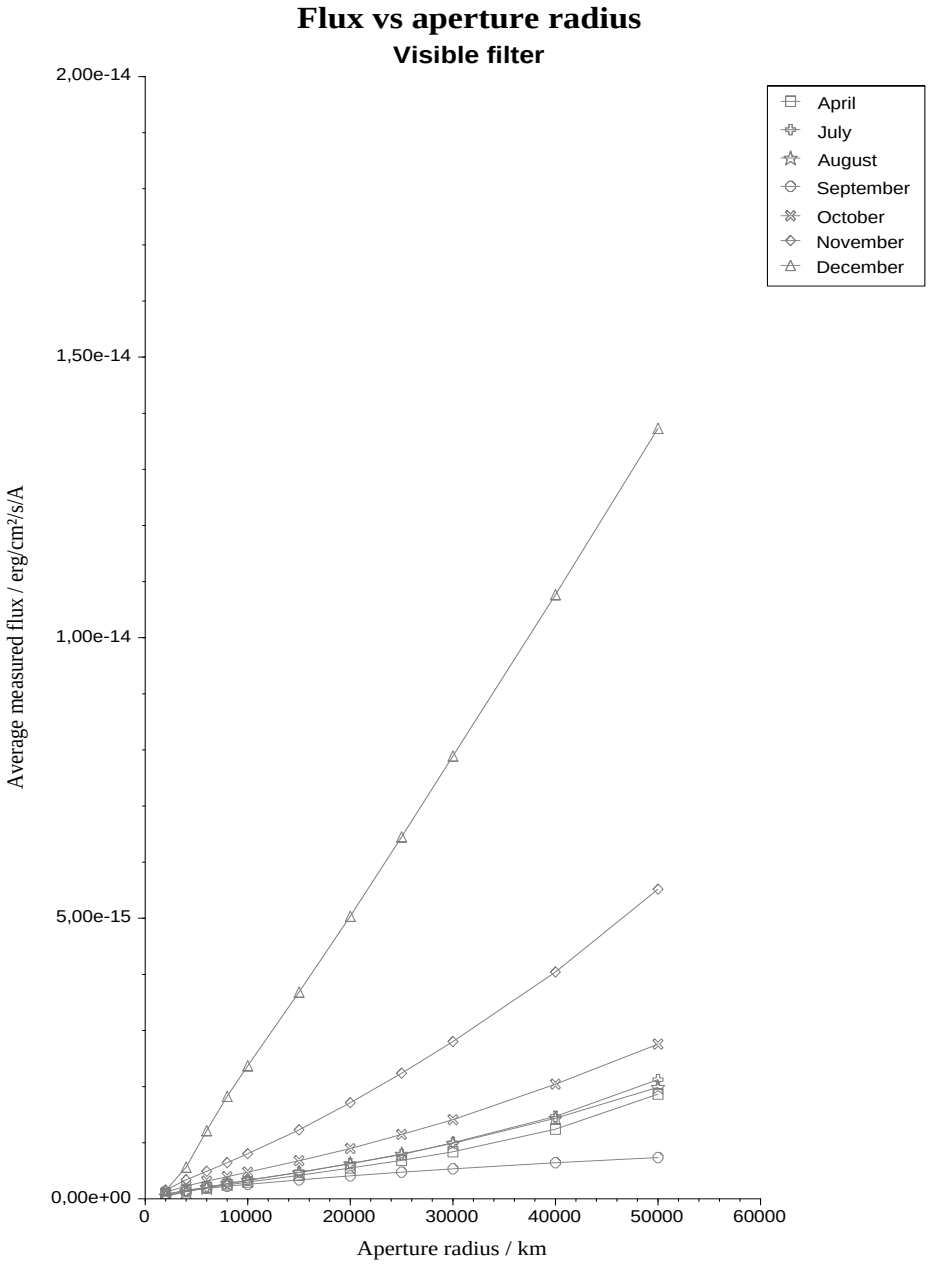


Figure 28: Measured absolute flux as a function of aperture radius ρ for V filter measurements; especially late in the year, fluxes are approximately proportional to ρ.

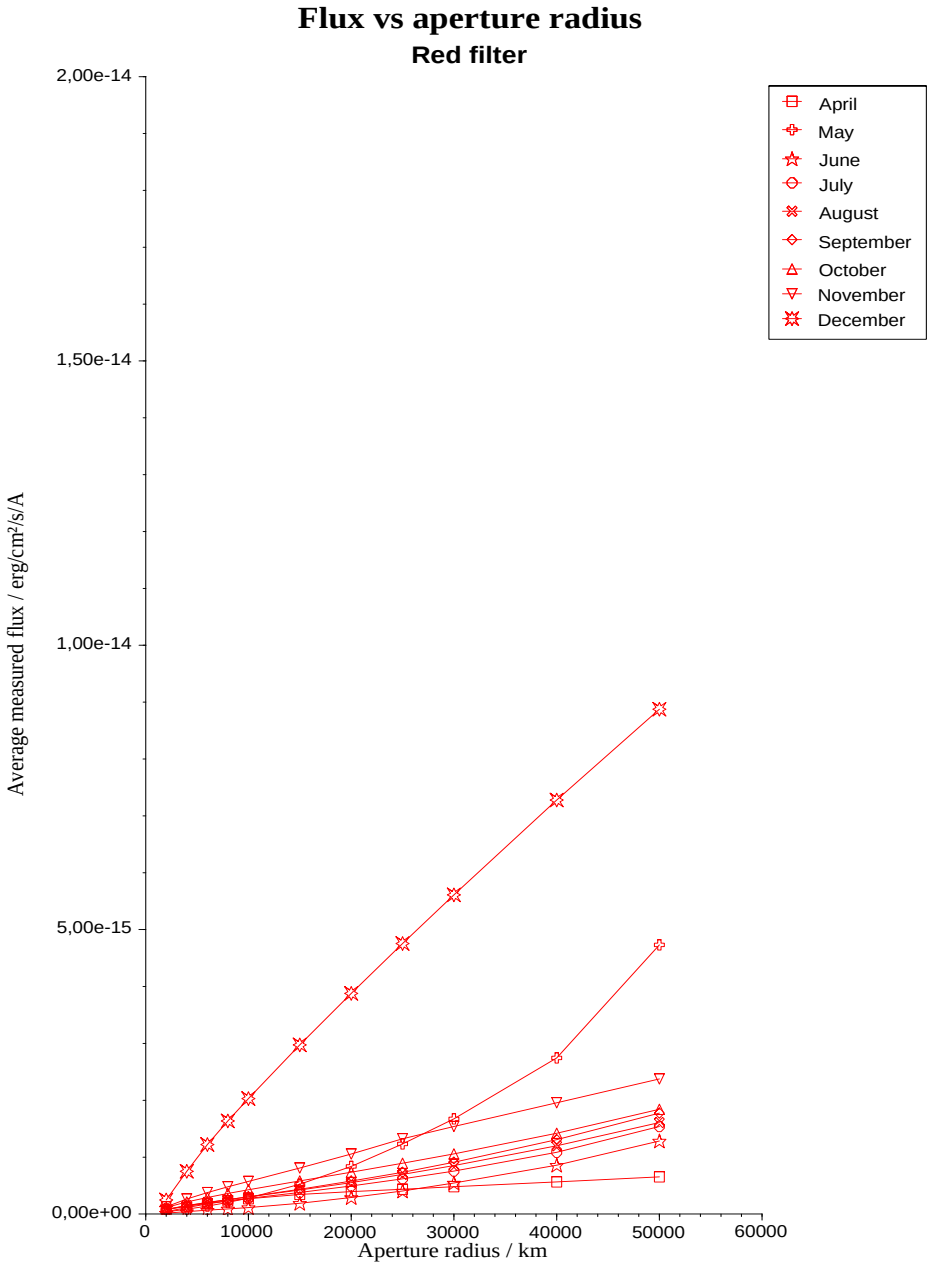


Figure 29: Measured absolute flux as a function of aperture radius ρ for R filter measurements; especially late in the year, fluxes are approximately proportional to ρ.

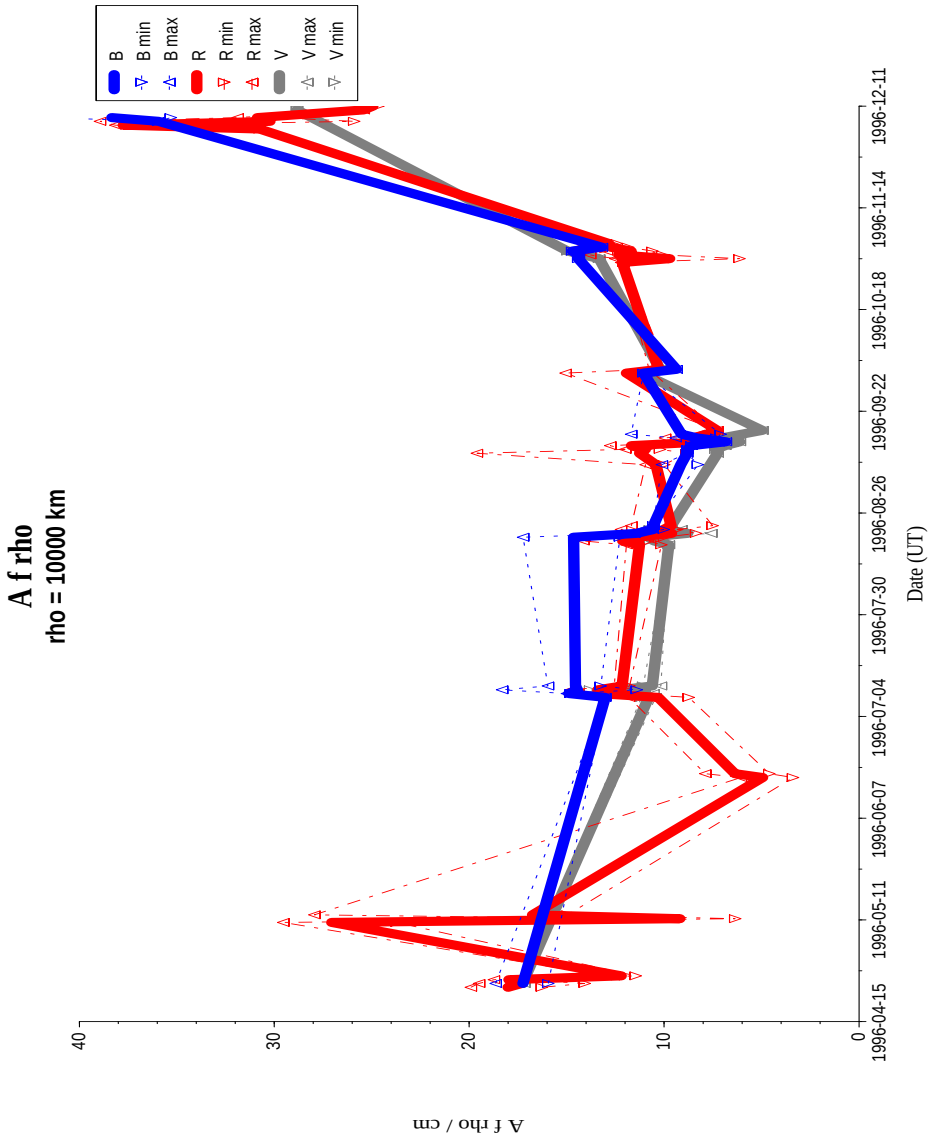


Figure 30: Dust production parameter A·f·ρ for $\rho = 10000$ km. The values for early observation dates are obviously very uncertain. Before mid-September the dust production appears to decrease slightly, although the comet gets closer to the Sun; this period is followed by a steep increase of dust production. The overall shape is similar to the run of the long-term lightcurves.

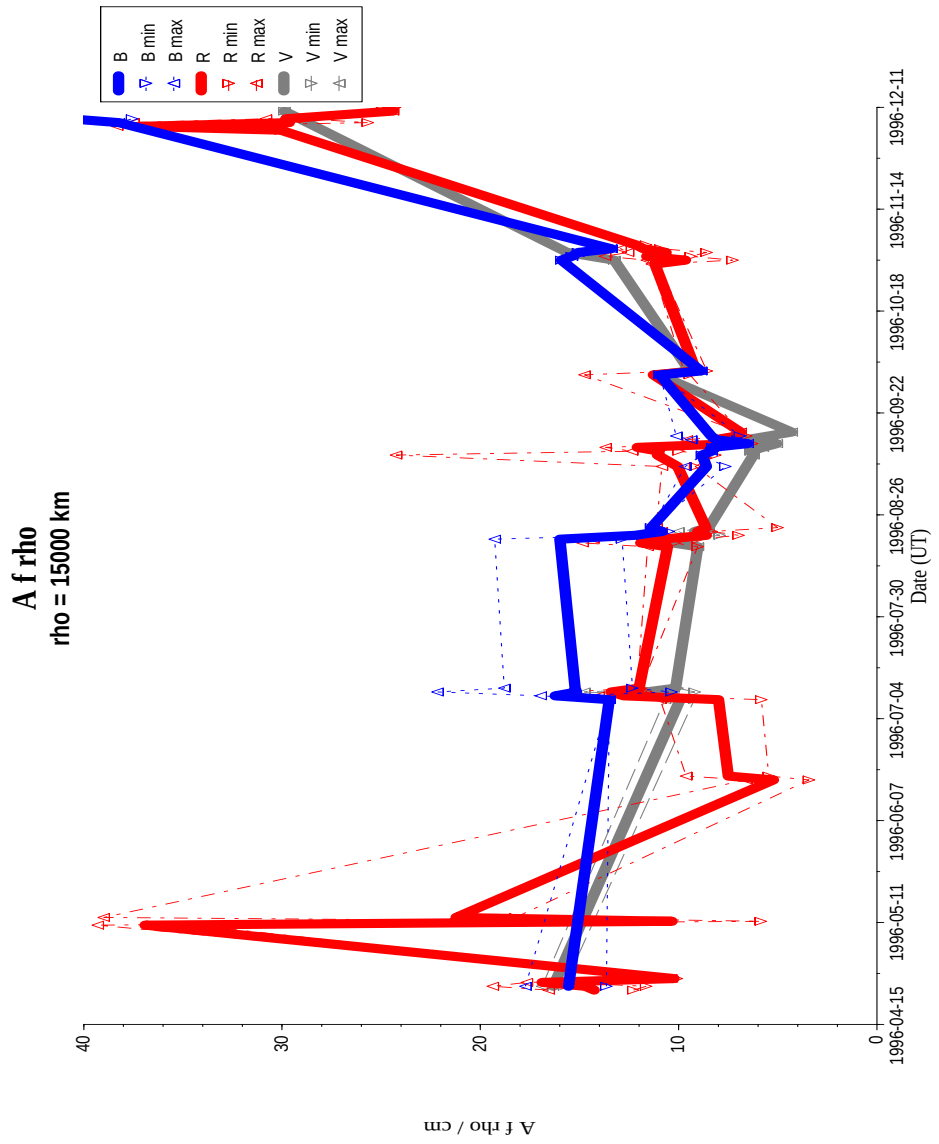


Figure 31: Dust production in A·f·ρ for $\rho = 15000$ km.

4 Analysis of short-term variability

The rotation period of the nucleus of comet 46P/Wirtanen is not yet reliably determined, although a few authors attempted to do so using both ground-based (Meech et al. A&A 326, 1997) and space-based (Lamy et al., A&A 335, 1998) observations of the comet. The latter group has fit a rotation period of 6 hours to the HST nucleus photometry, based on a data sample combining multiple cycle observing sets, which typically consisted of only 1-2 measurements per cycle. The ground-based observations had a better coverage of the rotation phase (2-3 hours per night, with only 2 subsequent nights and gaps of 2 months between runs), hence providing a data basis, which is also not well suited for a periodicity analysis.

The ESO 1996 observations of 46P/Wirtanen represent the most extensive existing imaging data set. Homogeneous observations are spread over a time interval of about 8 months. Sufficient images were taken in numerous observing nights to allow for a good phase coverage of a possible nucleus rotation period of several hours.

As we expected the brightness variations caused by the rotation of the cometary nucleus to be small, we decided to use our best images only for the analysis of short-term brightness variations. Therefore we made a selection of nights that appeared to be suitable with respect to the photometric and seeing conditions, and regarding a good coverage of single nights by sufficient images and with several nights per run. We carefully recalibrated the frames (for the method see section 2.1).

For the short-term variability analysis, a difference of a few hundredths of a magnitude can be crucial (the other groups found an amplitude of 0.05-0.1 mag for the rotational lightcurve of this comet).

In the following sections we describe the results of the periodicity analysis of the brightness measurements of the inner coma.

4.1 Influence of seeing variations

As a starting point we used the night of 20 August 1996 (UT), as it is one of the best nights regarding the observing conditions. The images of this night were used to cross-check the measured brightness variations of the inner coma of 46P/Wirtanen (see Böhnhardt et al. in their report to ESA-ESTEC in November 1997). As a result we could reproduce the sinusoidal brightness variation as found by Böhnhardt et al. for that night (see also report I of April 1999). An aperture radius of 2000km was used for the measurements presented in Fig. 32.

The last two images of this night were taken in twilight, and the measurements for the first image were found to be erroneous. The measurements for these images are not plotted in the figure. Test measurements done with a dense set of circular apertures on the same images (Böhnhardt, private communication, 1999) confirm the expected decay of the lightcurve amplitude with increasing aperture, which is shown in Fig. 33. It is evident that the shape of the lightcurve changes with increasing aperture size. The measurements made with the smallest aperture of 2000 km radius are systematically different from those with larger radii, which appear to be all similar in shape.

Therefore we checked the influence of the seeing on the measurements. As shown in the diagrams in appendix A the seeing varied sometimes significantly during an observation night. Due to these nightly variations the image quality of stars and other point-like sources (like the brightness peak in the inner coma) is changing from image to image. Measurements with narrow apertures, ie with diameters only 2-3 times larger than the full-width-at-half-maximum (FWHM) of the seeing disk, may suffer from such variability in image quality, since a non-negligible percentage of the light is lost in the outer wings of the seeing disk (for instance: apertures 2 and 3 times larger than the FWHM of the seeing disk contain only 93 and 99 percent of the total flux, respectively - ignoring further losses due to the non-gaussian shape of the seeing disk wing profiles).

The seeing varied between 0.8″ and 1.52″ during the test night (20 August 1996). The smallest aperture of 2000 km radius compares to 3.59" diameter at the time of the observations.

Figure 32 shows the R filter lightcurve of the inner coma of 20 August 1996 as measured with the 2000 km radius aperture (thick line). For comparison the seeing as measured by the La Silla seeing monitor telescope during the same night is plotted in the same figure (thin line). Obviously, a tight correlation exists between the brightness variability measured in the inner coma and the seeing: the better the seeing, the brighter the inner coma and vice versa. The amplitude of this variation is about 0.1 mag, which is close to the value one would expect for the light losses by the seeing (of the order of 10 percent from 2 to 3 times FWHM of the seeing disk).

The next step was to check the sensitivity against seeing variations of the next larger aperture, with a radius of 4000 km. In fact, this aperture size already turned out to be insensitive against seeing variations at all observation dates (see Fig. 33). However, the measurements of 20 August 1996 performed with this and larger apertures did not reveal any simple periodicity pattern. Therefore, we looked for other candidate nights for the short-term variability analysis (see subsection 4.2).

In summary, we conclude that the measured variability of the inner coma

reflects mostly seeing variations rather than intrinsic variability of the comet. This conclusion is contrary to what was said in the earlier report by Böhnhardt et al. on the same night's data. Measurements using very narrow apertures (2-3 times the FWHM of the seeing disk) are sensitive to seeing variations. To avoid this effect, one should only analyze images of very similar image quality and seeing, which is, however, very difficult to estimate from trailed star images in exposures of moving objects. Outside seeing monitor values may only partially reflect the actual image quality at the telescope. Alternatively one can choose larger apertures, but must then expect smaller amplitudes of brightness variations. This finding also renders doubtful the results of Meech et al. (A&A 326, 1997), derived from their lightcurve analysis of comet 46P/Wirtanen. Their observing period (17-18 August 1996) was close in time to our test night 20 August 1996, and had seeing in the range of 1.4″ up to 2.8″. They used an aperture radius of 2.5″, but no assessment of the impacts of seeing variations is presented.

Note: the peak-to-peak amplitude of their lightcurve is 0.1 mag, while the expected amplitude for light directly reflected from a nucleus of 600 m radius and an axis ratio of 1.3 (see Lamy et al., A&A 335, 1997) would only amount to 0.04 mag.

4.2 Selection of suitable nights for further lightcurve analysis

As the brightness variations caused by the rotation of the nucleus are expected to be small, only nights fulfilling certain criteria were selected for the further analysis of possible short-term variability:

- the night should be of good *photometric* quality;
- the *seeing* should be small (as compared to the measurement aperture) and constant; at least, the amplitude of the seeing variations should be small;
- the *number of images* available for that night should be as great as possible;
- data sets consisting of observations from several *subsequent nights* of good quality and with numerous images of *dense time coverage* were preferred.

We selected the following candidate nights for our analysis: 1996-05-11, 1996-05-12, 1996-08-20, 1996-08-21, 1996-09-12 and 1996-09-16. These nights

served as starting points. The data base was subsequently broadened by the addition of nights preceding or succeeding these candidate nights.

The night of 20 August 1996 fulfills our criteria except for the seeing variations as discussed above. We decided to use apertures of 4000 km radius, exclusively, since such aperture size seems to be above the limit, for which seeing plays a crucial role, though the effects of intrinsic variability of the comet will also be less pronounced than for smaller apertures.

The selection includes the night of 18 August 1996, although the night comprises only three suitable images, but is otherwise the best night of all according to all other criteria mentioned above.

4.3 Power spectrum analysis

Only under favourite circumstances one can discern a periodic variability pattern like rotational light changes in nightly lightcurves by pure eye inspection. The brightness amplitude must be large enough compared to the intrinisic photometric scattering, and the observations of this night must cover a time span comparable to the rotation period.

However, the only objective means to check an extensive set of observations from numerous nights including such, which were not completely photometric and others, in which only a few images had been taken, is to apply a periodogram analysis technique like a *Fast Fourier Transform* method or other periodicity search algorithms. We used a program frequently applied to eclipsing binary stars and pulsating variables for period search or improvement of ephemerides. The numerical period search uses the *Singular Value Decomposition (SVD)* algorithm (see Press et al., Numerical Recipes in FORTRAN, 2nd edition, p. 51ff., Cambridge Univ. Press 1992), which fits a function of the type

$$f(x) = a_1 + a_2 \cdot x + a_3 \cdot sin\phi(x) + a_4 \cdot cos\phi(x)$$

to the measurements and optimizes the fit by adjusting the coefficients a_i for given phases

$$\phi(x) = \phi_0 + int(x/P),$$

where ϕ_0 denotes an arbitrary zero phase and P is the assumed photometric period. To produce power spectra, the period P is used as a variable, and test periods are restricted to a range conceivably encompassing the suspected time scale of variability, with an adjustable time resolution. For each test period, corresponding to a set of phases, a least squares fit is made to the observations, and a quantity proportional to the inverse sum of squared residual ($O - C$ values) is plotted as power value against time or period. P

was varied from 0.01 up to several days at a step width of about 0.001 days for our investigation of comet 46P/Wirtanen. Examples of power spectra are shown in Figs. 34 to 39.

The interpretation of such power spectra is not always easy, since they can be rather complex, depending on the quality, number and distribution of input data. Also, the well-known aliasing problem, i.e. the appearance of numerous beat period peaks has to be recognized and properly dealt with, to identify possible physically realistic periodicities and to discern such from numerical artifacts.

Once candidate periods are isolated, they have to be tested by plotting the correspondingly phased observations together with their best fit against phase. With physical boundary conditions in mind, it is then possible to rule out purely numerical pseudo periodicities. A further crucial check for the reality of a power spectrum peak consists in the necessity of its appearance under use of different input data sets (different nights and groups of nights). With due regard to these considerations we applied the periodogram analysis to several single nights and samples of neighbouring nights, which are discussed in the following subsections.

4.3.1 May 1996

For the three observing nights in May 1996 we obtained a power spectrum with a sharp peak at a period of 0.0609 days (87.71 minutes), as shown in Fig. 34. However, we do not consider this short period as real, because the observations of each night are grouped within too short time intervals (2.00 hours, 1.54 hours and 1.55 hours on 11, 12 and 13 May, respectively) to allow for a reasonable phase coverage of variations with longer periods. The inspection of the best fit representation of this observing data set, phased with a trial period of 0.0609 days, as plotted in Fig. 35, clearly suggests that this period has to be discarded.

4.3.2 August 1996

An analysis of the data of August yields two periods with almost equal relative probabilities, 0.3704 days (8.89 hours) and 0.4543 days (10.90 hours), see Fig. 36. However, the fit for neither period matches the measurement data points well for more than a single night, as is seen in Fig. 37.

4.3.3 September 1996

The nights of 12 and 16 September 1996 were selected for the power analysis. The power spectra exhibit probable periodicities at 0.5990 days (14.38

hours) and 1.4985 days, as can be seen in Fig. 38. At first glance, the fits for both periods seem to represent the general distribution of groups of observing points quite reasonably, but if checked in more detail, the photometric variations within single nights is not well fit at all, which is demonstrated in Fig. 39.

4.3.4 August through September 1996

Finally, we combined the nights of 18, 20, 21 August and 12 and 16 September 1996 to form a data set with a broader time base. The power analysis yields a very complex power spectrum. As shown in Fig. 40, there are many peaks at periods between about 90 minutes and 1.5 days. However, the general structure of the power spectrum does not clearly favour a certain period. Due to the time distribution of the measurements, there are many pseudo and beat period peaks. A necessary precondition for the reality of a period is that it has to appear simultaneously in power spectra based on different subsets of input data.

The two groups of peaks at about 1 day and 0.5 days simply reflect the typical time separation of measurement groups by multiples of one full day. The highest peak appearing at 0.9280 days (22.27 hours) is just an artifact caused by the given time separation of our observations. This can be seen from Fig. 41, which shows the best fit representation for that period. It is evident that the night-to-night grouping of observations causes the high probability of this pseudo period. No similar peak is indicated in the power spectra exclusively based on August or September observations.

In summary, the power spectrum analysis could not yield a unique nucleus rotation period. Even if rotational light changes at a level of a few hundredths of magnitude can be expected, their photometric evidence seems to be masked by seeing variations, intrinsic measurement scattering, stochastic brightness variations of the inner coma, and by low-level nucleus activity.

5 BVR aperture photometry in tabular form

In appendix B to this report we present the results of the aperture photometry in tabular form. Table 4 contains the results of the BVR aperture photometry and characteristic data of all images used. Table 3 is a description of the result table entries.

We include the R measurements already presented in our first report here once again, for two reasons:

(1) In order to increase the flexibility in our processing of various data

sets we stored all measurements, image paramaters and ephemerides in a relational database management system (Adabas D 10 Entry Edition). For this reason we had to redesign the data structure. This redesign was valuable in many ways and allows us to present our results in a more user-friendly way. Table 4 is, in fact, the result of a joined SQL query of three database tables. The information model was then translated into a database scheme compliant with Codd's 3rd normal form (Codd, E.F.: "Further Normalization of the Data Base Relational Model", Data Base Systems, Courant Computer Science Symposia Series, Vol. 6, Englewood Cliffs, N. J., Prentice Hall, 1972). Table 4 is a view of the database.

(2) For the short-term variability analysis (see section 4) we changed the original selection of comparison stars used for the relative calibration of some nights. The reason was that we tried to achieve the highest possible accuracy for the selected nights, although in most cases the resulting flux values changed only very slightly compared with the calibration used in report I. These minor changes are irrelevant for the long-term lightcurve, but they might influence the short-term variability analysis, where small amplitude variations of the coma light are investigated.

Only the results for those observing nights and images, which were judged as useful input data for our analysis are contained in Table 4. A selection was made according to various considerations, e.g. in some images it was impossible to identify the comet; sometimes a bright star blend was present in the image of the comet; sometimes the star was located so deeply inside the coma (i.e. so close to the coma center) that any attempt to remove it *cleanly* failed; and finally, a number of images were simply underexposed.

The table is the result of database query over three relations. The complete database tables can be made available upon request, but will probably only be useful in combination with access to the images themselves.

6 Conclusions

Reports I and II summarize the results of our photometric analysis of images of comet 46P/Wirtanen obtained during its 1996 apparition. The main aims were to determine long-term BVR lightcurves and to search for short-term brightness variations due to the nucleus rotation.

The shape of the long-term lightcurve is in accordance with general expectations. The R lightcurve was discussed in detail in our previous report I. The B and V measurements confirm these results. All three light curves exhibit essentially the same overall shape, i.e. no systematic changes of the (B-V) and (V-R) color indices as a function of solar distance of the comet

are evident.

The shape of the lightcurves was investigated in different sections of time. Observations at solar distances larger than about 2.5 AU, say before September 1996, yield a gradient n of about 2 for the R curve, while the later observations suggest $n \approx 13$, indicating an increased activity.

Radial profiles of the coma brightness distribution were determined for all observations and filters. The profiles are given as full aperture fluxes versus aperture radius in logarithmic form as well as ring aperture fluxes versus radius in linear form. From the logarithmic representation, the coma gradient α was determined. For most of the observing time it is found to be around -1 for BVR data, as expected for homogeneous isotropic dust expansion. However, at early dates (April to June 1996) and in December 1996, appreciable deviations of α from a value of -1 are evident, partly due to the image quality, but also due to a non-uniform coma structure.

A periodogram analysis of possible short-term brightness variations with a time scale corresponding to the assumed nucleus rotation period could not yield definite detections. Though some candidate periods between about 1 hour and a few days were found, none of these could be verified to be physically realistic. The expected amplitude of rotational brightness variations of a few hundredths of magnitude are probably masked by seeing variations influencing small aperture data, photometric noise, and intrinsic fluctuations of the inner coma and active nucleus.

The rotation period suggested by Böhnhardt et al. turned out to be a consequence of the seeing variation during the observing night of 20 August 1996. We like to note that Meech et al. (A&A 326, 1997) may have had the same problem, as they also used a small aperture with a diameter of only 2.5″ for their measurements. The radius of this aperture corresponds to less than 3000 km at the location of the comet for their June and August measurements. Our investigations showed that measurements done with such small apertures can be influenced by the time variation of the seeing. Thus, only results of measurements performed with larger apertures (with a radius of more than 3000 km) can be regarded as reliable.

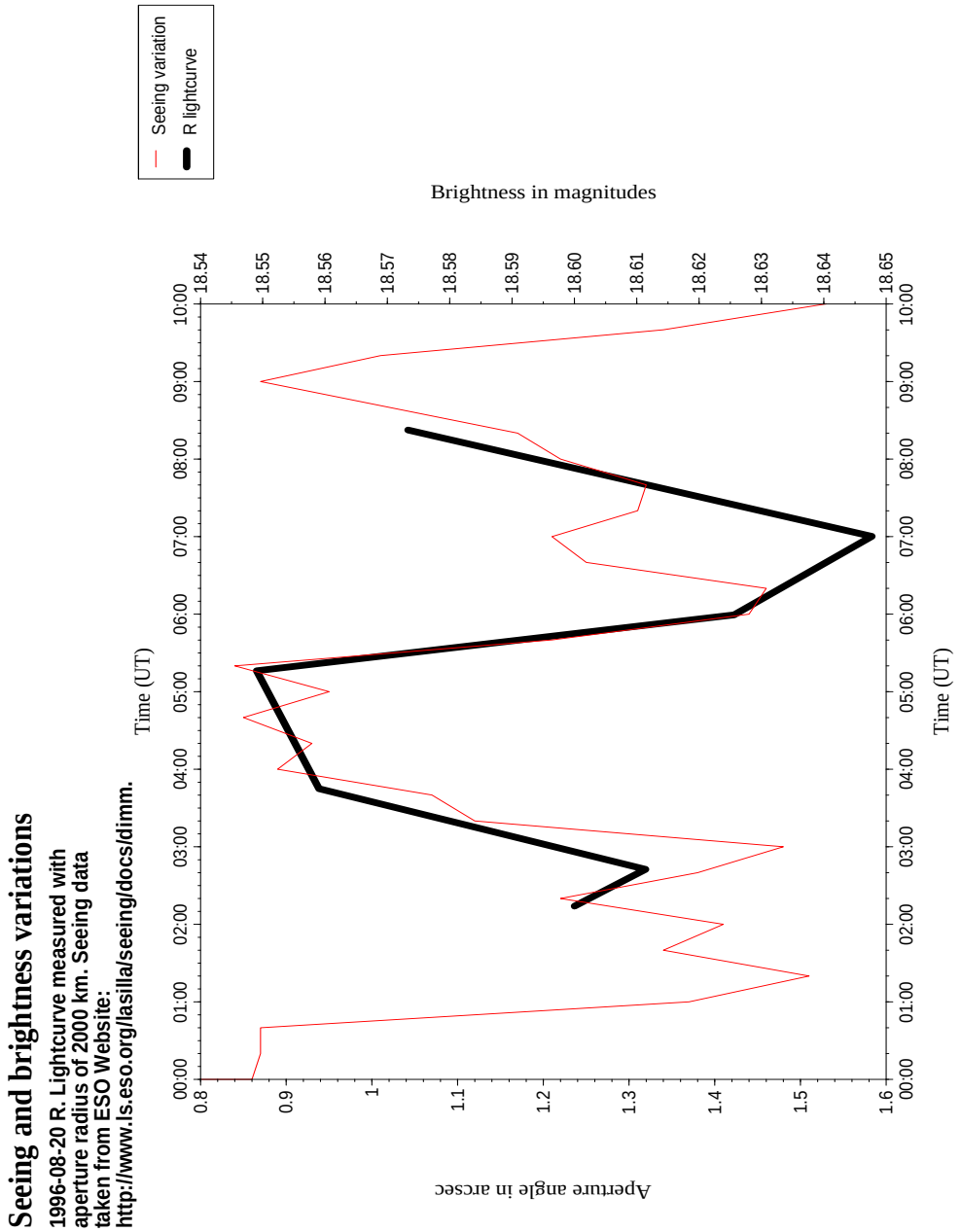


Figure 32: Measured coma brightness variation of 20 August 1996 (thick line) imposed on the seeing variations (thin line); a strong correlation is clearly evident.

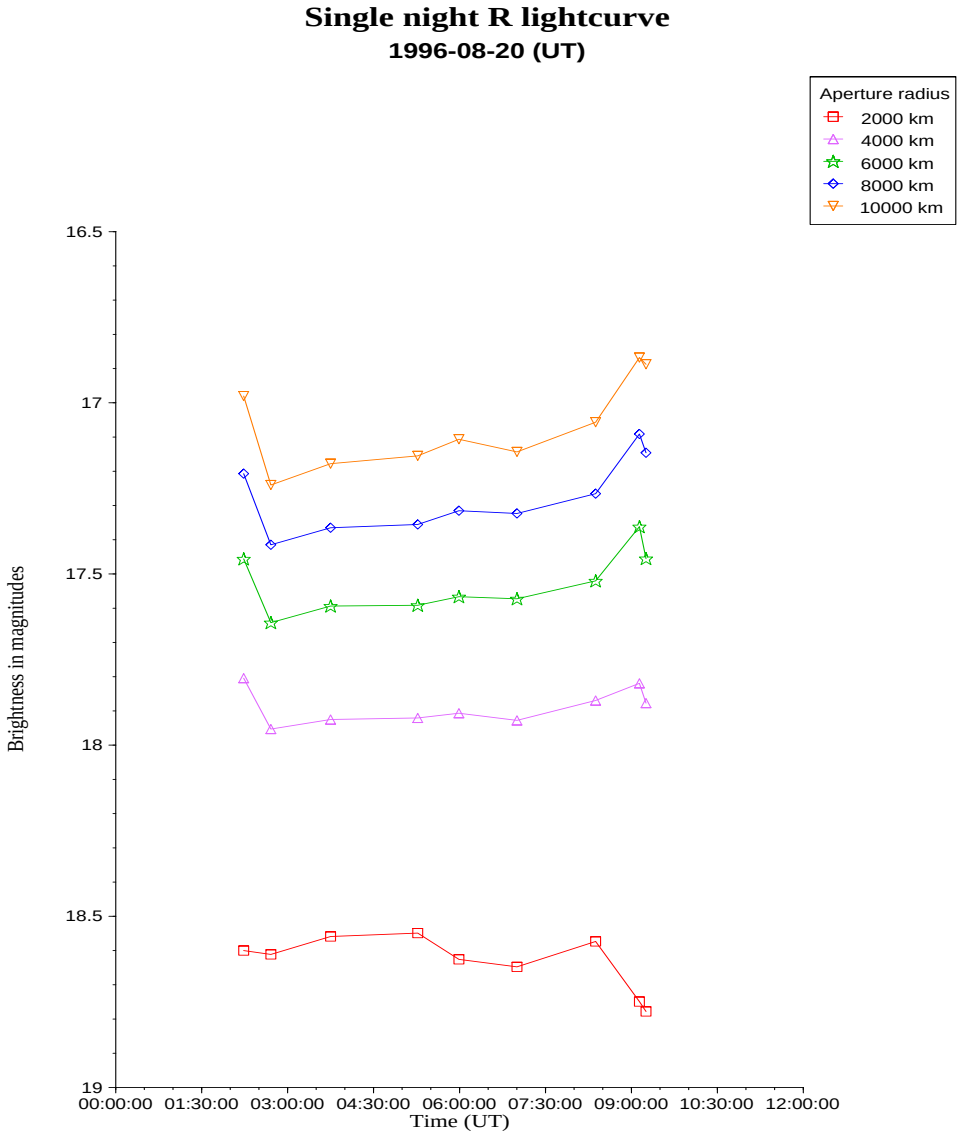


Figure 33: Measurements of 20 August 1996, obtained with different aperture radii between 2000 km (bottom) up to 10000 km (top). The smallest aperture data (2000 km) show a clearly different variability pattern than those obtained with larger apertures. The reason is the impact of seeing variations on data taken with aperture sizes, which are of size comparable with the seeing disk (see text).

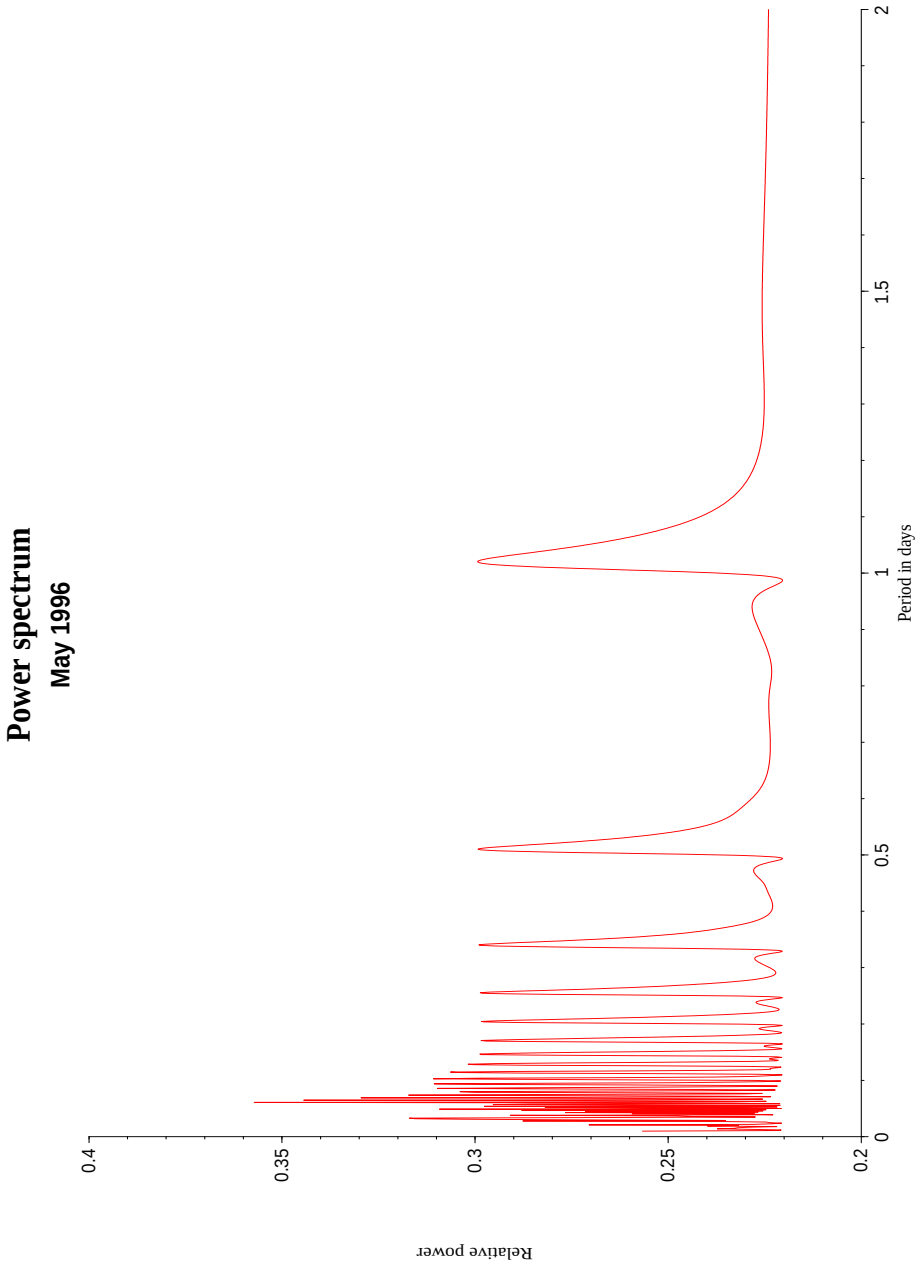


Figure 34: Power spectrum for the nights of 11, 12 and 13 May 1996.

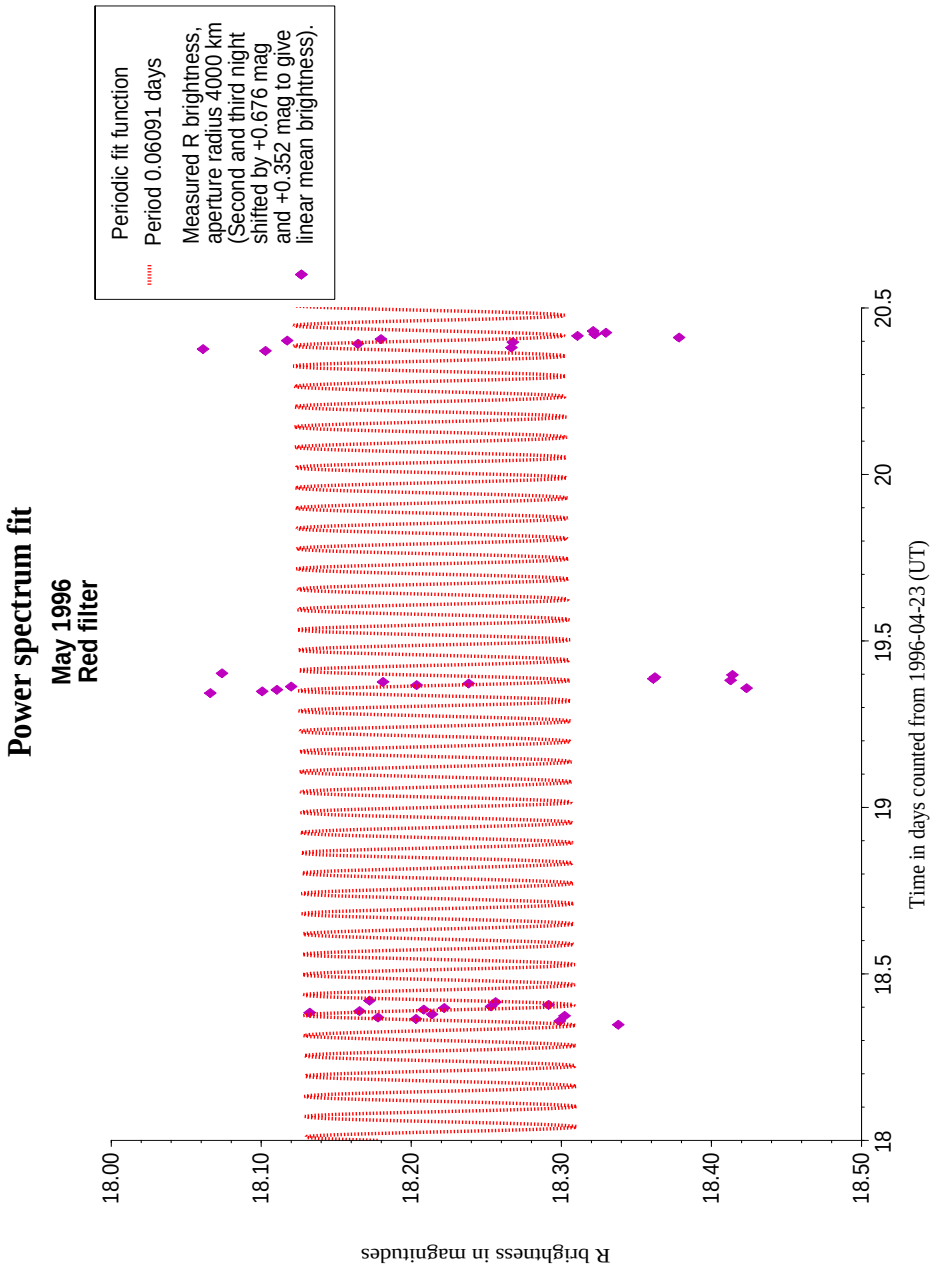


Figure 35: Power spectrum fit for the nights of 11, 12 and 13 May 1996.

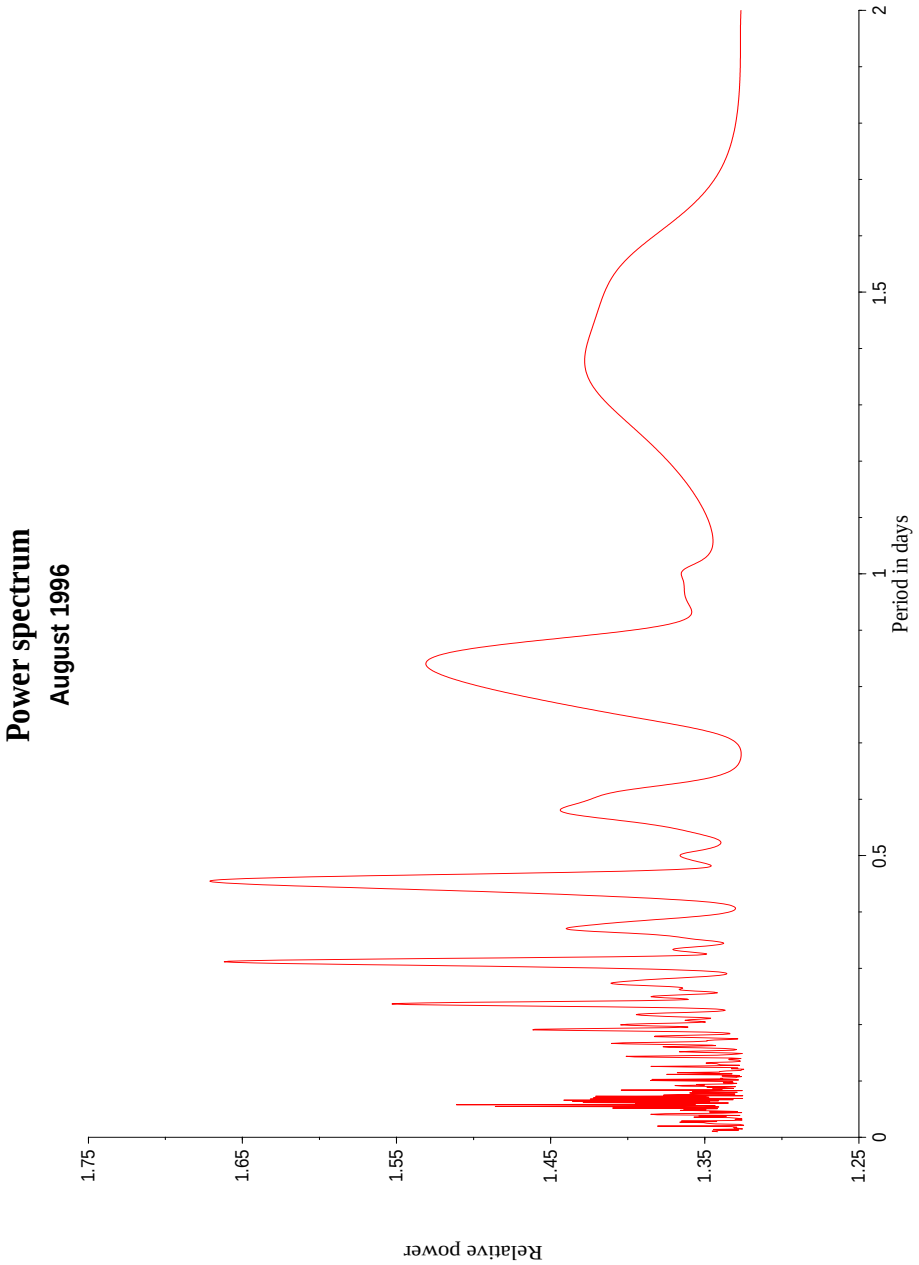


Figure 36: Power spectrum for the nights of 18 to 23 August 1996.

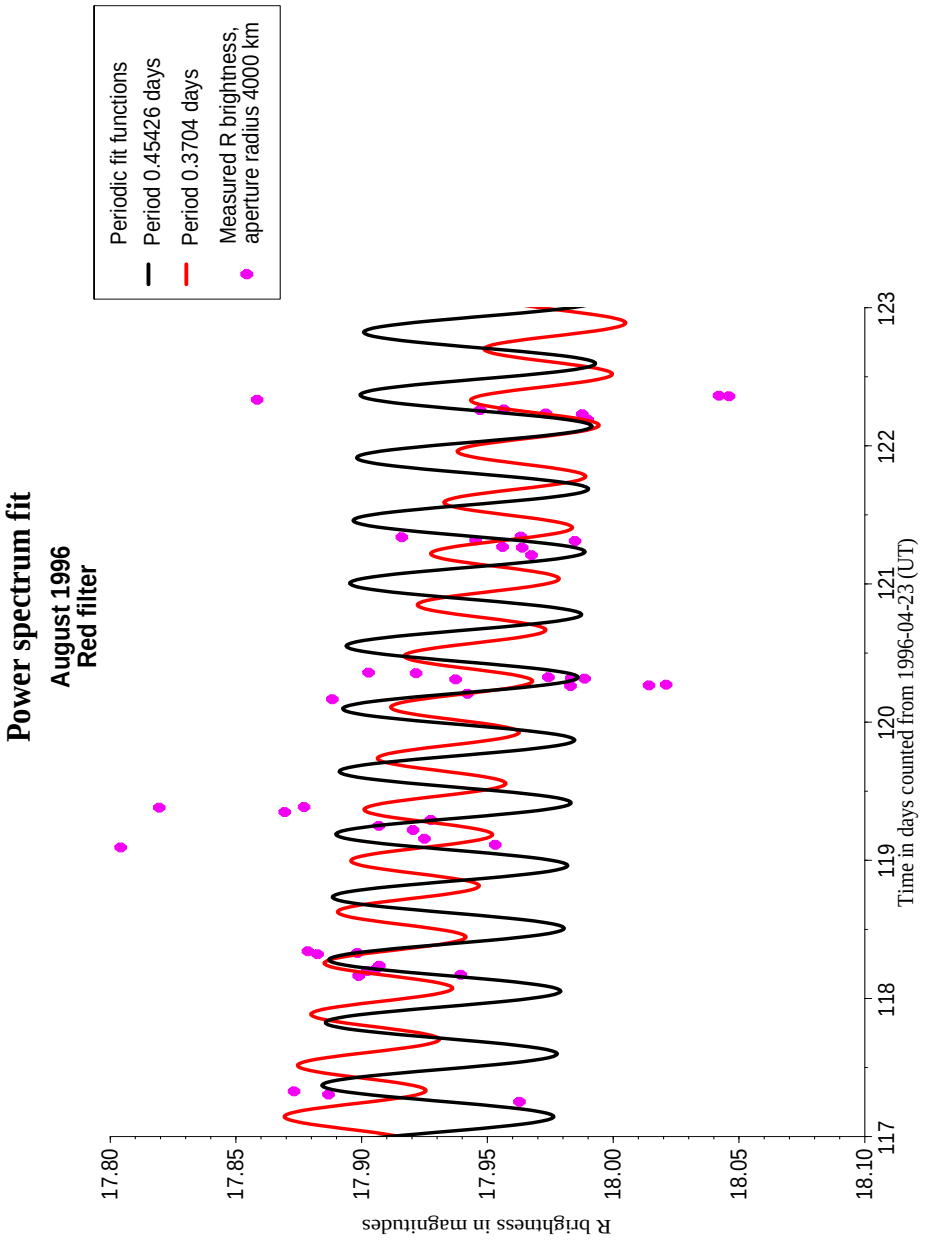


Figure 37: Power spectrum fit for the nights of 18 to 23 August 1996.

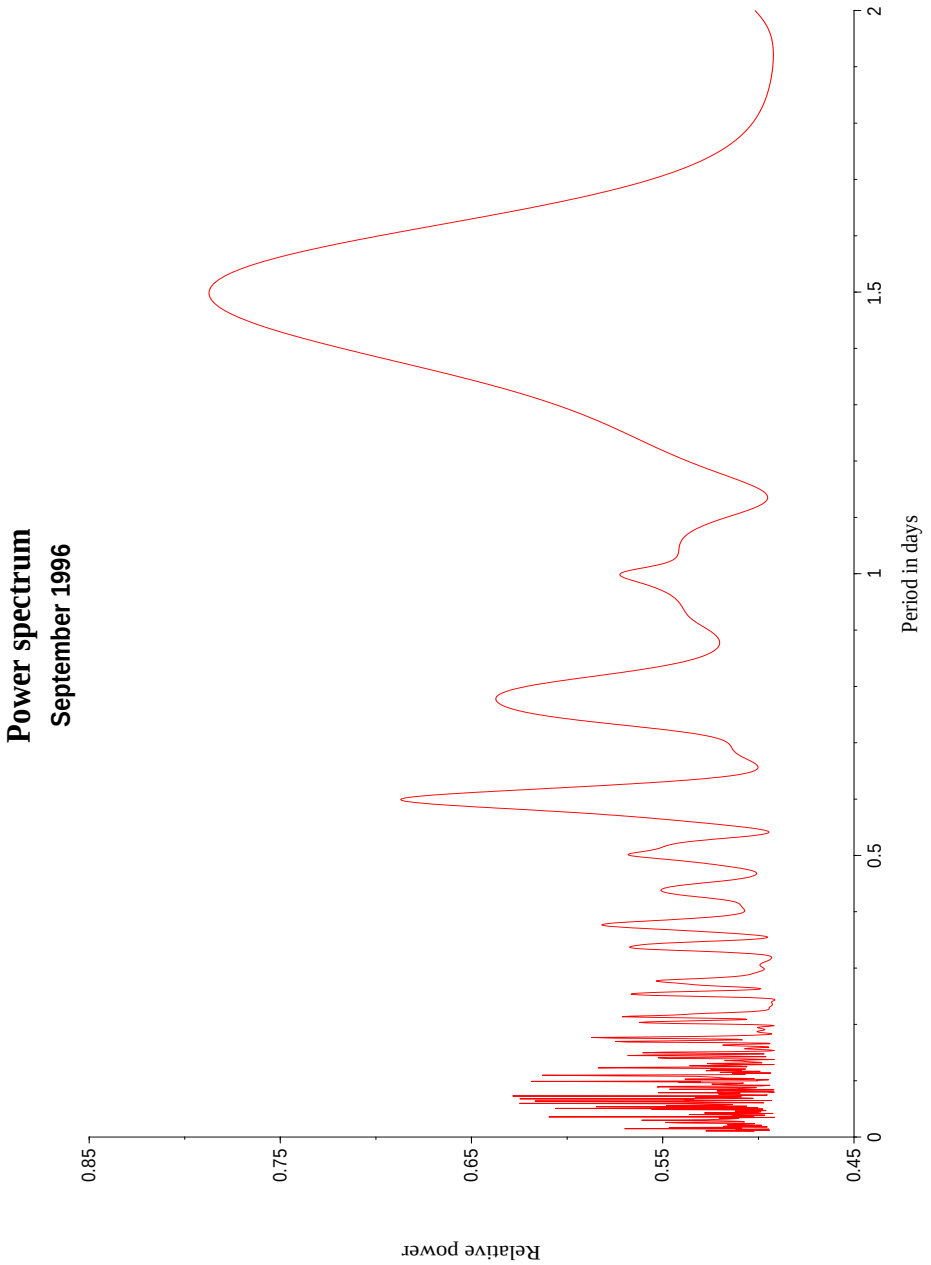


Figure 38: Power spectrum for the nights of 11 to 17 September 1996.

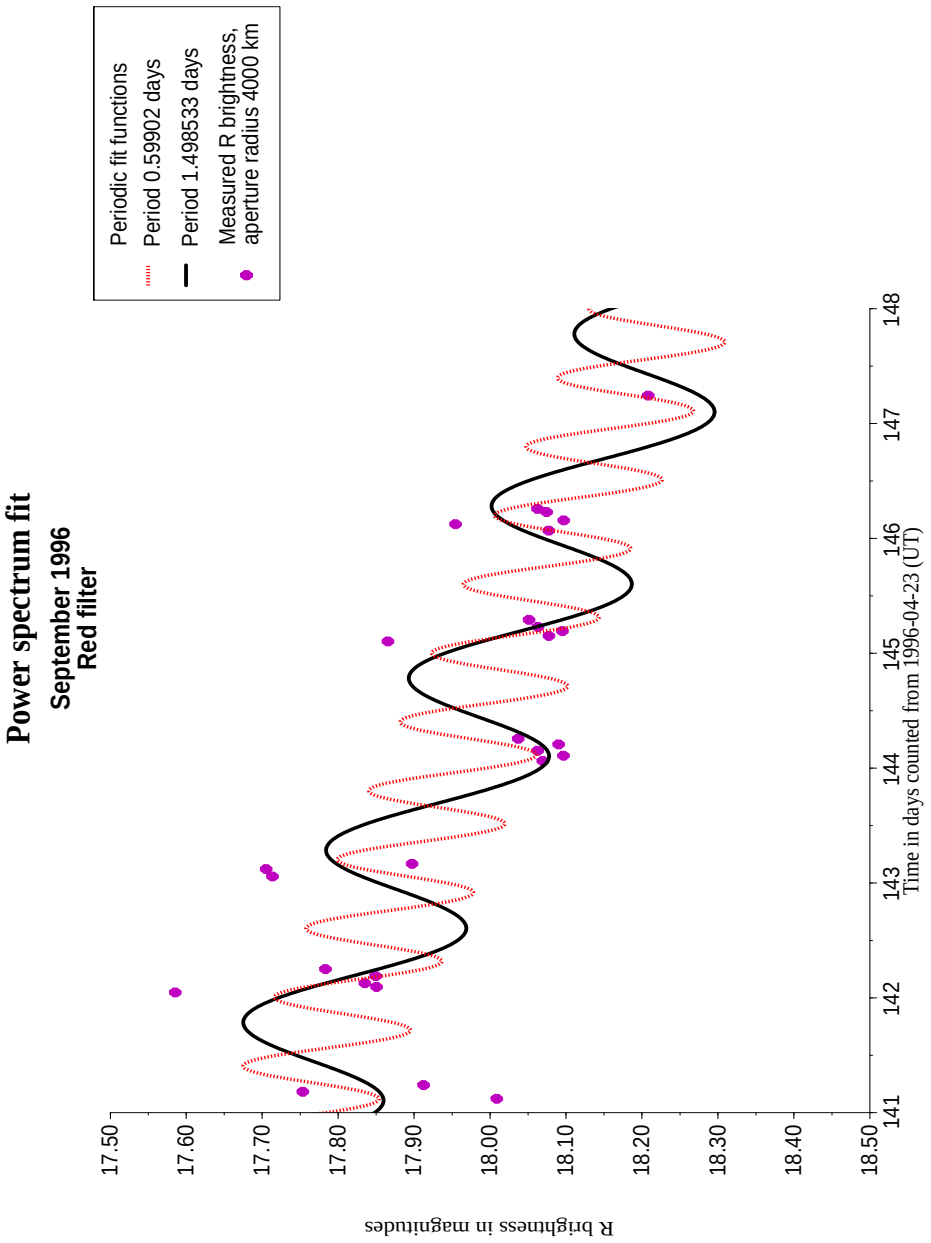


Figure 39: Power spectrum fit for the nights of 11 to 17 September 1996.

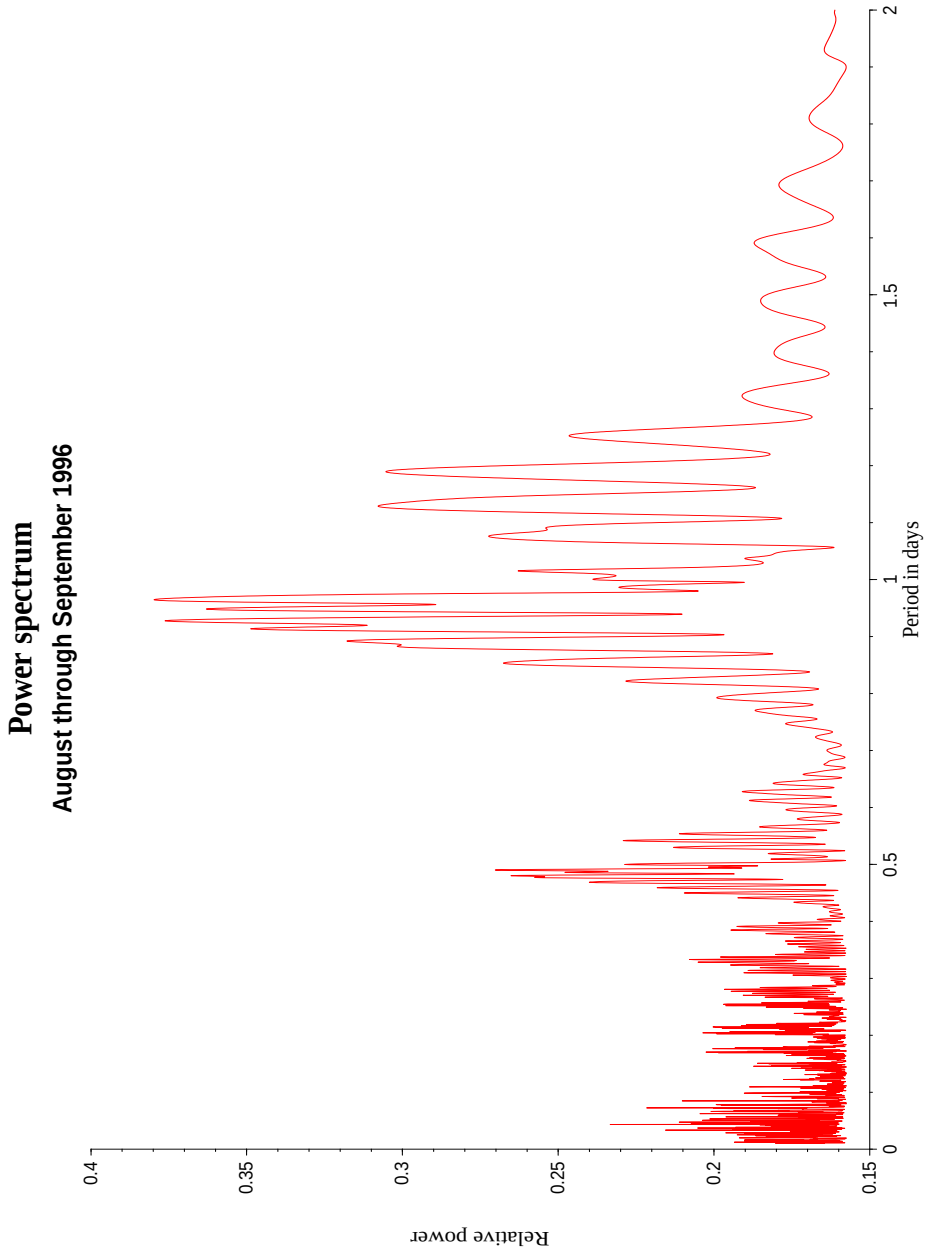


Figure 40: Power spectrum for all observing nights of August through September 1996 combined (18-23 August 1996, 11-17 September 1996).

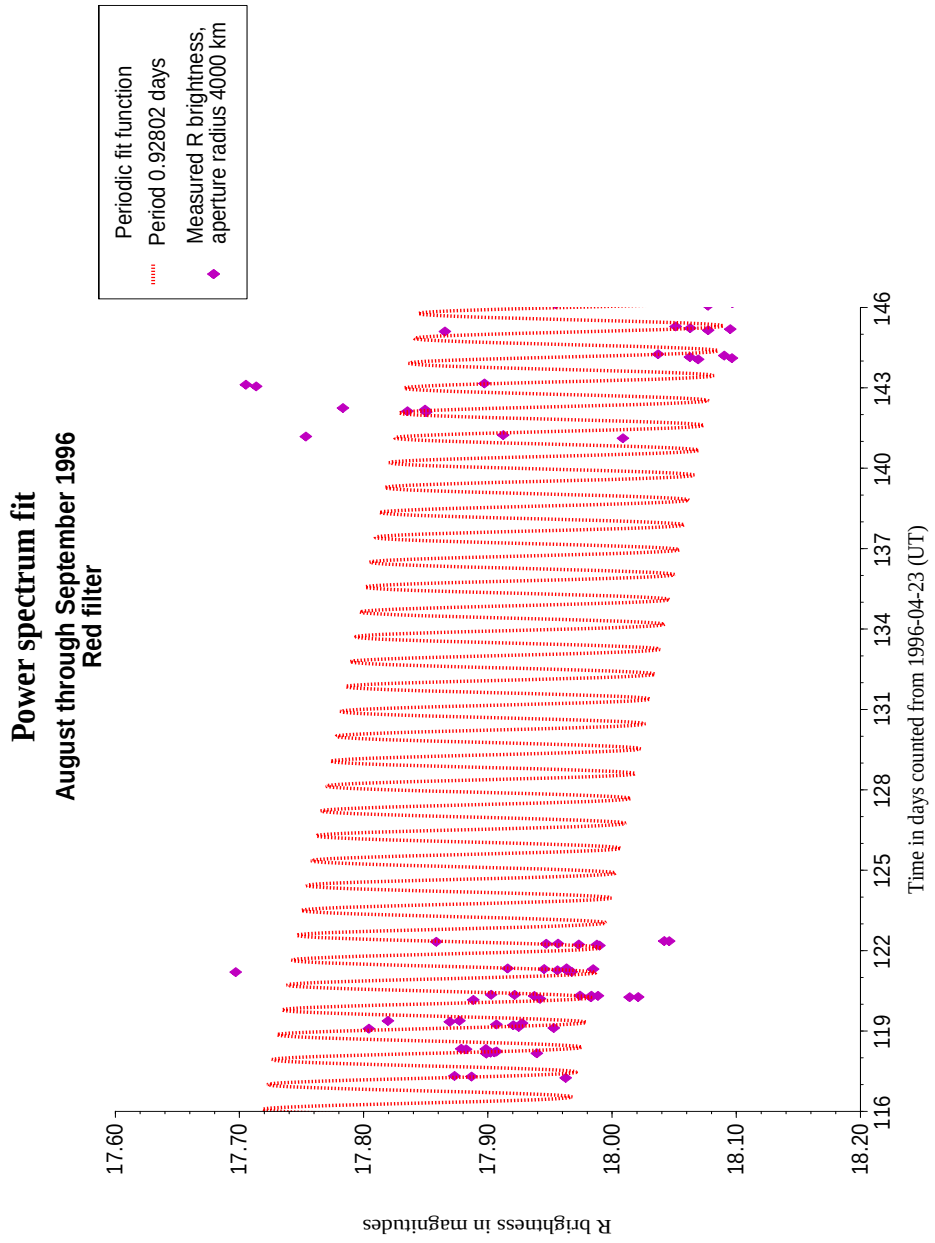
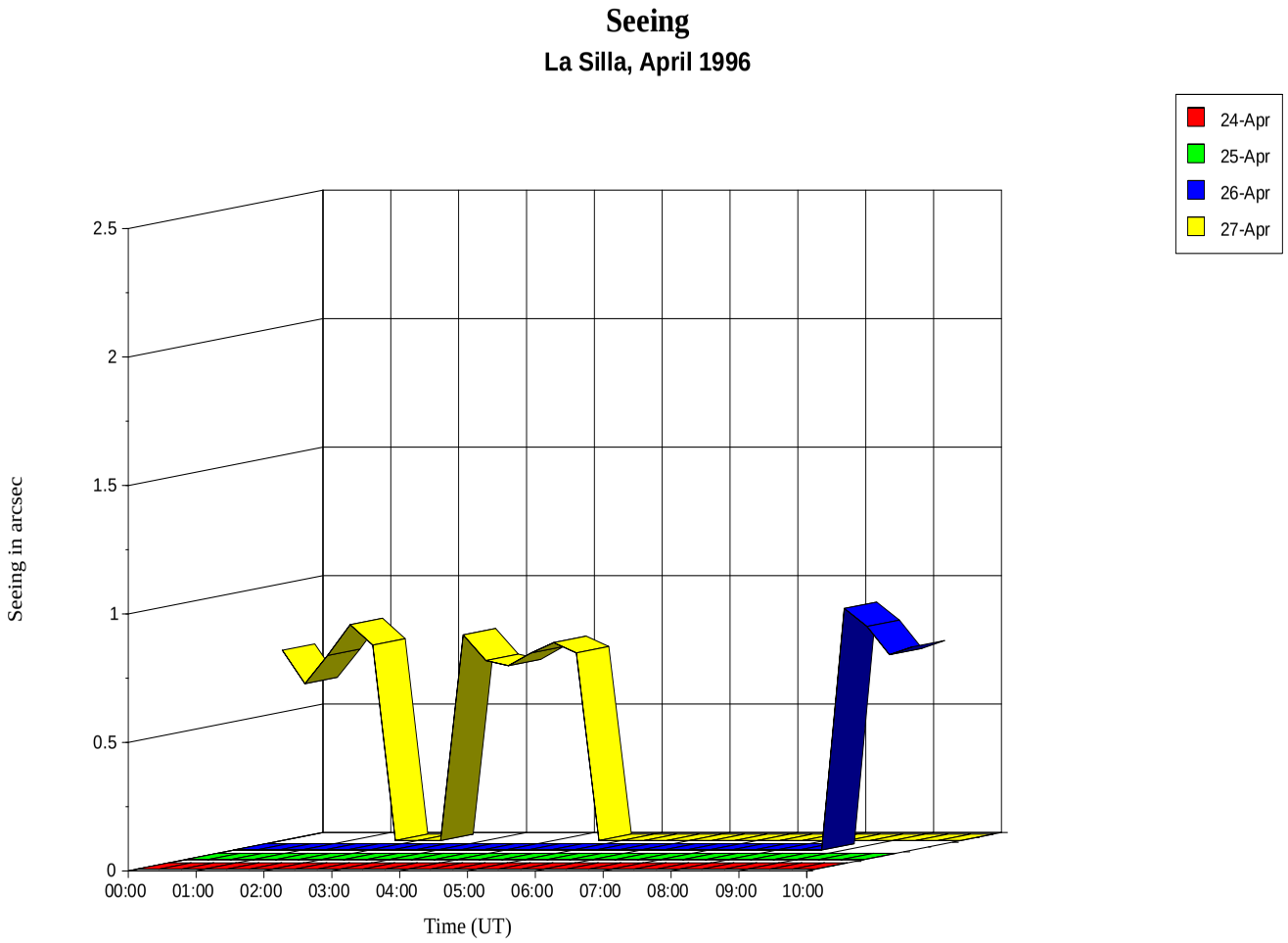
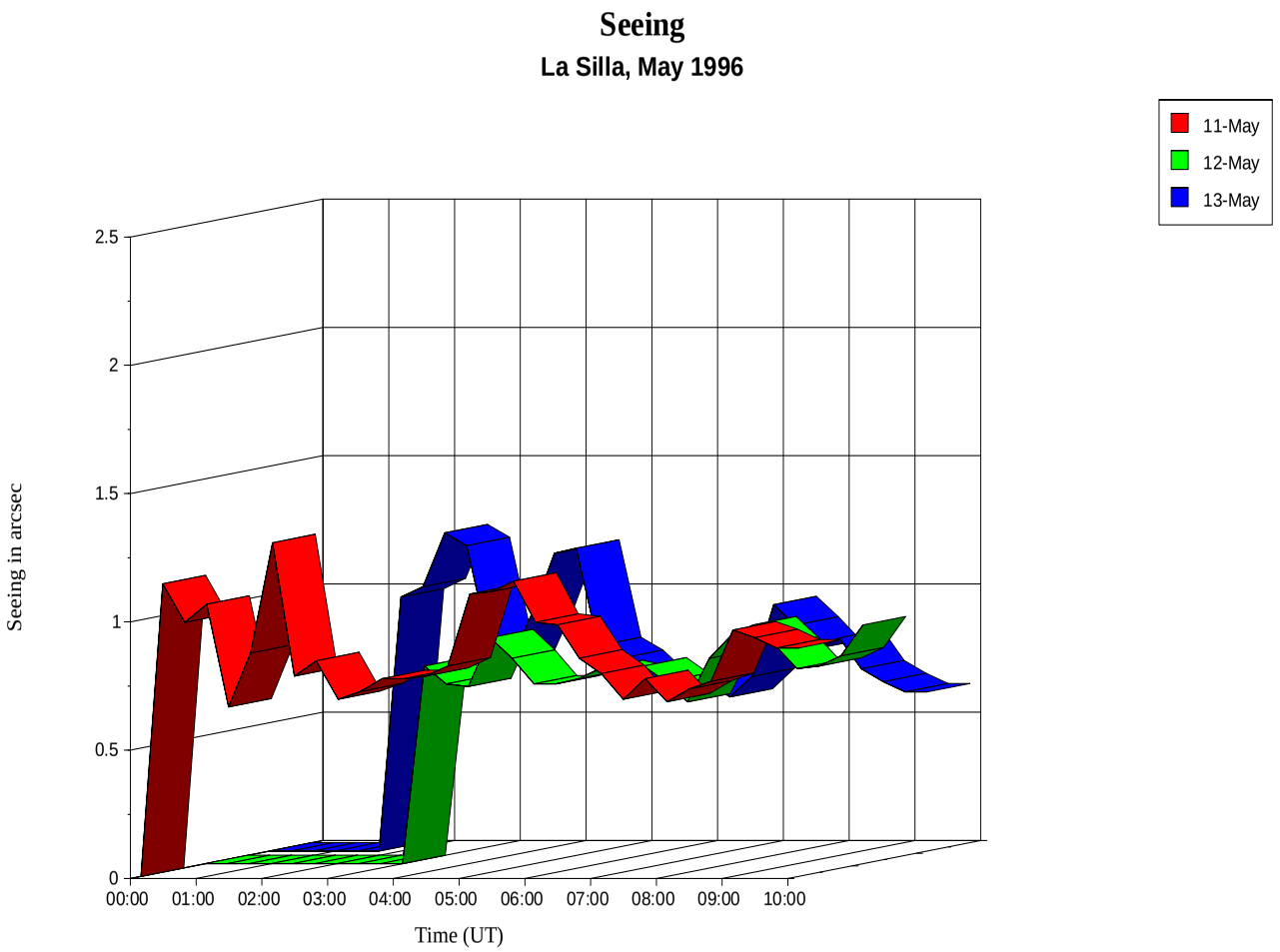


Figure 41: Power spectrum fit for combined nights of 18-23 August 1996 and 11-17 September 1996.

A Appendix: Seeing variations


Seeing
La Silla, April 1996
24-Apr
25-Apr
26-Apr
27-Apr
Seeing in arcsec
2.5
2
1.5
1
0.5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
Time (UT)


Seeing
La Silla, May 1996
11-May
12-May
13-May
Seeing in arcsec
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1.5
1
0.5
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00:00
01:00
02:00
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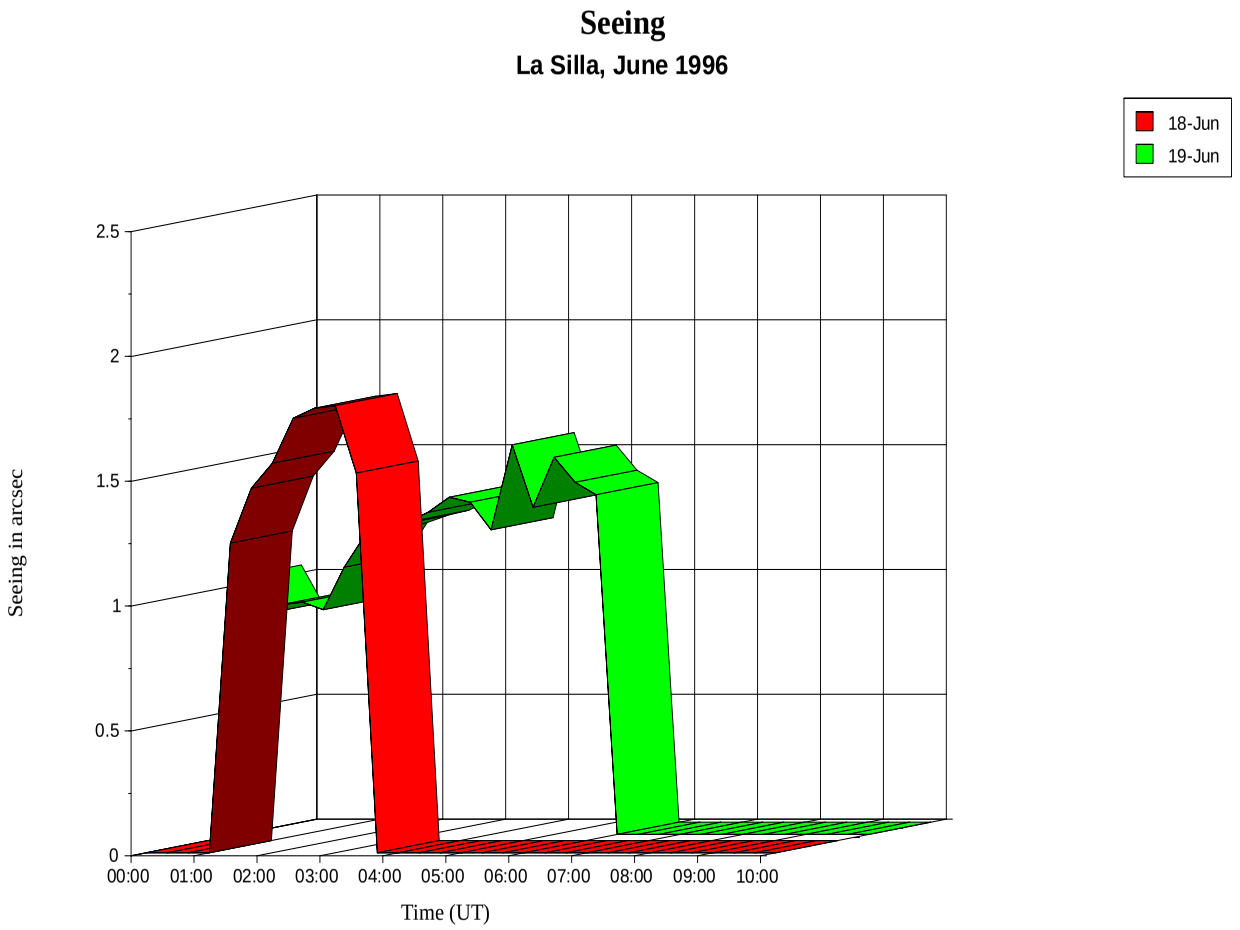
04:00
05:00
06:00
07:00
08:00
09:00
10:00
Time (UT)


Seeing
La Silla, June 1996
18-Jun
19-Jun
Seeing in arcsec
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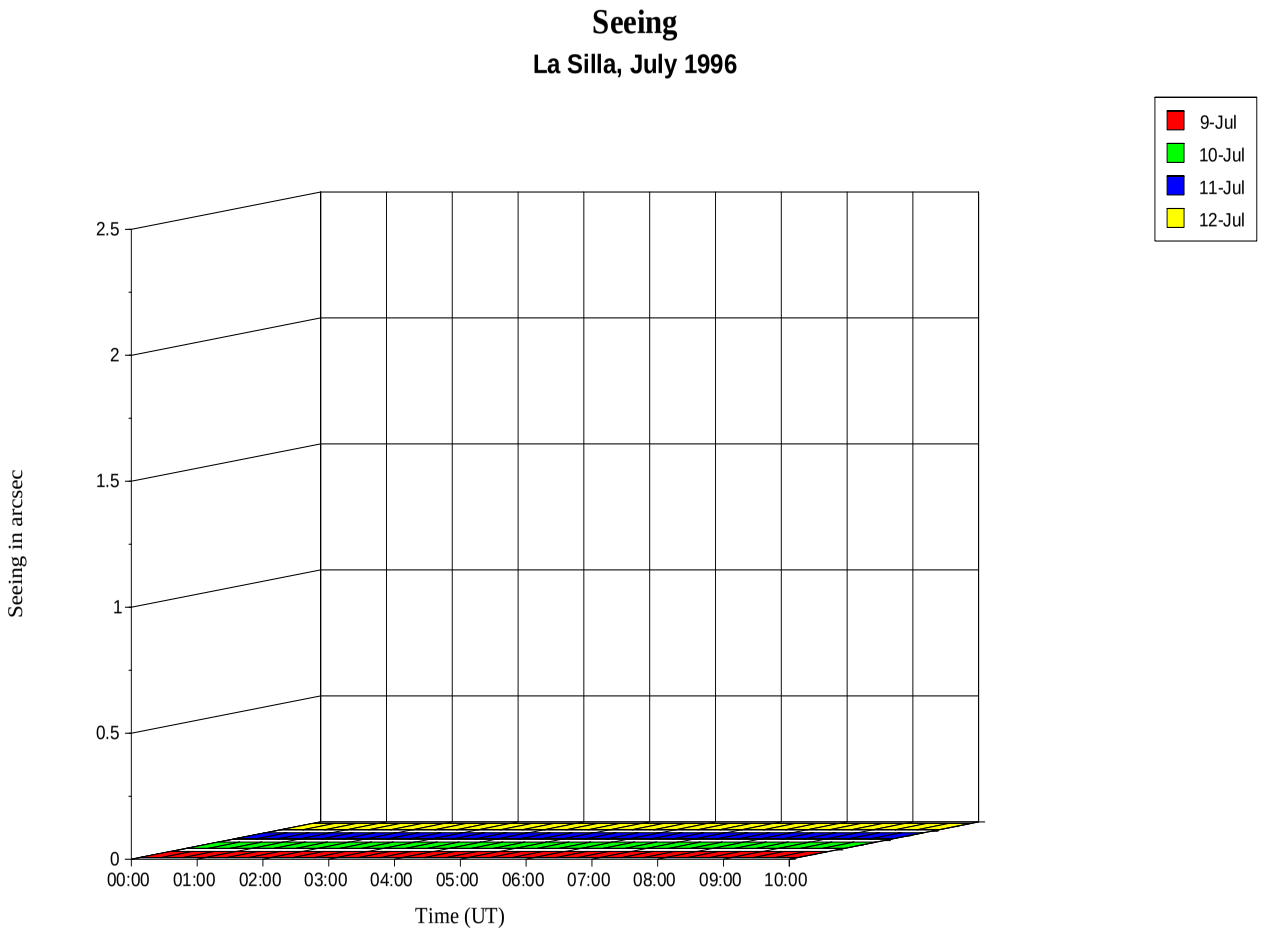
2
1.5
1
0.5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
Time (UT)


Seeing
La Silla, July 1996
9-Jul
10-Jul
11-Jul
12-Jul
Seeing in arcsec
2.5
2
1.5
1
0.5
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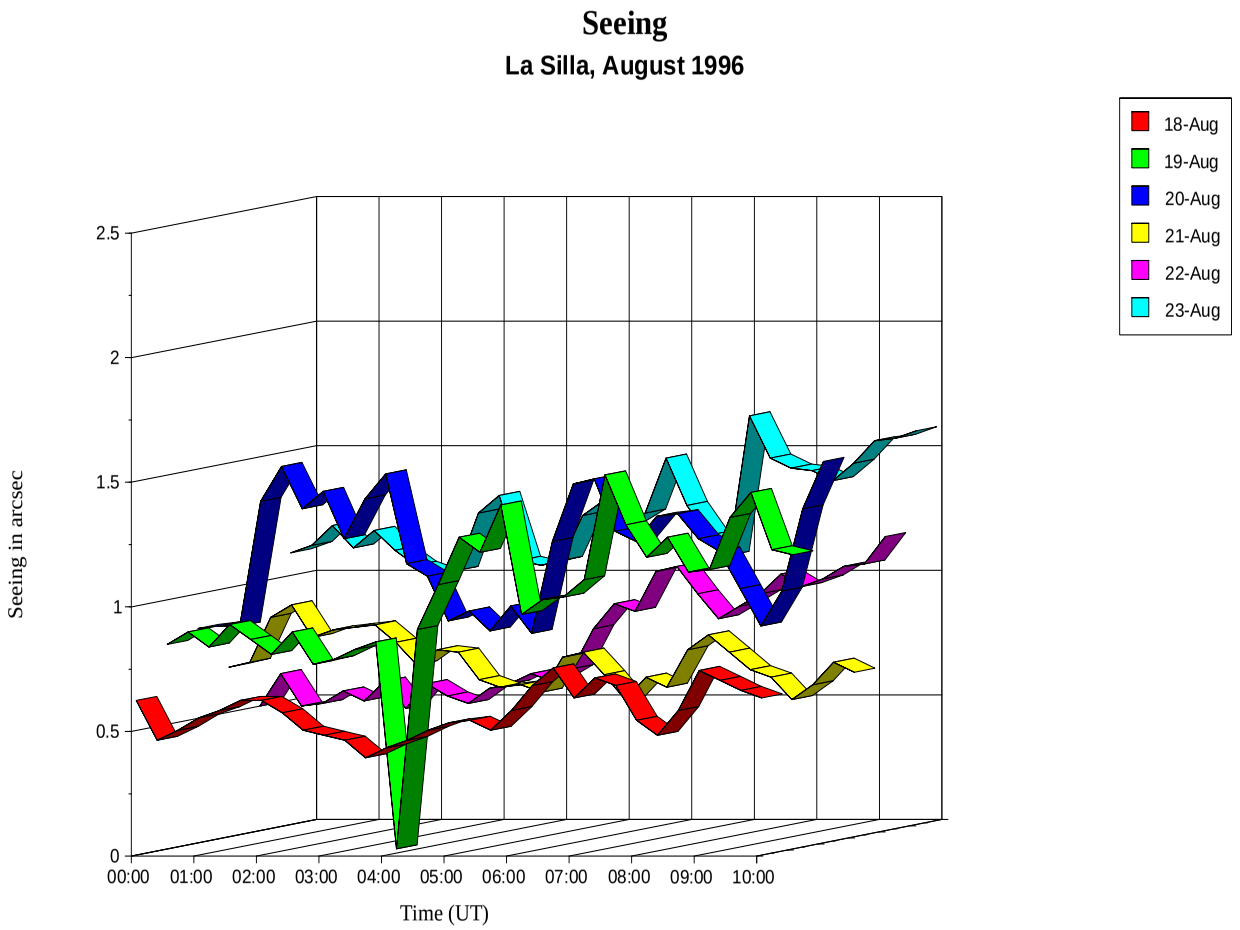
07:00
08:00
09:00
10:00
Time (UT)


Seeing
La Silla, August 1996
18-Aug
19-Aug
20-Aug
21-Aug
22-Aug
23-Aug
Seeing in arcsec
2.5
2
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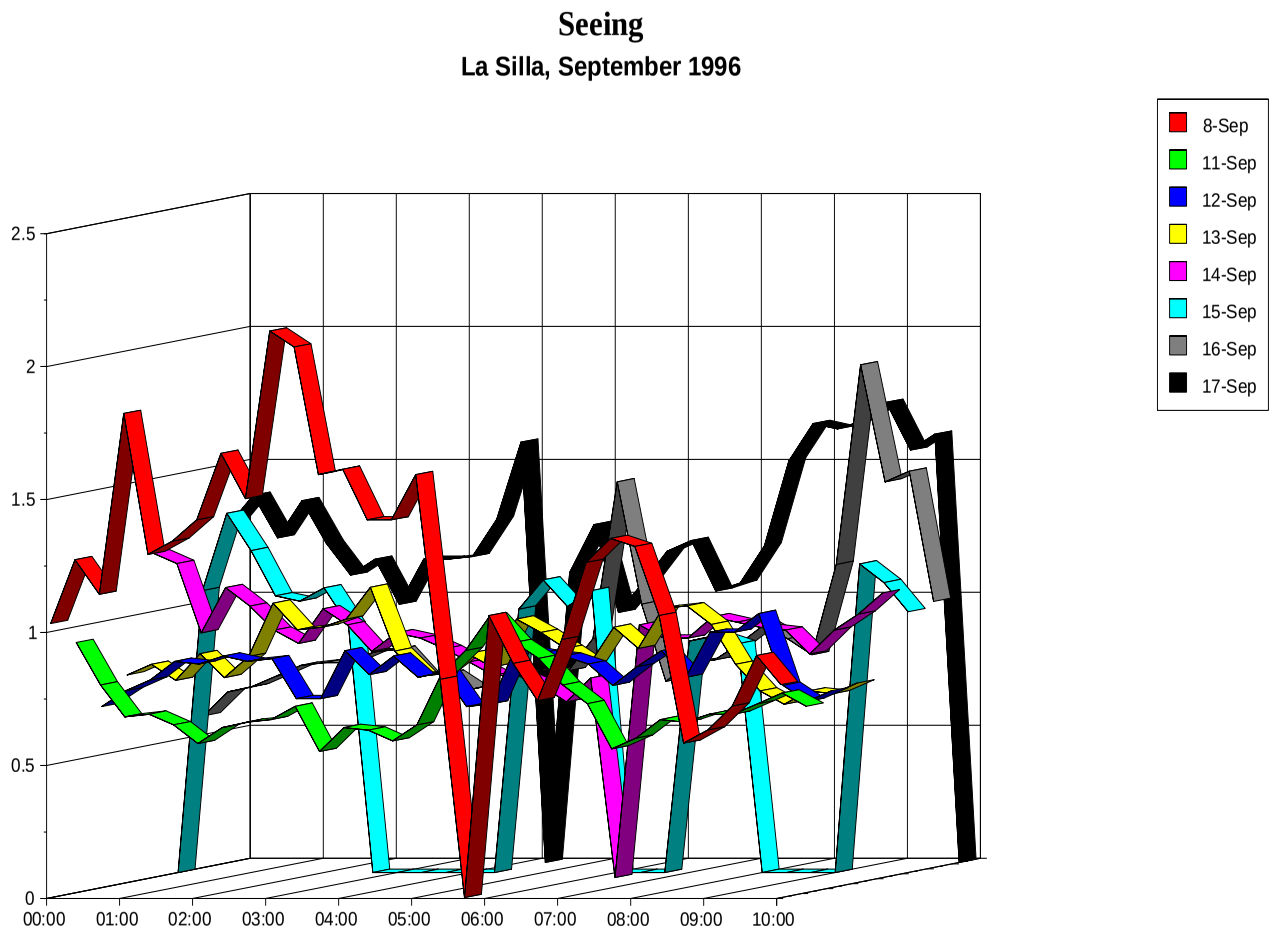
1
0.5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
Time (UT)


Seeing
La Silla, September 1996
8-Sep
11-Sep
12-Sep
13-Sep
14-Sep
15-Sep
16-Sep
17-Sep
2.5
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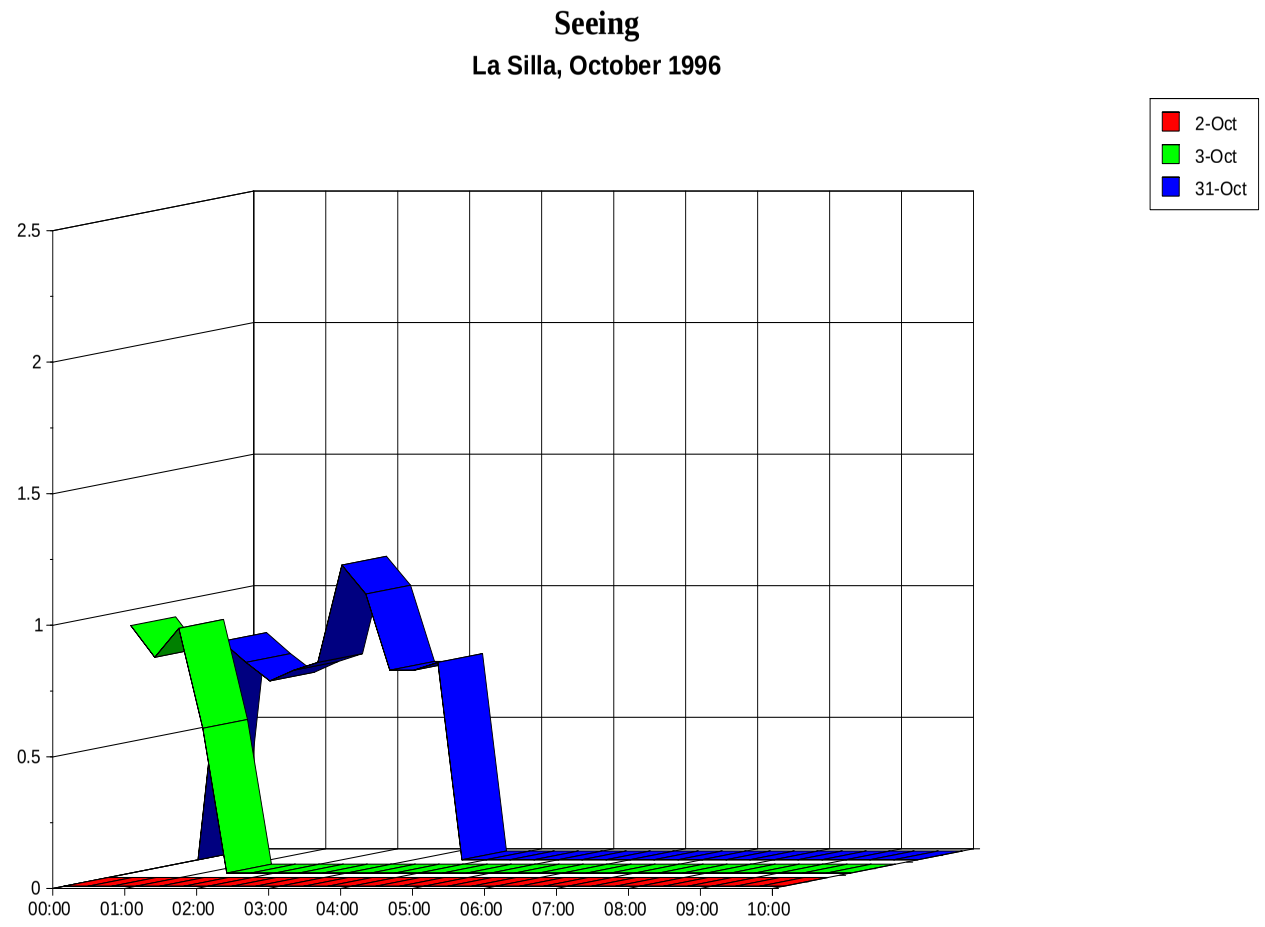
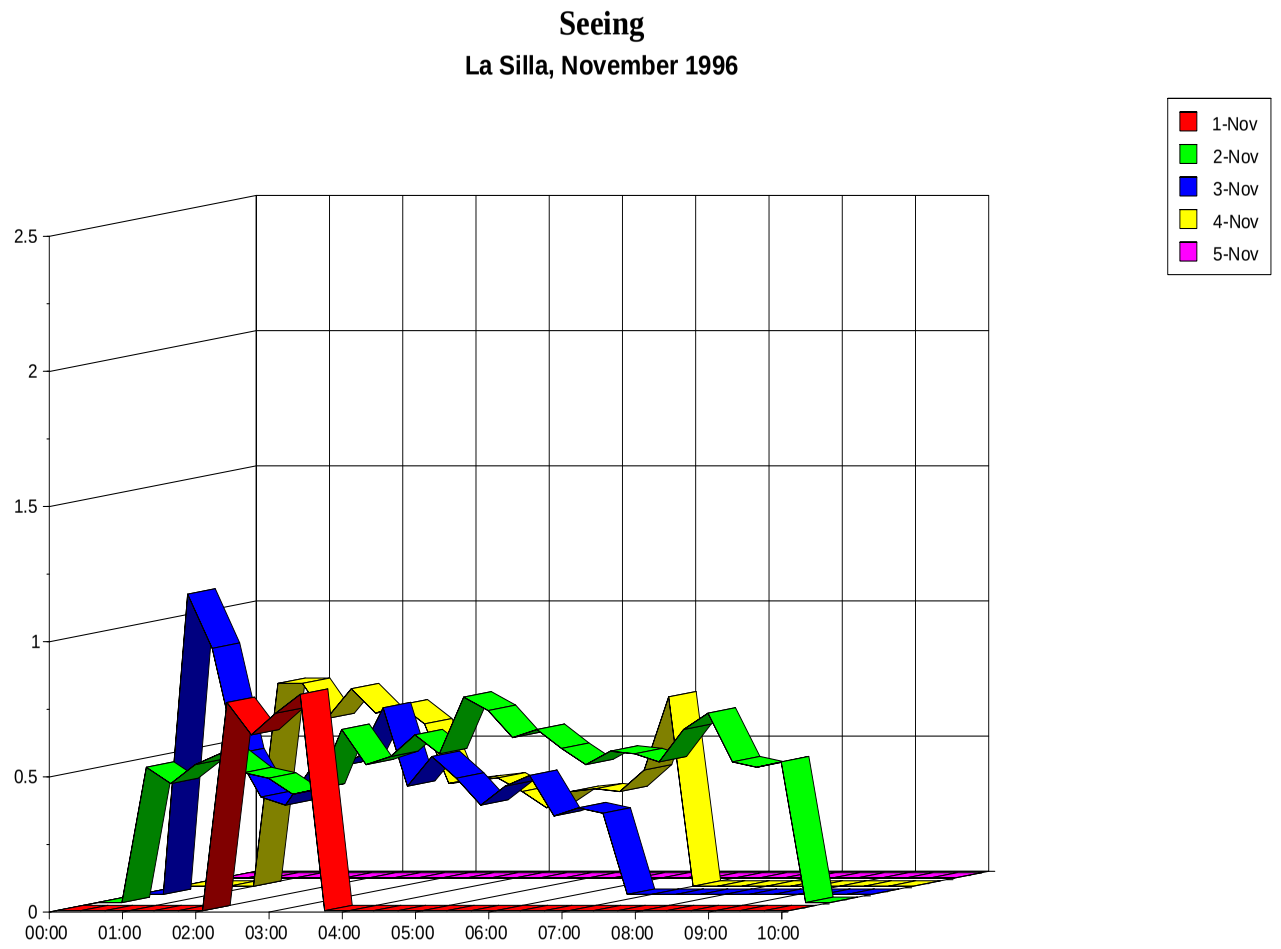
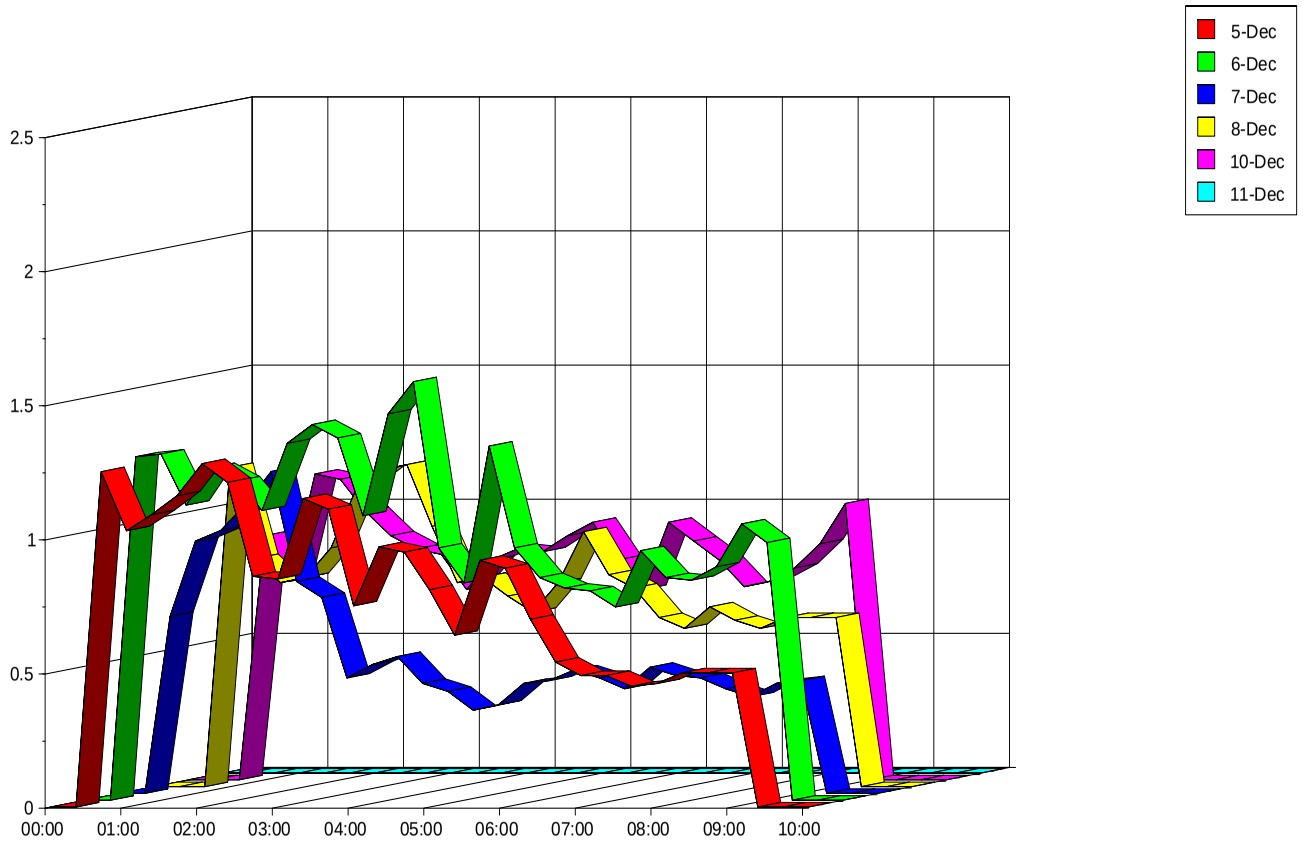
1.5
1
0.5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00


Seeing
La Silla, October 1996
2-Oct
3-Oct
31-Oct
2.5
2
1.5
1
0.5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00


Seeing
La Silla, November 1996
1-Nov
2-Nov
3-Nov
4-Nov
5-Nov
2.5
2
1.5
1
0.5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00

Seeing

La Silla, December 1996



B Appendix: BVR aperture photometry results

Table 3: Structure of the result table 4.

Field	*Description*
Date (UT)	Observation date (UT).
Time (UT)	Observation time (UT).
Image	Image identifier (file name of the image).
F	Bessell filter used (B, V or R).
Exp. time	Exposure time (seconds).
r	Object distance from the Sun (AU).
Δ	Object distance from the Earth (AU).
ρ	Aperture radius given in km at the location of the comet.
Mag	Relatively calibrated brightness (magnitudes).
Mag_{hc}	Relatively calibrated heliocentric brightness, ie normalized to $\Delta = 1$ AU (magnitudes).

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	2000	22.1112	19.4324
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	4000	20.8459	18.167
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	6000	20.2903	17.6115
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	8000	19.9456	17.2668
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	10000	19.7694	17.0906
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	15000	19.5297	16.8508
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	20000	19.4584	16.7796
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	25000	19.4583	16.7795
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	30000	19.4583	16.7794
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	40000	19.3579	16.679
1996-04-24	09:29:40	a048	R	600	3.31152	3.43373	50000	19.3578	16.679
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	2000	22.1653	19.4865
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	4000	20.937	18.2581
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	6000	20.3518	17.673
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	8000	20.1157	17.4369
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	10000	19.9891	17.3102
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	15000	19.8546	17.1758
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	20000	19.738	17.0592
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	25000	19.5454	16.8666
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	30000	19.4459	16.7671
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	40000	19.197	16.5182
1996-04-24	09:40:23	a049	R	600	3.31152	3.43373	50000	19.0813	16.4025

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	2000	23.1999	20.5338
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	4000	21.6111	18.9449
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	6000	20.7286	18.0625
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	8000	20.3029	17.6367
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	10000	20.1298	17.4637
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	15000	19.894	17.2279
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	20000	19.8939	17.2277
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	25000	19.8938	17.2276
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	30000	19.8937	17.2275
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	40000	19.8936	17.2274
1996-04-25	07:29:39	a125	R	300	3.30554	3.41372	50000	19.8935	17.2273
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	2000	22.5267	19.8605
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	4000	21.0491	18.383
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	6000	20.445	17.7788
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	8000	20.0499	17.3838
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	10000	19.8479	17.1818
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	15000	19.5823	16.9162
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	20000	19.5822	16.9161
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	25000	19.5821	16.916
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	30000	19.5821	16.9159
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	40000	19.582	16.9158
1996-04-25	07:36:50	a126	R	600	3.30554	3.41372	50000	19.5819	16.9158
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	2000	22.0028	19.3367

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	4000	20.9088	18.2427
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	6000	20.4188	17.7527
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	8000	20.1764	17.5103
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	10000	19.9649	17.2988
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	15000	19.8428	17.1767
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	20000	19.8037	17.1375
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	25000	19.8036	17.1374
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	30000	19.8035	17.1373
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	40000	19.8034	17.1373
1996-04-25	07:48:24	a127	R	600	3.30554	3.41372	50000	19.8033	17.1372
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	2000	21.9957	19.3295
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	4000	20.8592	18.1931
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	6000	20.3494	17.6833
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	8000	20.0759	17.4098
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	10000	19.9136	17.2475
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	15000	19.7096	17.0435
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	20000	19.5711	16.905
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	25000	19.542	16.8759
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	30000	19.5128	16.8466
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	40000	19.5127	16.8466
1996-04-25	08:01:58	a129	R	600	3.30554	3.41372	50000	19.5031	16.837
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	2000	22.6161	19.9499
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	4000	21.3733	18.7071

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	6000	20.8336	18.1675
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	8000	20.4739	17.8078
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	10000	20.2621	17.5959
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	15000	19.8516	17.1855
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	20000	19.5119	16.8457
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	25000	19.2413	16.5752
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	30000	18.9461	16.2799
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	40000	18.4852	15.8191
1996-04-25	08:18:34	a130	V	600	3.30554	3.41372	50000	18.0793	15.4131
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	2000	22.3718	19.7057
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	4000	21.266	18.5998
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	6000	20.8451	18.179
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	8000	20.5341	17.8679
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	10000	20.2736	17.6074
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	15000	19.9257	17.2596
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	20000	19.634	16.9678
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	25000	19.4073	16.7412
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	30000	19.1857	16.5195
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	40000	18.8123	16.1462
1996-04-25	08:30:14	a131	V	600	3.30554	3.41372	50000	18.4173	15.7511
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	2000	23.531	20.8648
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	4000	22.0941	19.428
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	6000	21.5593	18.8931

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	8000	21.2184	18.5523
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	10000	21.0246	18.3584
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	15000	20.7533	18.0872
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	20000	20.5061	17.8399
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	25000	20.0392	17.3731
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	30000	19.7626	17.0964
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	40000	19.3694	16.7033
1996-04-25	08:42:12	a132	B	900	3.30554	3.41372	50000	19.0315	16.3654
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	2000	23.0521	20.386
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	4000	21.9026	19.2365
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	6000	21.3809	18.7147
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	8000	21.1029	18.4367
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	10000	20.8544	18.1882
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	15000	20.469	17.8029
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	20000	20.0775	17.4113
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	25000	19.7664	17.1003
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	30000	19.479	16.8129
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	40000	19.0679	16.4018
1996-04-25	08:58:52	a133	B	900	3.30554	3.41372	50000	18.6645	15.9984
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	2000	21.8131	19.1469
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	4000	20.7256	18.0595
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	6000	20.2275	17.5613
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	8000	19.9646	17.2984

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	10000	19.7985	17.1324
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	15000	19.5762	16.91
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	20000	19.3607	16.6945
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	25000	19.1786	16.5125
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	30000	18.9905	16.3244
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	40000	18.8361	16.1699
1996-04-25	09:17:08	a134	R	600	3.30554	3.41372	50000	18.6261	15.96
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	2000	21.8067	19.1405
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	4000	20.8029	18.1367
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	6000	20.4411	17.775
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	8000	20.2448	17.5787
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	10000	20.059	17.3929
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	15000	19.8966	17.2304
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	20000	19.799	17.1329
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	25000	19.7989	17.1328
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	30000	19.7146	17.0485
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	40000	19.7145	17.0484
1996-04-25	09:30:36	a136	R	300	3.30554	3.41372	50000	19.7145	17.0483
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	2000	21.6174	18.9513
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	4000	20.6608	17.9947
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	6000	20.2516	17.5855
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	8000	19.9945	17.3283
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	10000	19.8495	17.1833

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	15000	19.4944	16.8283
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	20000	19.2608	16.5946
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	25000	19.0469	16.3807
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	30000	18.8506	16.1844
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	40000	18.5826	15.9165
1996-04-25	09:37:18	a137	R	600	3.30554	3.41372	50000	18.308	15.6418
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	2000	21.7476	19.0815
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	4000	20.6896	18.0234
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	6000	20.2698	17.6036
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	8000	19.9721	17.3059
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	10000	19.8105	17.1443
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	15000	19.4331	16.767
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	20000	19.1311	16.465
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	25000	18.86	16.1938
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	30000	18.6684	16.0022
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	40000	18.3376	15.6714
1996-04-25	09:48:57	a138	R	600	3.30554	3.41372	50000	18.006	15.3398
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	2000	21.8866	19.2204
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	4000	20.7515	18.0853
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	6000	20.3463	17.6802
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	8000	20.039	17.3728
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	10000	19.7762	17.1101
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	15000	19.3426	16.6765

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	20000	19.1423	16.4761
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	25000	19.0401	16.3739
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	30000	18.8375	16.1714
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	40000	18.5738	15.9076
1996-04-25	10:00:38	a139	R	510	3.30554	3.41372	50000	18.2199	15.5538
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	2000	21.828	19.1746
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	4000	20.8264	18.1731
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	6000	20.3905	17.7372
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	8000	20.1134	17.46
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	10000	19.8943	17.241
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	15000	19.5245	16.8712
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	20000	19.2521	16.5988
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	25000	19.0697	16.4164
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	30000	18.9365	16.2831
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	40000	18.5934	15.94
1996-04-26	09:19:22	c061	R	600	3.29954	3.39366	50000	18.2506	15.5973
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	2000	21.7209	19.0675
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	4000	20.6779	18.0246
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	6000	20.2823	17.6289
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	8000	20.0202	17.3668
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	10000	19.8025	17.1492
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	15000	19.4267	16.7733
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	20000	19.1765	16.5232

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	25000	18.91	16.2566
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	30000	18.6372	15.9839
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	40000	18.2135	15.5601
1996-04-26	09:31:11	c062	R	600	3.29954	3.39366	50000	17.8685	15.2151
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	2000	21.9031	19.2626
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	4000	20.9093	18.2689
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	6000	20.5249	17.8845
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	8000	20.3189	17.6785
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	10000	20.1836	17.5431
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	15000	19.9863	17.3458
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	20000	19.8503	17.2098
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	25000	19.8192	17.1788
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	30000	19.624	16.9835
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	40000	19.2636	16.6232
1996-04-27	09:15:23	e81	R	600	3.29354	3.37356	50000	19.0333	16.3929
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	2000	22.0161	19.3757
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	4000	21.0166	18.3762
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	6000	20.6129	17.9725
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	8000	20.4407	17.8003
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	10000	20.3196	17.6791
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	15000	20.0175	17.3771
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	20000	19.8328	17.1924
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	25000	19.7414	17.101

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	30000	19.6679	17.0275
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	40000	19.5274	16.887
1996-04-27	09:27:01	e82	R	600	3.29354	3.37356	50000	19.3773	16.7368
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	2000	21.8458	19.3968
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	4000	20.7868	18.3379
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	6000	20.1512	17.7023
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	8000	19.6654	17.2165
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	10000	19.281	16.8321
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	15000	18.4371	15.9881
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	20000	17.8352	15.3862
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	25000	17.3915	14.9426
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	30000	17.0142	14.5653
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	40000	16.4281	13.9792
1996-05-11	08:20:57	e059	R	300	3.20809	3.0888	50000	15.9427	13.4938
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	2000	21.8531	19.4041
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	4000	20.7479	18.2989
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	6000	20.1191	17.6701
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	8000	19.6482	17.1993
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	10000	19.2435	16.7946
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	15000	18.4254	15.9765
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	20000	17.868	15.419
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	25000	17.4113	14.9623
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	30000	17.0563	14.6074

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	40000	16.4446	13.9957
1996-05-11	08:36:39	e061	R	300	3.20809	3.0888	50000	15.9672	13.5183
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	2000	21.7022	19.2532
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	4000	20.6521	18.2031
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	6000	20.0441	17.5952
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	8000	19.5717	17.1228
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	10000	19.1595	16.7106
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	15000	18.4005	15.9516
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	20000	17.7997	15.3508
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	25000	17.3352	14.8863
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	30000	16.9586	14.5097
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	40000	16.3568	13.9078
1996-05-11	08:45:33	e062	R	300	3.20809	3.0888	50000	15.8555	13.4066
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	2000	21.7238	19.2748
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	4000	20.6267	18.1778
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	6000	19.9258	17.4768
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	8000	19.416	16.967
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	10000	19.0428	16.5938
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	15000	18.3328	15.8839
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	20000	17.7609	15.312
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	25000	17.3008	14.8518
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	30000	16.9008	14.4518
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	40000	16.3006	13.8517

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-11	08:52:20	e063	R	300	3.20809	3.0888	50000	15.8238	13.3748
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	2000	21.8975	19.4485
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	4000	20.7511	18.3021
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	6000	20.0519	17.6029
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	8000	19.5024	17.0534
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	10000	19.1122	16.6633
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	15000	18.4133	15.9643
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	20000	17.8262	15.3772
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	25000	17.3783	14.9294
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	30000	17.02	14.5711
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	40000	16.4162	13.9673
1996-05-11	08:59:08	e064	R	300	3.20809	3.0888	50000	15.9444	13.4954
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	2000	21.8642	19.4153
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	4000	20.6628	18.2138
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	6000	20.0208	17.5718
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	8000	19.5454	17.0964
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	10000	19.165	16.7161
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	15000	18.3396	15.8907
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	20000	17.7669	15.318
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	25000	17.3086	14.8596
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	30000	16.9315	14.4826
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	40000	16.3166	13.8676
1996-05-11	09:05:55	e065	R	300	3.20809	3.0888	50000	15.8304	13.3815

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	2000	21.8286	19.3797
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	4000	20.5812	18.1323
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	6000	19.9592	17.5102
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	8000	19.4838	17.0349
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	10000	19.0884	16.6394
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	15000	18.3068	15.8578
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	20000	17.7478	15.2989
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	25000	17.2732	14.8243
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	30000	16.8962	14.4473
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	40000	16.2999	13.851
1996-05-11	09:12:42	e066	R	300	3.20809	3.0888	50000	15.7869	13.3379
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	2000	21.727	19.2781
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	4000	20.6145	18.1655
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	6000	20.0648	17.6158
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	8000	19.596	17.1471
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	10000	19.1781	16.7292
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	15000	18.3599	15.9109
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	20000	17.7934	15.3445
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	25000	17.306	14.857
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	30000	16.9368	14.4879
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	40000	16.3267	13.8778
1996-05-11	09:19:29	e067	R	300	3.20809	3.0888	50000	15.8481	13.3992
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	2000	21.7771	19.3282

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	4000	20.6573	18.2083
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	6000	19.9957	17.5467
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	8000	19.4881	17.0391
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	10000	19.1043	16.6554
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	15000	18.2946	15.8456
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	20000	17.7149	15.266
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	25000	17.2315	14.7825
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	30000	16.8609	14.412
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	40000	16.2614	13.8124
1996-05-11	09:26:16	e068	R	300	3.20809	3.0888	50000	15.7834	13.3345
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	2000	21.9639	19.5149
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	4000	20.6708	18.2219
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	6000	20.0716	17.6226
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	8000	19.5486	17.0996
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	10000	19.1536	16.7047
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	15000	18.4335	15.9845
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	20000	17.8664	15.4175
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	25000	17.3992	14.9503
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	30000	17.0082	14.5592
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	40000	16.4064	13.9575
1996-05-11	09:33:04	e069	R	300	3.20809	3.0888	50000	15.9309	13.482
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	2000	21.6738	19.2248
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	4000	20.702	18.2531

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	6000	20.038	17.589
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	8000	19.5645	17.1155
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	10000	19.122	16.6731
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	15000	18.3658	15.9168
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	20000	17.7598	15.3109
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	25000	17.2859	14.8369
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	30000	16.9185	14.4695
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	40000	16.313	13.8641
1996-05-11	09:39:51	e070	R	300	3.20809	3.0888	50000	15.8427	13.3937
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	2000	21.7649	19.3159
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	4000	20.7404	18.2914
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	6000	20.0533	17.6044
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	8000	19.5307	17.0818
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	10000	19.0931	16.6441
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	15000	18.2926	15.8437
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	20000	17.7332	15.2843
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	25000	17.2727	14.8238
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	30000	16.8935	14.4445
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	40000	16.2727	13.8237
1996-05-11	09:46:38	e071	R	300	3.20809	3.0888	50000	15.7679	13.319
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	2000	21.8128	19.3638
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	4000	20.705	18.2561
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	6000	20.0547	17.6058

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	8000	19.5489	17.0999
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	10000	19.1215	16.6725
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	15000	18.339	15.8901
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	20000	17.7508	15.3019
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	25000	17.2918	14.8428
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	30000	16.9156	14.4666
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	40000	16.3156	13.8667
1996-05-11	09:58:17	e072	R	300	3.20809	3.0888	50000	15.8503	13.4014
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	2000	21.7616	19.3127
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	4000	20.6211	18.1722
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	6000	20.0194	17.5705
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	8000	19.5235	17.0745
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	10000	19.124	16.6751
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	15000	18.3693	15.9204
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	20000	17.8199	15.3709
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	25000	17.3589	14.91
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	30000	16.9847	14.5357
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	40000	16.3895	13.9406
1996-05-11	10:05:04	e073	R	300	3.20809	3.0888	50000	15.9251	13.4762
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	2000	21.5017	19.0527
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	4000	20.441	17.992
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	6000	19.8626	17.4136
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	8000	19.4545	17.0056

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	10000	19.0825	16.6335
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	15000	18.3011	15.8522
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	20000	17.7625	15.3136
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	25000	17.3092	14.8602
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	30000	16.932	14.483
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	40000	16.3327	13.8837
1996-05-11	10:12:32	e074	R	300	3.20809	3.0888	50000	15.8676	13.4187
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	2000	22.0412	19.6066
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	4000	21.1766	18.7421
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	6000	20.7502	18.3157
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	8000	20.4627	18.0282
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	10000	20.2459	17.8114
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	15000	19.5339	17.0994
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	20000	19.0696	16.6351
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	25000	18.7094	16.2749
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	30000	18.5174	16.0829
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	40000	18.0836	15.6491
1996-05-12	08:14:48	f109	R	300	3.20189	3.06832	50000	17.7768	15.3422
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	2000	22.0674	19.6329
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	4000	21.2111	18.7766
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	6000	20.7394	18.3049
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	8000	20.2818	17.8473
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	10000	19.9943	17.5598

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	15000	19.3552	16.9207
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	20000	18.8805	16.446
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	25000	18.5631	16.1286
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	30000	18.2883	15.8538
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	40000	17.7876	15.3531
1996-05-12	08:22:13	f110	R	300	3.20189	3.06832	50000	17.3908	14.9563
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	2000	21.8138	19.3793
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	4000	21.2209	18.7864
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	6000	20.8076	18.3731
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	8000	20.6321	18.1976
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	10000	20.4272	17.9927
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	15000	20.0118	17.5773
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	20000	19.6389	17.2043
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	25000	19.3849	16.9504
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	30000	19.1695	16.735
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	40000	18.9889	16.5544
1996-05-12	08:29:01	f111	R	300	3.20189	3.06832	50000	18.8962	16.4617
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	2000	22.197	19.7625
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	4000	21.5339	19.0994
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	6000	21.1562	18.7217
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	8000	20.9763	18.5418
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	10000	20.6154	18.1809
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	15000	19.9298	17.4953

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	20000	19.4922	17.0577
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	25000	19.1823	16.7478
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	30000	18.8941	16.4595
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	40000	18.6319	16.1974
1996-05-12	08:35:48	f112	R	300	3.20189	3.06832	50000	18.3333	15.8988
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	2000	22.0868	19.6523
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	4000	21.2305	18.7959
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	6000	20.8434	18.4089
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	8000	20.4682	18.0337
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	10000	20.225	17.7905
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	15000	19.6507	17.2162
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	20000	19.1875	16.753
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	25000	18.7996	16.3651
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	30000	18.4955	16.061
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	40000	18.0507	15.6162
1996-05-12	08:42:35	f113	R	300	3.20189	3.06832	50000	17.6528	15.2183
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	2000	22.0251	19.5906
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	4000	21.314	18.8795
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	6000	20.907	18.4725
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	8000	20.4482	18.0137
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	10000	20.1517	17.7172
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	15000	19.5452	17.1106
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	20000	19.2034	16.7689

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	25000	18.8605	16.426
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	30000	18.551	16.1165
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	40000	18.178	15.7435
1996-05-12	08:49:22	f114	R	300	3.20189	3.06832	50000	17.7423	15.3078
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	2000	22.0795	19.645
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	4000	21.3487	18.9142
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	6000	21.0631	18.6286
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	8000	20.9176	18.4831
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	10000	20.6934	18.2589
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	15000	20.3409	17.9064
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	20000	19.9126	17.4781
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	25000	19.5156	17.0811
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	30000	19.3954	16.9609
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	40000	19.1172	16.6827
1996-05-12	08:56:10	f115	R	300	3.20189	3.06832	50000	18.367	15.9325
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	2000	22.1428	19.7083
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	4000	21.2916	18.8571
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	6000	20.9665	18.532
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	8000	20.6629	18.2284
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	10000	20.3042	17.8697
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	15000	19.8637	17.4292
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	20000	19.488	17.0535
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	25000	18.9978	16.5633

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	30000	18.6288	16.1943
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	40000	18.098	15.6635
1996-05-12	09:02:56	f116	R	300	3.20189	3.06832	50000	16.8868	14.4523
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	2000	22.1587	19.7242
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	4000	21.5233	19.0888
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	6000	20.965	18.5305
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	8000	20.7601	18.3256
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	10000	20.4539	18.0194
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	15000	20.0413	17.6068
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	20000	19.7238	17.2893
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	25000	19.4448	17.0103
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	30000	19.2538	16.8193
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	40000	18.7697	16.3352
1996-05-12	09:09:43	f117	R	300	3.20189	3.06832	50000	16.9742	14.5397
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	2000	22.1145	19.68
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	4000	21.4718	19.0373
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	6000	21.0714	18.6369
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	8000	20.654	18.2195
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	10000	20.326	17.8915
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	15000	19.6849	17.2504
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	20000	19.2339	16.7994
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	25000	18.8687	16.4342
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	30000	18.555	16.1204

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	40000	18.0187	15.5842
1996-05-12	09:16:30	f118	R	300	3.20189	3.06832	50000	16.9853	14.5507
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	2000	22.0886	19.6541
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	4000	21.4728	19.0383
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	6000	20.9516	18.5171
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	8000	20.5767	18.1422
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	10000	20.2954	17.8609
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	15000	19.7937	17.3592
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	20000	19.3188	16.8843
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	25000	18.8846	16.45
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	30000	18.6372	16.2027
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	40000	18.1471	15.7126
1996-05-12	09:23:17	f119	R	300	3.20189	3.06832	50000	17.1216	14.6871
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	2000	22.16	19.7255
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	4000	21.5245	19.09
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	6000	21.0677	18.6332
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	8000	20.652	18.2175
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	10000	20.2827	17.8482
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	15000	19.529	17.0945
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	20000	19.0541	16.6196
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	25000	18.658	16.2235
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	30000	18.3799	15.9454
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	40000	17.8709	15.4364

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-12	09:33:18	f120	R	300	3.20189	3.06832	50000	17.3833	14.9488
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	2000	22.0545	19.62
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	4000	21.1844	18.7498
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	6000	20.6272	18.1927
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	8000	20.3044	17.8699
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	10000	20.0728	17.6383
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	15000	19.4498	17.0153
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	20000	19.038	16.6035
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	25000	18.6647	16.2302
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	30000	18.359	15.9245
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	40000	17.8211	15.3866
1996-05-12	09:40:10	f121	R	300	3.20189	3.06832	50000	17.4348	15.0003
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	2000	22.0457	19.6112
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	4000	21.0541	18.6196
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	6000	20.6361	18.2016
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	8000	20.2675	17.833
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	10000	19.9881	17.5536
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	15000	19.4092	16.9747
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	20000	19.0122	16.5777
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	25000	18.6304	16.1959
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	30000	18.3203	15.8858
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	40000	17.8633	15.4288
1996-05-12	09:47:04	f122	R	300	3.20189	3.06832	50000	17.5469	15.1124

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	2000	21.7519	19.3319
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	4000	20.8751	18.4551
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	6000	20.3839	17.964
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	8000	19.9445	17.5245
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	10000	19.622	17.202
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	15000	18.9243	16.5044
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	20000	18.4032	15.9833
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	25000	18.0051	15.5851
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	30000	17.6705	15.2506
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	40000	17.1512	14.7313
1996-05-13	08:54:08	f229	R	300	3.19568	3.04783	50000	16.7114	14.2914
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	2000	21.8763	19.4564
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	4000	20.8334	18.4135
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	6000	20.3472	17.9272
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	8000	19.9087	17.4888
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	10000	19.5991	17.1792
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	15000	18.8864	16.4664
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	20000	18.328	15.9081
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	25000	17.8523	15.4323
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	30000	17.4925	15.0725
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	40000	16.9337	14.5137
1996-05-13	09:02:04	f230	R	300	3.19568	3.04783	50000	16.5067	14.0868
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	2000	21.8141	19.3942

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	4000	21.0389	18.619
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	6000	20.519	18.099
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	8000	20.0948	17.6749
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	10000	19.6826	17.2626
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	15000	18.9872	16.5673
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	20000	18.4561	16.0361
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	25000	17.9817	15.5618
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	30000	17.6336	15.2137
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	40000	17.0804	14.6605
1996-05-13	09:08:51	f231	R	300	3.19568	3.04783	50000	16.635	14.2151
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	2000	21.8554	19.4355
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	4000	20.9366	18.5167
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	6000	20.3855	17.9656
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	8000	19.9769	17.5569
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	10000	19.6769	17.2569
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	15000	19.0195	16.5996
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	20000	18.4411	16.0211
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	25000	18.017	15.5971
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	30000	17.6345	15.2146
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	40000	17.0777	14.6577
1996-05-13	09:25:12	f232	R	300	3.19568	3.04783	50000	16.6195	14.1995
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	2000	21.9864	19.5665
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	4000	21.0398	18.6199

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	6000	20.4619	18.0419
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	8000	20.0052	17.5853
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	10000	19.6152	17.1952
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	15000	18.8978	16.4778
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	20000	18.3567	15.9368
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	25000	17.9164	15.4965
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	30000	17.5704	15.1505
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	40000	16.9714	14.5514
1996-05-13	09:31:59	f233	R	300	3.19568	3.04783	50000	16.4321	14.0121
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	2000	21.8869	19.4669
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	4000	20.8895	18.4695
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	6000	20.3729	17.9529
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	8000	19.9597	17.5397
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	10000	19.6399	17.2199
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	15000	18.9922	16.5722
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	20000	18.4881	16.0682
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	25000	18.0681	15.6481
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	30000	17.7098	15.2899
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	40000	17.1495	14.7295
1996-05-13	09:38:47	f234	R	300	3.19568	3.04783	50000	15.5262	13.1063
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	2000	21.9753	19.5554
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	4000	20.952	18.532
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	6000	20.4341	18.0141

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	8000	19.9929	17.573
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	10000	19.6129	17.1929
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	15000	18.9486	16.5286
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	20000	18.459	16.0391
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	25000	18.0384	15.6184
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	30000	17.6882	15.2682
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	40000	17.0535	14.6336
1996-05-13	09:45:34	f235	R	300	3.19568	3.04783	50000	15.4766	13.0566
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	2000	22.0143	19.5944
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	4000	21.1506	18.7306
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	6000	20.5486	18.1286
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	8000	20.0882	17.6682
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	10000	19.7004	17.2805
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	15000	18.9769	16.5569
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	20000	18.4344	16.0145
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	25000	18.0004	15.5804
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	30000	17.6425	15.2225
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	40000	17.0484	14.6284
1996-05-13	09:52:21	f236	R	300	3.19568	3.04783	50000	16.5507	14.1308
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	2000	22.0702	19.6503
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	4000	21.0829	18.663
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	6000	20.5554	18.1354
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	8000	20.1287	17.7087

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	10000	19.7445	17.3246
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	15000	19.0849	16.665
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	20000	18.527	16.1071
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	25000	18.0839	15.664
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	30000	17.7337	15.3138
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	40000	17.1488	14.7288
1996-05-13	09:59:08	f237	R	300	3.19568	3.04783	50000	16.6152	14.1953
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	2000	21.984	19.564
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	4000	21.0945	18.6745
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	6000	20.5563	18.1364
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	8000	20.109	17.689
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	10000	19.7407	17.3208
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	15000	19.0889	16.6689
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	20000	18.5817	16.1617
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	25000	18.1379	15.718
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	30000	17.8068	15.3868
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	40000	17.2566	14.8367
1996-05-13	10:05:55	f238	R	300	3.19568	3.04783	50000	16.6823	14.2623
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	2000	22.0016	19.5817
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	4000	21.1019	18.6819
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	6000	20.4768	18.0568
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	8000	20.0515	17.6316
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	10000	19.6926	17.2727

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	15000	19.0157	16.5957
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	20000	18.4839	16.0639
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	25000	18.0612	15.6413
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	30000	17.7083	15.2884
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	40000	17.125	14.705
1996-05-13	10:12:42	f239	R	300	3.19568	3.04783	50000	16.4895	14.0695
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	2000	21.885	19.465
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	4000	21.0933	18.6734
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	6000	20.5113	18.0914
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	8000	20.0089	17.589
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	10000	19.6825	17.2625
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	15000	18.9262	16.5062
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	20000	18.3444	15.9244
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	25000	17.9009	15.481
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	30000	17.5367	15.1167
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	40000	16.9643	14.5443
1996-05-13	10:20:25	f240	R	300	3.19568	3.04783	50000	16.4966	14.0766
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	2000	21.6901	19.2701
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	4000	20.746	18.3261
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	6000	19.9888	17.5689
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	8000	19.4444	17.0245
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	10000	19.0654	16.6454
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	15000	18.2634	15.8435

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	20000	17.6801	15.2602
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	25000	17.2608	14.8409
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	30000	16.8735	14.4536
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	40000	16.2489	13.8289
1996-05-13	10:27:12	f241	R	300	3.19568	3.04783	50000	15.7558	13.3359
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	2000	22.1438	20.3043
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	4000	21.3082	19.4687
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	6000	20.9865	19.1471
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	8000	20.8533	19.0138
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	10000	20.6124	18.773
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	15000	20.1614	18.322
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	20000	19.805	17.9656
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	25000	19.5779	17.7385
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	30000	19.3138	17.4744
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	40000	18.981	17.1415
1996-06-18	07:58:37	g036	R	1200	2.96323	2.33287	50000	18.5376	16.6981
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	2000	21.8967	20.0573
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	4000	21.0111	19.1716
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	6000	20.6255	18.786
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	8000	20.2993	18.4598
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	10000	20.0121	18.1727
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	15000	19.4494	17.6099
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	20000	19.0161	17.1766

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	25000	18.6741	16.8347
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	30000	18.3475	16.5081
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	40000	17.851	16.0115
1996-06-18	08:27:38	g037	R	1800	2.96323	2.33287	50000	17.4391	15.5996
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	2000	21.9277	20.0883
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	4000	21.0063	19.1668
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	6000	20.5672	18.7278
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	8000	20.2431	18.4036
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	10000	19.9806	18.1412
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	15000	19.4982	17.6588
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	20000	19.0503	17.2108
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	25000	18.7141	16.8746
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	30000	18.4244	16.5849
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	40000	17.9282	16.0888
1996-06-18	09:10:07	g038	R	1800	2.96323	2.33287	50000	17.5388	15.6994
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	2000	22.7262	20.9041
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	4000	21.5322	19.7101
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	6000	20.8078	18.9857
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	8000	20.5017	18.6795
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	10000	20.2575	18.4353
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	15000	19.6333	17.8111
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	20000	19.1021	17.28
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	25000	18.6699	16.8478

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	30000	18.3015	16.4793
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	40000	17.7497	15.9275
1996-06-19	05:22:36	g131	R	600	2.95652	2.31437	50000	17.2571	15.4349
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	2000	22.4944	20.6723
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	4000	21.0608	19.2386
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	6000	20.4569	18.6347
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	8000	20.1113	18.2892
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	10000	19.7885	17.9663
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	15000	19.2139	17.3918
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	20000	18.7179	16.8957
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	25000	18.2874	16.4652
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	30000	17.914	16.0919
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	40000	17.302	15.4798
1996-06-19	05:58:31	g134	R	600	2.95652	2.31437	50000	16.8029	14.9807
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	2000	22.3688	20.5466
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	4000	21.0651	19.2429
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	6000	20.4103	18.5881
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	8000	19.98	18.1578
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	10000	19.6715	17.8494
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	15000	19.0165	17.1943
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	20000	18.4608	16.6386
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	25000	18.0486	16.2264
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	30000	17.7431	15.9209

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	40000	17.2497	15.4276
1996-06-19	06:55:13	g137	R	600	2.95652	2.31437	50000	16.8637	15.0415
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	2000	20.2611	18.7843
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	4000	19.5537	18.0768
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	6000	19.258	17.7811
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	8000	19.077	17.6001
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	10000	19.0316	17.5547
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	15000	18.9082	17.4313
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	20000	18.8615	17.3847
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	25000	18.8615	17.3846
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	30000	18.8615	17.3846
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	40000	18.8614	17.3846
1996-07-09	07:32:52	h049	R	120	2.81952	1.97412	50000	18.8614	17.3845
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	2000	20.214	18.7371
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	4000	19.486	18.0091
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	6000	19.1728	17.6959
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	8000	18.9548	17.478
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	10000	18.7862	17.3094
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	15000	18.4299	16.953
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	20000	18.2351	16.7583
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	25000	18.0821	16.6052
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	30000	17.8929	16.416
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	40000	17.5904	16.1135

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-09	07:44:49	h050	R	300	2.81952	1.97412	50000	17.3449	15.868
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	2000	20.2631	18.7862
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	4000	19.5635	18.0867
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	6000	19.2304	17.7536
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	8000	19.0176	17.5408
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	10000	18.8463	17.3694
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	15000	18.5551	17.0782
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	20000	18.3937	16.9169
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	25000	18.3302	16.8533
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	30000	18.2874	16.8105
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	40000	18.1391	16.6623
1996-07-09	07:58:14	h051	R	300	2.81952	1.97412	50000	17.9282	16.4513
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	2000	20.3663	18.8894
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	4000	19.6011	18.1242
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	6000	19.3099	17.8331
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	8000	19.0975	17.6206
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	10000	18.8909	17.414
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	15000	18.8441	17.3672
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	20000	18.7139	17.237
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	25000	18.6475	17.1706
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	30000	18.6174	17.1405
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	40000	18.6174	17.1405
1996-07-09	08:21:38	h053	R	60	2.81952	1.97412	50000	18.6173	17.1405

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	2000	20.5387	19.0618
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	4000	19.6697	18.1929
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	6000	19.3586	17.8818
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	8000	19.1861	17.7092
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	10000	19.113	17.6361
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	15000	19.113	17.6361
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	20000	19.018	17.5411
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	25000	19.0179	17.5411
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	30000	19.0179	17.541
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	40000	18.9497	17.4729
1996-07-09	08:29:26	h054	R	120	2.81952	1.97412	50000	18.9497	17.4728
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	2000	20.7184	19.2415
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	4000	19.9322	18.4553
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	6000	19.6028	18.1259
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	8000	19.4358	17.9589
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	10000	19.28	17.8031
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	15000	18.9754	17.4986
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	20000	18.749	17.2721
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	25000	18.6013	17.1245
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	30000	18.4363	16.9594
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	40000	18.107	16.6302
1996-07-09	09:06:33	h058	V	600	2.81952	1.97412	50000	17.829	16.3521
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	2000	21.3944	19.9176

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	4000	20.6194	19.1426
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	6000	20.2704	18.7935
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	8000	19.9473	18.4704
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	10000	19.7094	18.2326
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	15000	19.2305	17.7536
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	20000	18.8068	17.33
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	25000	18.4606	16.9837
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	30000	18.1467	16.6698
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	40000	17.6579	16.181
1996-07-09	09:19:35	h059	B	900	2.81952	1.97412	50000	17.189	15.7121
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	2000	20.7361	19.2593
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	4000	19.9095	18.4326
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	6000	19.5911	18.1142
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	8000	19.3714	17.8945
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	10000	19.2071	17.7303
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	15000	18.8135	17.3366
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	20000	18.52	17.0431
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	25000	18.3051	16.8283
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	30000	18.1287	16.6519
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	40000	17.7183	16.2415
1996-07-09	09:40:31	h060	V	900	2.81952	1.97412	50000	17.3909	15.914
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	2000	20.0168	18.5568
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	4000	19.4018	17.9418

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	6000	19.0378	17.5778
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	8000	18.7854	17.3254
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	10000	18.5846	17.1245
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	15000	18.2108	16.7507
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	20000	17.8819	16.4219
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	25000	17.5672	16.1072
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	30000	17.3019	15.8419
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	40000	16.8642	15.4042
1996-07-10	06:11:11	h178	R	300	2.81253	1.95886	50000	16.4022	14.9422
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	2000	20.0074	18.5474
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	4000	19.4178	17.9578
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	6000	19.0348	17.5748
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	8000	18.7787	17.3187
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	10000	18.6107	17.1507
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	15000	18.2372	16.7772
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	20000	17.882	16.422
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	25000	17.5932	16.1332
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	30000	17.3447	15.8847
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	40000	16.8967	15.4367
1996-07-10	06:26:06	h179	R	360	2.81253	1.95886	50000	16.4273	14.9672
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	2000	20.5003	19.0402
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	4000	19.8638	18.4038
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	6000	19.5564	18.0964

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	8000	19.3587	17.8987
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	10000	19.1623	17.7022
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	15000	18.8107	17.3507
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	20000	18.5721	17.1121
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	25000	18.3479	16.8879
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	30000	18.1685	16.7085
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	40000	17.7772	16.3172
1996-07-10	06:36:40	h180	V	600	2.81253	1.95886	50000	17.3898	15.9298
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	2000	21.3117	19.8517
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	4000	20.5612	19.1011
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	6000	20.152	18.692
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	8000	19.8253	18.3653
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	10000	19.5348	18.0748
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	15000	18.9603	17.5003
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	20000	18.5001	17.0401
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	25000	18.1353	16.6753
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	30000	17.8216	16.3616
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	40000	17.2513	15.7912
1996-07-10	06:53:53	h181	B	900	2.81253	1.95886	50000	16.8032	15.3431
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	2000	20.0727	18.6127
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	4000	19.2903	17.8302
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	6000	18.9633	17.5033
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	8000	18.7459	17.2859

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	10000	18.5471	17.087
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	15000	18.1355	16.6755
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	20000	17.7741	16.3141
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	25000	17.4466	15.9865
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	30000	17.1785	15.7185
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	40000	16.6874	15.2273
1996-07-10	07:13:22	h182	R	300	2.81253	1.95886	50000	16.2726	14.8126
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	2000	20.0457	18.5857
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	4000	19.5111	18.0511
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	6000	19.1778	17.7178
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	8000	18.9602	17.5002
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	10000	18.7651	17.3051
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	15000	18.368	16.908
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	20000	18.0416	16.5816
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	25000	17.7403	16.2803
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	30000	17.4875	16.0275
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	40000	17.0156	15.5556
1996-07-10	07:30:58	h185	R	300	2.81253	1.95886	50000	16.2443	14.7843
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	2000	20.5533	19.0933
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	4000	19.9623	18.5022
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	6000	19.6626	18.2026
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	8000	19.4404	17.9804
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	10000	19.2464	17.7863

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	15000	18.8625	17.4025
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	20000	18.5738	17.1137
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	25000	18.2966	16.8366
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	30000	18.0501	16.5901
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	40000	17.5656	16.1056
1996-07-10	07:38:33	h186	V	600	2.81253	1.95886	50000	16.7362	15.2762
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	2000	21.2589	19.7989
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	4000	20.5348	19.0748
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	6000	20.073	18.613
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	8000	19.8061	18.3461
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	10000	19.5492	18.0892
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	15000	19.0565	17.5965
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	20000	18.6594	17.1994
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	25000	18.3113	16.8513
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	30000	17.9741	16.514
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	40000	17.4156	15.9556
1996-07-10	07:51:37	h187	B	1200	2.81253	1.95886	50000	16.9699	15.5099
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	2000	20.075	18.6318
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	4000	19.5132	18.0699
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	6000	19.1832	17.7399
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	8000	18.8961	17.4528
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	10000	18.6547	17.2115
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	15000	18.2153	16.7721

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	20000	17.8216	16.3784
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	25000	17.4294	15.9861
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	30000	17.1215	15.6782
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	40000	16.5851	15.1418
1996-07-11	06:00:37	h306	R	60	2.80552	1.9438	50000	16.1457	14.7024
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	2000	19.9895	18.5462
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	4000	19.425	17.9817
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	6000	19.1255	17.6822
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	8000	18.8535	17.4102
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	10000	18.6404	17.1971
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	15000	18.1947	16.7515
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	20000	17.7946	16.3514
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	25000	17.4044	15.9612
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	30000	17.075	15.6318
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	40000	16.5203	15.077
1996-07-11	06:11:24	h307	R	120	2.80552	1.9438	50000	16.0189	14.5757
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	2000	20.0606	18.6173
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	4000	19.3803	17.937
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	6000	19.018	17.5747
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	8000	18.7294	17.2862
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	10000	18.4977	17.0544
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	15000	17.9985	16.5552
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	20000	17.5657	16.1224

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	25000	17.1732	15.7299
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	30000	16.8409	15.3976
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	40000	16.2904	14.8472
1996-07-11	06:23:19	h309	R	240	2.80552	1.9438	50000	15.7589	14.3156
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	2000	20.0554	18.6121
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	4000	19.4018	17.9585
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	6000	19.0656	17.6224
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	8000	18.7986	17.3553
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	10000	18.5466	17.1033
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	15000	18.047	16.6038
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	20000	17.6289	16.1856
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	25000	17.2567	15.8134
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	30000	16.9205	15.4772
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	40000	16.3976	14.9544
1996-07-11	06:32:20	h310	R	300	2.80552	1.9438	50000	15.8715	14.4282
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	2000	20.5172	19.074
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	4000	19.8462	18.4029
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	6000	19.465	18.0218
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	8000	19.1922	17.7489
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	10000	18.9327	17.4894
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	15000	18.4191	16.9758
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	20000	17.9866	16.5433
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	25000	17.6126	16.1693

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	30000	17.27	15.8268
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	40000	16.7065	15.2632
1996-07-11	06:39:57	h311	V	600	2.80552	1.9438	50000	16.2267	14.7834
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	2000	21.2746	19.8313
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	4000	20.5252	19.082
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	6000	20.0167	18.5734
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	8000	19.6159	18.1726
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	10000	19.2951	17.8519
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	15000	18.6475	17.2043
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	20000	18.1289	16.6856
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	25000	17.7039	16.2607
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	30000	17.3414	15.8981
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	40000	16.7632	15.3199
1996-07-11	06:53:41	h312	B	1200	2.80552	1.9438	50000	16.2964	14.8531
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	2000	20.0852	18.6419
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	4000	19.4044	17.9612
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	6000	19.0458	17.6025
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	8000	18.8054	17.3621
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	10000	18.576	17.1328
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	15000	18.1252	16.6819
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	20000	17.8884	16.4451
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	25000	17.5699	16.1267
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	30000	17.3157	15.8725

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	40000	16.8023	15.3591
1996-07-11	09:03:54	h323	R	60	2.80552	1.9438	50000	16.3495	14.9062
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	2000	20.165	18.7217
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	4000	19.4107	17.9674
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	6000	19.0663	17.6231
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	8000	18.7689	17.3256
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	10000	18.6127	17.1695
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	15000	18.2415	16.7983
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	20000	17.9574	16.5141
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	25000	17.7804	16.3371
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	30000	17.5554	16.1122
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	40000	17.0095	15.5662
1996-07-11	09:11:21	h324	R	60	2.80552	1.9438	50000	16.5054	15.0622
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	2000	20.091	18.6478
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	4000	19.4866	18.0433
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	6000	19.1451	17.7018
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	8000	18.8897	17.4464
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	10000	18.7005	17.2573
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	15000	18.3201	16.8768
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	20000	18.0446	16.6013
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	25000	17.7872	16.3439
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	30000	17.4906	16.0473
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	40000	16.9518	15.5086

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-11	09:15:20	h325	R	240	2.80552	1.9438	50000	16.45	15.0067
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	2000	20.323	18.8797
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	4000	19.7725	18.3293
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	6000	19.5128	18.0695
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	8000	19.3044	17.8611
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	10000	19.1777	17.7345
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	15000	18.9342	17.491
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	20000	18.7847	17.3415
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	25000	18.6951	17.2519
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	30000	18.5945	17.1513
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	40000	18.2731	16.8299
1996-07-11	09:23:10	h326	V	480	2.80552	1.9438	50000	17.8097	16.3664
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	2000	21.1308	19.6875
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	4000	20.5195	19.0762
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	6000	20.2157	18.7725
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	8000	19.9806	18.5374
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	10000	19.8098	18.3665
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	15000	19.4741	18.0309
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	20000	19.1624	17.7191
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	25000	18.9573	17.5141
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	30000	18.6808	17.2376
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	40000	18.2415	16.7983
1996-07-11	09:34:24	h327	B	900	2.80552	1.9438	50000	17.8186	16.3754

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	2000	20.0358	18.6092
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	4000	19.5001	18.0735
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	6000	19.1731	17.7465
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	8000	18.9628	17.5362
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	10000	18.7224	17.2958
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	15000	18.2537	16.8271
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	20000	17.8749	16.4483
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	25000	17.5143	16.0877
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	30000	17.248	15.8214
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	40000	16.7818	15.3552
1996-07-12	10:01:01	h465	R	120	2.79849	1.92894	50000	16.3858	14.9592
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	2000	20.5765	19.1499
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	4000	19.9432	18.5166
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	6000	19.6166	18.19
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	8000	19.4039	17.9773
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	10000	19.149	17.7224
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	15000	18.7922	17.3656
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	20000	18.4465	17.0199
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	25000	18.1376	16.711
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	30000	17.8589	16.4323
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	40000	17.3848	15.9582
1996-07-12	10:06:10	h466	V	240	2.79849	1.92894	50000	17.0035	15.5769
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	2000	21.1993	19.7727

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	4000	20.5088	19.0822
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	6000	20.0664	18.6398
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	8000	19.7209	18.2943
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	10000	19.4219	17.9953
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	15000	18.8044	17.3778
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	20000	18.3127	16.8861
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	25000	17.9064	16.4798
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	30000	17.5551	16.1285
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	40000	16.9869	15.5603
1996-07-12	10:12:40	h467	B	360	2.79849	1.92894	50000	16.5637	15.1371
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	2000	20.0723	18.6457
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	4000	19.438	18.0114
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	6000	19.1654	17.7388
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	8000	18.8946	17.468
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	10000	18.6522	17.2256
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	15000	18.2705	16.8439
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	20000	17.9431	16.5166
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	25000	17.6437	16.2171
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	30000	17.3763	15.9498
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	40000	16.8965	15.47
1996-07-12	10:21:16	h468	R	120	2.79849	1.92894	50000	16.4662	15.0397
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	2000	20.5746	19.148
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	4000	19.9932	18.5666

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	6000	19.6463	18.2197
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	8000	19.4527	18.0261
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	10000	19.2419	17.8153
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	15000	18.814	17.3874
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	20000	18.405	16.9784
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	25000	18.1237	16.6971
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	30000	17.842	16.4154
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	40000	17.4076	15.981
1996-07-12	10:25:37	h469	V	240	2.79849	1.92894	50000	17.0189	15.5923
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	2000	22.704	21.2774
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	4000	21.0868	19.6602
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	6000	20.0769	18.6503
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	8000	19.8089	18.3823
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	10000	19.624	18.1974
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	15000	19.2623	17.8357
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	20000	18.6826	17.2561
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	25000	18.2116	16.785
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	30000	17.837	16.4104
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	40000	17.3765	15.95
1996-07-12	10:32:35	h470	B	360	2.79849	1.92894	50000	17.0186	15.592
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	2000	19.5252	18.5765
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	4000	18.9113	17.9627
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	6000	18.5925	17.6439

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	8000	18.3637	17.4151
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	10000	18.1866	17.2379
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	15000	17.8711	16.9224
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	20000	17.6613	16.7127
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	25000	17.4944	16.5458
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	30000	17.3417	16.393
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	40000	17.14	16.1913
1996-08-18	06:02:43	i093	R	600	2.52875	1.54785	50000	17.0095	16.0608
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	2000	19.9781	19.0295
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	4000	19.3112	18.3626
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	6000	19.0029	18.0543
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	8000	18.7828	17.8342
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	10000	18.5881	17.6395
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	15000	18.2323	17.2836
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	20000	17.9529	17.0042
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	25000	17.7216	16.7729
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	30000	17.4999	16.5513
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	40000	17.168	16.2193
1996-08-18	06:16:03	i094	V	600	2.52875	1.54785	50000	16.8105	15.8618
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	2000	19.5174	18.5688
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	4000	18.8355	17.8868
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	6000	18.4775	17.5289
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	8000	18.2201	17.2714

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	10000	18.0097	17.0611
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	15000	17.6317	16.6831
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	20000	17.312	16.3634
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	25000	17.0211	16.0725
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	30000	16.7753	15.8267
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	40000	16.3774	15.4288
1996-08-18	07:18:46	i105	R	600	2.52875	1.54785	50000	16.0075	15.0589
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	2000	19.5677	18.619
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	4000	18.8218	17.8731
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	6000	18.4698	17.5212
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	8000	18.2178	17.2691
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	10000	18.0218	17.0731
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	15000	17.6039	16.6552
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	20000	17.2222	16.2735
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	25000	16.8999	15.9513
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	30000	16.6452	15.6966
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	40000	16.2187	15.27
1996-08-18	07:51:31	i107	R	600	2.52875	1.54785	50000	15.847	14.8983
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	2000	19.511	18.5697
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	4000	18.84	17.8988
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	6000	18.4915	17.5502
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	8000	18.2484	17.3071
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	10000	18.0404	17.0992

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	15000	17.6455	16.7042
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	20000	17.3064	16.3651
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	25000	17.0236	16.0823
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	30000	16.7605	15.8192
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	40000	16.2846	15.3433
1996-08-19	03:54:53	j081	R	600	2.5212	1.54261	50000	15.9139	14.9726
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	2000	19.556	18.6147
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	4000	18.8806	17.9394
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	6000	18.5369	17.5956
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	8000	18.2829	17.3416
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	10000	18.0767	17.1354
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	15000	17.6913	16.75
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	20000	17.3885	16.4472
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	25000	17.1185	16.1772
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	30000	16.8545	15.9132
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	40000	16.4338	15.4925
1996-08-19	04:06:50	j082	R	600	2.5212	1.54261	50000	16.0888	15.1475
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	2000	20.0155	19.0742
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	4000	19.2971	18.3558
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	6000	18.9553	18.014
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	8000	18.7146	17.7733
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	10000	18.5156	17.5743
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	15000	18.0989	17.1576

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	20000	17.7494	16.8081
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	25000	17.457	16.5157
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	30000	17.1962	16.2549
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	40000	16.7604	15.8191
1996-08-19	04:19:04	j083	V	600	2.5212	1.54261	50000	16.3746	15.4333
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	2000	19.9918	19.0505
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	4000	19.2645	18.3233
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	6000	18.917	17.9757
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	8000	18.6686	17.7273
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	10000	18.4709	17.5296
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	15000	18.0449	17.1036
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	20000	17.7213	16.78
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	25000	17.4373	16.496
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	30000	17.1799	16.2386
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	40000	16.7333	15.792
1996-08-19	04:30:59	j084	V	600	2.5212	1.54261	50000	16.3689	15.4277
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	2000	19.6115	18.6703
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	4000	18.8434	17.9022
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	6000	18.5101	17.5688
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	8000	18.2988	17.3575
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	10000	18.1052	17.1639
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	15000	17.7265	16.7853
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	20000	17.4059	16.4646

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	25000	17.1312	16.1899
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	30000	16.8826	15.9413
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	40000	16.4347	15.4934
1996-08-19	04:46:33	j086	R	600	2.5212	1.54261	50000	16.0244	15.0831
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	2000	19.5837	18.6424
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	4000	18.8466	17.9053
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	6000	18.4907	17.5495
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	8000	18.2457	17.3045
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	10000	18.0537	17.1124
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	15000	17.6526	16.7113
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	20000	17.339	16.3977
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	25000	17.0862	16.1449
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	30000	16.849	15.9078
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	40000	16.442	15.5007
1996-08-19	04:58:33	j087	R	600	2.5212	1.54261	50000	16.0539	15.1126
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	2000	19.6175	18.6763
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	4000	18.8483	17.907
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	6000	18.4666	17.5254
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	8000	18.1979	17.2566
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	10000	17.9837	17.0424
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	15000	17.5688	16.6276
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	20000	17.2316	16.2904
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	25000	16.9418	16.0006

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	30000	16.7143	15.773
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	40000	16.3463	15.405
1996-08-19	05:41:51	j090	R	600	2.5212	1.54261	50000	15.9827	15.0414
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	2000	19.7484	18.8072
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	4000	18.8237	17.8824
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	6000	18.4037	17.4624
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	8000	18.1014	17.1601
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	10000	17.8644	16.9231
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	15000	17.4064	16.4651
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	20000	17.0239	16.0826
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	25000	16.676	15.7347
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	30000	16.3702	15.4289
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	40000	15.8605	14.9192
1996-08-19	07:41:00	j109	R	600	2.5212	1.54261	50000	15.4476	14.5064
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	2000	19.8372	18.8959
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	4000	18.8396	17.8983
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	6000	18.4196	17.4783
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	8000	18.1288	17.1875
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	10000	17.8963	16.955
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	15000	17.4553	16.514
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	20000	17.092	16.1507
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	25000	16.7565	15.8152
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	30000	16.4548	15.5135

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	40000	15.9769	15.0356
1996-08-19	07:53:35	j110	R	600	2.5212	1.54261	50000	15.5657	14.6244
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	2000	19.8162	18.8749
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	4000	18.8199	17.8786
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	6000	18.3536	17.4123
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	8000	18.0463	17.1051
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	10000	17.8113	16.87
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	15000	17.3184	16.3771
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	20000	16.9085	15.9672
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	25000	16.5657	15.6244
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	30000	16.2493	15.308
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	40000	15.7466	14.8053
1996-08-19	08:11:21	j111	R	600	2.5212	1.54261	50000	15.3298	14.3885
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	2000	19.5342	18.6
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	2000	19.5342	18.6
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	2000	19.5342	18.6
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	2000	19.5342	18.6
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	4000	18.7385	17.8042
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	4000	18.7385	17.8042
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	4000	18.7385	17.8042
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	4000	18.7385	17.8042
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	6000	18.3902	17.456
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	6000	18.3902	17.456

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	6000	18.3902	17.456
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	6000	18.3902	17.456
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	8000	18.1414	17.2071
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	8000	18.1414	17.2071
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	8000	18.1414	17.2071
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	8000	18.1414	17.2071
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	10000	17.9144	16.9801
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	10000	17.9144	16.9801
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	10000	17.9144	16.9801
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	10000	17.9144	16.9801
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	15000	17.407	16.4727
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	15000	17.407	16.4727
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	15000	17.407	16.4727
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	15000	17.407	16.4727
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	20000	16.9899	16.0556
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	20000	16.9899	16.0556
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	20000	16.9899	16.0556
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	20000	16.9899	16.0556
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	25000	16.7297	15.7954
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	25000	16.7297	15.7954
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	25000	16.7297	15.7954
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	25000	16.7297	15.7954
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	30000	16.5042	15.5699

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	30000	16.5042	15.5699
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	30000	16.5042	15.5699
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	30000	16.5042	15.5699
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	40000	16.1341	15.1998
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	40000	16.1341	15.1998
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	40000	16.1341	15.1998
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	40000	16.1341	15.1998
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	50000	15.8399	14.9056
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	50000	15.8399	14.9056
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	50000	15.8399	14.9056
1996-08-20	02:14:03	k068	R	600	2.51363	1.53764	50000	15.8399	14.9056
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	2000	20.0506	19.1163
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	4000	19.2979	18.3636
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	6000	18.935	18.0007
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	8000	18.6593	17.7251
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	10000	18.4378	17.5035
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	15000	18.0255	17.0912
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	20000	17.6904	16.7561
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	25000	17.4021	16.4679
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	30000	17.1337	16.1994
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	40000	16.6721	15.7378
1996-08-20	02:30:23	k069	V	600	2.51363	1.53764	50000	16.2912	15.3569
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	2000	19.5457	18.6114

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	2000	19.5457	18.6114
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	2000	19.5457	18.6114
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	2000	19.5457	18.6114
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	4000	18.8874	17.9531
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	4000	18.8874	17.9531
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	4000	18.8874	17.9531
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	4000	18.8874	17.9531
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	6000	18.5762	17.642
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	6000	18.5762	17.642
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	6000	18.5762	17.642
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	6000	18.5762	17.642
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	8000	18.3492	17.4149
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	8000	18.3492	17.4149
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	8000	18.3492	17.4149
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	8000	18.3492	17.4149
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	10000	18.1745	17.2402
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	10000	18.1745	17.2402
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	10000	18.1745	17.2402
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	10000	18.1745	17.2402
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	15000	17.8455	16.9113
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	15000	17.8455	16.9113
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	15000	17.8455	16.9113
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	15000	17.8455	16.9113

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	20000	17.5911	16.6569
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	20000	17.5911	16.6569
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	20000	17.5911	16.6569
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	20000	17.5911	16.6569
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	25000	17.3511	16.4168
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	25000	17.3511	16.4168
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	25000	17.3511	16.4168
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	25000	17.3511	16.4168
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	30000	17.1351	16.2009
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	30000	17.1351	16.2009
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	30000	17.1351	16.2009
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	30000	17.1351	16.2009
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	40000	16.7648	15.8305
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	40000	16.7648	15.8305
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	40000	16.7648	15.8305
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	40000	16.7648	15.8305
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	50000	16.4115	15.4772
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	50000	16.4115	15.4772
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	50000	16.4115	15.4772
1996-08-20	02:42:31	k070	R	600	2.51363	1.53764	50000	16.4115	15.4772
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	2000	19.4933	18.559
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	2000	19.4933	18.559
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	2000	19.4933	18.559

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	2000	19.4933	18.559
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	4000	18.8591	17.9249
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	4000	18.8591	17.9249
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	4000	18.8591	17.9249
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	4000	18.8591	17.9249
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	6000	18.5279	17.5936
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	6000	18.5279	17.5936
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	6000	18.5279	17.5936
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	6000	18.5279	17.5936
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	8000	18.2994	17.3651
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	8000	18.2994	17.3651
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	8000	18.2994	17.3651
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	8000	18.2994	17.3651
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	10000	18.1122	17.1779
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	10000	18.1122	17.1779
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	10000	18.1122	17.1779
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	10000	18.1122	17.1779
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	15000	17.75	16.8157
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	15000	17.75	16.8157
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	15000	17.75	16.8157
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	15000	17.75	16.8157
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	20000	17.4406	16.5063
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	20000	17.4406	16.5063

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	20000	17.4406	16.5063
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	20000	17.4406	16.5063
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	25000	17.1645	16.2303
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	25000	17.1645	16.2303
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	25000	17.1645	16.2303
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	25000	17.1645	16.2303
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	30000	16.9563	16.022
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	30000	16.9563	16.022
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	30000	16.9563	16.022
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	30000	16.9563	16.022
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	40000	16.582	15.6477
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	40000	16.582	15.6477
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	40000	16.582	15.6477
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	40000	16.582	15.6477
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	50000	16.2474	15.3132
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	50000	16.2474	15.3132
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	50000	16.2474	15.3132
1996-08-20	03:44:57	k074	R	600	2.51363	1.53764	50000	16.2474	15.3132
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	2000	20.6257	19.6914
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	4000	19.9396	19.0053
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	6000	19.5469	18.6127
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	8000	19.2465	18.3122
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	10000	18.9828	18.0486

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	15000	18.4917	17.5574
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	20000	18.0731	17.1389
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	25000	17.7151	16.7808
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	30000	17.4141	16.4798
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	40000	16.9143	15.9801
1996-08-20	03:57:06	k075	B	600	2.51363	1.53764	50000	16.4833	15.549
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	2000	19.4833	18.549
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	2000	19.4833	18.549
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	2000	19.4833	18.549
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	2000	19.4833	18.549
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	4000	18.8547	17.9204
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	4000	18.8547	17.9204
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	4000	18.8547	17.9204
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	4000	18.8547	17.9204
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	6000	18.5257	17.5915
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	6000	18.5257	17.5915
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	6000	18.5257	17.5915
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	6000	18.5257	17.5915
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	8000	18.2894	17.3552
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	8000	18.2894	17.3552
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	8000	18.2894	17.3552
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	8000	18.2894	17.3552
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	10000	18.089	17.1548

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	10000	18.089	17.1548
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	10000	18.089	17.1548
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	10000	18.089	17.1548
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	15000	17.7167	16.7824
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	15000	17.7167	16.7824
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	15000	17.7167	16.7824
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	15000	17.7167	16.7824
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	20000	17.4125	16.4783
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	20000	17.4125	16.4783
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	20000	17.4125	16.4783
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	20000	17.4125	16.4783
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	25000	17.1368	16.2026
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	25000	17.1368	16.2026
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	25000	17.1368	16.2026
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	25000	17.1368	16.2026
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	30000	16.879	15.9448
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	30000	16.879	15.9448
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	30000	16.879	15.9448
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	30000	16.879	15.9448
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	40000	16.4429	15.5086
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	40000	16.4429	15.5086
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	40000	16.4429	15.5086
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	40000	16.4429	15.5086

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	50000	16.0732	15.1389
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	50000	16.0732	15.1389
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	50000	16.0732	15.1389
1996-08-20	05:16:11	k085	R	600	2.51363	1.53764	50000	16.0732	15.1389
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	2000	19.9299	18.9957
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	4000	19.2472	18.313
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	6000	18.8945	17.9602
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	8000	18.6622	17.7279
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	10000	18.4645	17.5302
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	15000	18.093	17.1587
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	20000	17.8001	16.8659
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	25000	17.532	16.5977
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	30000	17.284	16.3497
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	40000	16.8509	15.9166
1996-08-20	05:29:12	k086	V	600	2.51363	1.53764	50000	16.4683	15.534
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	2000	20.6735	19.7392
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	4000	19.7943	18.86
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	6000	19.3725	18.4382
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	8000	19.0494	18.1151
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	10000	18.7739	17.8396
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	15000	18.22	17.2857
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	20000	17.8012	16.867
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	25000	17.4415	16.5072

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	30000	17.1378	16.2035
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	40000	16.6192	15.6849
1996-08-20	05:42:15	k087	B	900	2.51363	1.53764	50000	16.1891	15.2548
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	2000	19.5599	18.6256
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	2000	19.5599	18.6256
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	2000	19.5599	18.6256
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	2000	19.5599	18.6256
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	4000	18.8411	17.9068
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	4000	18.8411	17.9068
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	4000	18.8411	17.9068
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	4000	18.8411	17.9068
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	6000	18.5005	17.5663
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	6000	18.5005	17.5663
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	6000	18.5005	17.5663
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	6000	18.5005	17.5663
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	8000	18.2494	17.3151
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	8000	18.2494	17.3151
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	8000	18.2494	17.3151
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	8000	18.2494	17.3151
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	10000	18.0407	17.1064
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	10000	18.0407	17.1064
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	10000	18.0407	17.1064
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	10000	18.0407	17.1064

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	15000	17.6505	16.7162
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	15000	17.6505	16.7162
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	15000	17.6505	16.7162
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	15000	17.6505	16.7162
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	20000	17.3193	16.385
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	20000	17.3193	16.385
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	20000	17.3193	16.385
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	20000	17.3193	16.385
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	25000	17.044	16.1097
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	25000	17.044	16.1097
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	25000	17.044	16.1097
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	25000	17.044	16.1097
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	30000	16.785	15.8507
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	30000	16.785	15.8507
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	30000	16.785	15.8507
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	30000	16.785	15.8507
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	40000	16.3517	15.4174
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	40000	16.3517	15.4174
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	40000	16.3517	15.4174
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	40000	16.3517	15.4174
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	50000	16.0071	15.0728
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	50000	16.0071	15.0728
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	50000	16.0071	15.0728

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	05:59:25	k088	R	600	2.51363	1.53764	50000	16.0071	15.0728
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	2000	19.5819	18.6477
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	2000	19.5819	18.6477
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	2000	19.5819	18.6477
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	2000	19.5819	18.6477
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	4000	18.8618	17.9275
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	4000	18.8618	17.9275
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	4000	18.8618	17.9275
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	4000	18.8618	17.9275
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	6000	18.5066	17.5723
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	6000	18.5066	17.5723
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	6000	18.5066	17.5723
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	6000	18.5066	17.5723
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	8000	18.2575	17.3232
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	8000	18.2575	17.3232
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	8000	18.2575	17.3232
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	8000	18.2575	17.3232
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	10000	18.0776	17.1433
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	10000	18.0776	17.1433
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	10000	18.0776	17.1433
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	10000	18.0776	17.1433
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	15000	17.7479	16.8137
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	15000	17.7479	16.8137

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	15000	17.7479	16.8137
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	15000	17.7479	16.8137
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	20000	17.4628	16.5286
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	20000	17.4628	16.5286
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	20000	17.4628	16.5286
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	20000	17.4628	16.5286
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	25000	17.2155	16.2813
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	25000	17.2155	16.2813
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	25000	17.2155	16.2813
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	25000	17.2155	16.2813
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	30000	16.9816	16.0473
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	30000	16.9816	16.0473
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	30000	16.9816	16.0473
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	30000	16.9816	16.0473
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	40000	16.5922	15.6579
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	40000	16.5922	15.6579
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	40000	16.5922	15.6579
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	40000	16.5922	15.6579
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	50000	16.2678	15.3335
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	50000	16.2678	15.3335
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	50000	16.2678	15.3335
1996-08-20	07:00:08	k099	R	600	2.51363	1.53764	50000	16.2678	15.3335
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	2000	19.5076	18.5733

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	2000	19.5076	18.5733
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	2000	19.5076	18.5733
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	2000	19.5076	18.5733
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	4000	18.8037	17.8694
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	4000	18.8037	17.8694
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	4000	18.8037	17.8694
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	4000	18.8037	17.8694
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	6000	18.4545	17.5202
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	6000	18.4545	17.5202
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	6000	18.4545	17.5202
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	6000	18.4545	17.5202
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	8000	18.1996	17.2653
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	8000	18.1996	17.2653
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	8000	18.1996	17.2653
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	8000	18.1996	17.2653
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	10000	17.9909	17.0567
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	10000	17.9909	17.0567
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	10000	17.9909	17.0567
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	10000	17.9909	17.0567
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	15000	17.5251	16.5908
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	15000	17.5251	16.5908
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	15000	17.5251	16.5908
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	15000	17.5251	16.5908

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	20000	17.1631	16.2288
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	20000	17.1631	16.2288
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	20000	17.1631	16.2288
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	20000	17.1631	16.2288
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	25000	16.8536	15.9193
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	25000	16.8536	15.9193
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	25000	16.8536	15.9193
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	25000	16.8536	15.9193
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	30000	16.5937	15.6594
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	30000	16.5937	15.6594
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	30000	16.5937	15.6594
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	30000	16.5937	15.6594
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	40000	16.1699	15.2356
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	40000	16.1699	15.2356
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	40000	16.1699	15.2356
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	40000	16.1699	15.2356
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	50000	15.808	14.8737
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	50000	15.808	14.8737
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	50000	15.808	14.8737
1996-08-20	08:22:28	k106	R	600	2.51363	1.53764	50000	15.808	14.8737
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	2000	21.0729	20.1386
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	4000	19.7602	18.8259
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	6000	19.2426	18.3083

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	8000	18.8987	17.9645
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	10000	18.6132	17.6789
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	15000	18.0517	17.1175
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	20000	17.6145	16.6802
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	25000	17.2393	16.305
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	30000	16.921	15.9868
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	40000	16.3923	15.4581
1996-08-20	08:34:50	k107	B	900	2.51363	1.53764	50000	15.9712	15.037
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	2000	19.6833	18.749
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	4000	18.7537	17.8195
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	6000	18.2962	17.3619
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	8000	18.0252	17.091
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	10000	17.8021	16.8678
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	15000	17.3793	16.4451
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	20000	17.0495	16.1153
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	25000	16.7317	15.7974
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	30000	16.523	15.5887
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	40000	16.1989	15.2646
1996-08-20	09:08:23	k110	R	300	2.51363	1.53764	50000	15.8999	14.9656
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	2000	19.7123	18.778
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	4000	18.8113	17.8771
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	6000	18.389	17.4548
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	8000	18.0802	17.1459

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	10000	17.8217	16.8874
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	15000	17.3458	16.4115
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	20000	16.9959	16.0616
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	25000	16.7111	15.7768
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	30000	16.4723	15.5381
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	40000	16.0344	15.1001
1996-08-20	09:15:15	k111	R	600	2.51363	1.53764	50000	15.6962	14.7619
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	2000	19.4206	18.493
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	4000	18.8159	17.8883
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	6000	18.4825	17.5548
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	8000	18.2263	17.2987
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	10000	18.0105	17.0829
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	15000	17.5891	16.6615
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	20000	17.2609	16.3332
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	25000	16.9569	16.0292
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	30000	16.7174	15.7898
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	40000	16.3287	15.4011
1996-08-21	03:57:47	l091	R	600	2.50604	1.53295	50000	15.9727	15.045
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	2000	25.3848	24.4572
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	4000	22.1108	21.1832
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	6000	20.1008	19.1732
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	8000	19.1732	18.2456
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	10000	18.8221	17.8944

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	15000	18.334	17.4063
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	20000	17.9959	17.0682
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	25000	17.7498	16.8221
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	30000	17.5473	16.6197
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	40000	17.1664	16.2388
1996-08-21	04:09:57	l092	V	240	2.50604	1.53295	50000	16.8521	15.9244
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	2000	19.4308	18.5031
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	4000	18.8697	17.942
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	6000	18.5745	17.6468
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	8000	18.3604	17.4327
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	10000	18.1857	17.2581
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	15000	17.8317	16.904
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	20000	17.6008	16.6732
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	25000	17.3733	16.4456
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	30000	17.2004	16.2728
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	40000	16.8911	15.9635
1996-08-21	04:56:26	l100	R	300	2.50604	1.53295	50000	16.6394	15.7117
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	2000	19.8483	18.9207
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	4000	19.2696	18.342
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	6000	18.9464	18.0188
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	8000	18.7007	17.7731
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	10000	18.5005	17.5729
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	15000	18.1321	17.2045

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	20000	17.8497	16.922
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	25000	17.585	16.6574
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	30000	17.3655	16.4379
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	40000	16.9588	16.0311
1996-08-21	05:05:43	l101	V	600	2.50604	1.53295	50000	16.5954	15.6678
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	2000	20.6497	19.7221
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	4000	19.9866	19.059
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	6000	19.593	18.6653
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	8000	19.3033	18.3757
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	10000	19.0602	18.1325
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	15000	18.5691	17.6414
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	20000	18.1979	17.2703
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	25000	17.8718	16.9441
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	30000	17.576	16.6483
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	40000	17.0842	16.1566
1996-08-21	05:20:05	l102	B	600	2.50604	1.53295	50000	16.6818	15.7541
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	2000	20.6301	19.7024
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	4000	19.976	19.0483
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	6000	19.5985	18.6709
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	8000	19.2806	18.353
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	10000	19.0364	18.1087
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	15000	18.5004	17.5727
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	20000	18.0986	17.171

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	25000	17.7477	16.8201
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	30000	17.439	16.5113
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	40000	16.9517	16.024
1996-08-21	05:34:58	l103	B	600	2.50604	1.53295	50000	16.5329	15.6052
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	2000	19.5934	18.6658
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	4000	18.9107	17.983
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	6000	18.585	17.6573
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	8000	18.3775	17.4499
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	10000	18.2277	17.3
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	15000	17.9117	16.9841
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	20000	17.6579	16.7303
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	25000	17.4056	16.4779
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	30000	17.1802	16.2525
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	40000	16.7925	15.8648
1996-08-21	06:16:12	l109	R	300	2.50604	1.53295	50000	16.4542	15.5266
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	2000	19.5747	18.6471
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	4000	18.9419	18.0142
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	6000	18.5879	17.6603
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	8000	18.3834	17.4558
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	10000	18.2114	17.2838
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	15000	17.8261	16.8984
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	20000	17.551	16.6233
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	25000	17.2939	16.3662

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	30000	17.0132	16.0856
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	40000	16.5439	15.6163
1996-08-21	06:23:06	l110	R	300	2.50604	1.53295	50000	16.186	15.2584
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	2000	19.5692	18.6416
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	4000	18.9487	18.021
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	6000	18.63	17.7024
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	8000	18.3981	17.4704
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	10000	18.2273	17.2997
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	15000	17.9386	17.011
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	20000	17.7081	16.7804
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	25000	17.4607	16.5331
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	30000	17.2582	16.3305
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	40000	16.8429	15.9152
1996-08-21	06:30:17	l111	R	300	2.50604	1.53295	50000	16.4859	15.5583
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	2000	19.4484	18.5208
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	4000	18.8649	17.9373
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	6000	18.5782	17.6506
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	8000	18.3677	17.44
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	10000	18.205	17.2773
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	15000	17.8387	16.911
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	20000	17.5207	16.593
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	25000	17.2489	16.3213
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	30000	17.048	16.1203

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	40000	16.6726	15.7449
1996-08-21	07:25:43	l115	R	300	2.50604	1.53295	50000	16.3973	15.4697
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	2000	19.4793	18.5517
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	4000	18.9162	17.9886
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	6000	18.6262	17.6986
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	8000	18.4134	17.4857
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	10000	18.2747	17.3471
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	15000	18.0072	17.0795
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	20000	17.735	16.8074
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	25000	17.4922	16.5646
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	30000	17.3198	16.3921
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	40000	16.9677	16.0401
1996-08-21	07:33:02	l116	R	300	2.50604	1.53295	50000	16.7035	15.7759
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	2000	19.4824	18.5547
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	4000	18.9109	17.9833
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	6000	18.6452	17.7175
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	8000	18.4763	17.5487
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	10000	18.3563	17.4286
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	15000	18.1123	17.1847
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	20000	17.9375	17.0098
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	25000	17.7396	16.8119
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	30000	17.5237	16.596
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	40000	17.1875	16.2599

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-21	07:40:08	l117	R	300	2.50604	1.53295	50000	16.9731	16.0455
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	2000	19.4651	18.5375
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	4000	18.9018	17.9742
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	6000	18.6188	17.6912
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	8000	18.4075	17.4799
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	10000	18.2905	17.3629
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	15000	18.0459	17.1183
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	20000	17.8502	16.9226
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	25000	17.6567	16.7291
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	30000	17.4959	16.5683
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	40000	17.1883	16.2607
1996-08-21	07:46:56	l118	R	300	2.50604	1.53295	50000	16.8818	15.9542
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	2000	19.4285	18.5009
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	4000	18.8493	17.9216
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	6000	18.5332	17.6056
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	8000	18.3021	17.3745
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	10000	18.1168	17.1892
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	15000	17.7727	16.845
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	20000	17.5604	16.6328
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	25000	17.3465	16.4188
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	30000	17.1782	16.2505
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	40000	16.8736	15.946
1996-08-21	08:29:41	l123	R	300	2.50604	1.53295	50000	16.6517	15.7241

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	2000	19.428	18.5004
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	4000	18.8304	17.9027
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	6000	18.5101	17.5825
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	8000	18.305	17.3773
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	10000	18.135	17.2073
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	15000	17.851	16.9233
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	20000	17.6417	16.714
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	25000	17.4372	16.5095
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	30000	17.2714	16.3438
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	40000	17.06	16.1323
1996-08-21	08:36:25	l124	R	300	2.50604	1.53295	50000	16.9015	15.9738
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	2000	19.2647	18.3434
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	4000	18.6184	17.697
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	6000	18.2497	17.3283
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	8000	18.0637	17.1424
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	10000	17.9309	17.0096
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	15000	17.6194	16.698
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	20000	17.3573	16.4359
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	25000	17.1805	16.2591
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	30000	17.0298	16.1084
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	40000	16.7043	15.7829
1996-08-22	04:51:59	m146	R	300	2.49844	1.52852	50000	16.4186	15.4973
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	2000	19.4605	18.5392

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	4000	18.8889	17.9675
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	6000	18.5787	17.6573
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	8000	18.3618	17.4404
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	10000	18.1734	17.2521
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	15000	17.7682	16.8469
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	20000	17.5462	16.6248
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	25000	17.3368	16.4155
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	30000	17.1926	16.2712
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	40000	16.8351	15.9137
1996-08-22	05:00:31	m147	R	300	2.49844	1.52852	50000	16.5443	15.623
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	2000	19.8628	18.9414
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	4000	19.2983	18.377
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	6000	19.0092	18.0878
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	8000	18.7833	17.862
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	10000	18.6091	17.6877
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	15000	18.2545	17.3331
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	20000	17.9947	17.0734
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	25000	17.7578	16.8364
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	30000	17.5415	16.6202
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	40000	17.1433	16.222
1996-08-22	05:07:43	m148	V	300	2.49844	1.52852	50000	16.8101	15.8887
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	2000	20.6327	19.7114
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	4000	20.0024	19.081

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	6000	19.6667	18.7454
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	8000	19.4178	18.4965
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	10000	19.1772	18.2558
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	15000	18.6861	17.7648
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	20000	18.3279	17.4066
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	25000	18.0236	17.1022
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	30000	17.766	16.8446
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	40000	17.281	16.3597
1996-08-22	05:15:04	m149	B	300	2.49844	1.52852	50000	16.9114	15.9901
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	2000	19.5266	18.6052
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	4000	18.8851	17.9638
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	6000	18.5636	17.6422
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	8000	18.3581	17.4368
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	10000	18.18	17.2586
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	15000	17.8698	16.9484
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	20000	17.6353	16.714
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	25000	17.4011	16.4798
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	30000	17.218	16.2966
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	40000	16.8946	15.9733
1996-08-22	06:18:39	m157	R	300	2.49844	1.52852	50000	16.611	15.6896
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	2000	19.5575	18.6361
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	4000	18.8774	17.956
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	6000	18.5639	17.6425

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	8000	18.3477	17.4264
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	10000	18.1958	17.2744
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	15000	17.8824	16.961
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	20000	17.6355	16.7141
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	25000	17.4652	16.5439
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	30000	17.2482	16.3269
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	40000	16.9909	16.0695
1996-08-22	06:25:39	m158	R	300	2.49844	1.52852	50000	16.7485	15.8271
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	2000	19.5404	18.6191
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	4000	18.9061	17.9848
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	6000	18.5673	17.6459
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	8000	18.3259	17.4045
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	10000	18.1439	17.2226
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	15000	17.8104	16.889
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	20000	17.5502	16.6289
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	25000	17.3091	16.3877
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	30000	17.0848	16.1634
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	40000	16.7276	15.8063
1996-08-22	07:27:26	m169	R	300	2.49844	1.52852	50000	16.3956	15.4742
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	2000	19.4951	18.5737
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	4000	18.8666	17.9453
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	6000	18.5384	17.6171
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	8000	18.311	17.3896

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	10000	18.169	17.2476
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	15000	17.8958	16.9745
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	20000	17.6407	16.7193
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	25000	17.4147	16.4934
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	30000	17.1909	16.2695
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	40000	16.8499	15.9285
1996-08-22	07:34:11	m170	R	300	2.49844	1.52852	50000	16.5817	15.6603
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	2000	19.564	18.6427
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	4000	18.8372	17.9159
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	6000	18.5189	17.5976
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	8000	18.3111	17.3898
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	10000	18.1391	17.2177
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	15000	17.7979	16.8766
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	20000	17.5517	16.6304
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	25000	17.3392	16.4178
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	30000	17.1453	16.2239
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	40000	16.7826	15.8613
1996-08-22	08:06:56	m176	R	300	2.49844	1.52852	50000	16.4581	15.5367
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	2000	19.5468	18.6254
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	4000	18.8846	17.9633
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	6000	18.5783	17.6569
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	8000	18.3745	17.4531
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	10000	18.2239	17.3025

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	15000	17.9066	16.9853
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	20000	17.6389	16.7175
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	25000	17.4613	16.54
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	30000	17.3148	16.3934
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	40000	17.0337	16.1124
1996-08-22	08:13:38	m177	R	300	2.49844	1.52852	50000	16.7599	15.8386
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	2000	20.68	19.7586
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	4000	19.9539	19.0325
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	6000	19.5525	18.6312
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	8000	19.2622	18.3409
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	10000	19.0621	18.1408
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	15000	18.6185	17.6972
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	20000	18.2324	17.311
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	25000	17.9156	16.9942
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	30000	17.6387	16.7173
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	40000	17.2111	16.2898
1996-08-22	08:20:41	m178	B	600	2.49844	1.52852	50000	16.8429	15.9215
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	2000	20.0311	19.1097
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	4000	19.2433	18.3219
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	6000	18.8506	17.9293
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	8000	18.6263	17.7049
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	10000	18.432	17.5106
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	15000	18.0657	17.1444

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	20000	17.7433	16.822
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	25000	17.4693	16.548
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	30000	17.2271	16.3057
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	40000	16.7942	15.8728
1996-08-22	08:33:00	m179	V	300	2.49844	1.52852	50000	16.4642	15.5429
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	2000	19.5878	18.6724
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	4000	18.9053	17.9898
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	6000	18.5674	17.652
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	8000	18.329	17.4135
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	10000	18.1306	17.2152
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	15000	17.693	16.7776
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	20000	17.3917	16.4763
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	25000	17.1367	16.2213
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	30000	16.9355	16.0201
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	40000	16.5416	15.6261
1996-08-23	04:33:45	n126	R	300	2.49083	1.52436	50000	16.2214	15.306
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	2000	19.9897	19.0743
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	4000	19.3609	18.4454
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	6000	19.0287	18.1133
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	8000	18.7605	17.8451
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	10000	18.5365	17.6211
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	15000	18.2337	17.3183
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	20000	17.9111	16.9956

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	25000	17.6557	16.7402
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	30000	17.4669	16.5515
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	40000	17.1359	16.2204
1996-08-23	04:41:30	n127	V	300	2.49083	1.52436	50000	16.817	15.9016
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	2000	20.6485	19.7331
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	4000	19.9292	19.0138
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	6000	19.5688	18.6534
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	8000	19.3299	18.4145
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	10000	19.1072	18.1917
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	15000	18.5846	17.6691
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	20000	18.1313	17.2159
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	25000	17.7997	16.8842
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	30000	17.4933	16.5778
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	40000	17.0126	16.0972
1996-08-23	04:48:59	n128	B	300	2.49083	1.52436	50000	16.6143	15.6989
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	2000	19.5494	18.6339
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	4000	18.9031	17.9877
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	6000	18.5897	17.6743
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	8000	18.3742	17.4588
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	10000	18.2065	17.2911
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	15000	17.8967	16.9813
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	20000	17.6056	16.6901
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	25000	17.313	16.3976

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	30000	17.1178	16.2024
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	40000	16.7133	15.7978
1996-08-23	05:29:09	n134	R	300	2.49083	1.52436	50000	16.3614	15.4459
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	2000	19.5214	18.6059
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	4000	18.8886	17.9732
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	6000	18.5641	17.6487
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	8000	18.3389	17.4234
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	10000	18.1334	17.218
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	15000	17.8026	16.8872
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	20000	17.5979	16.6825
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	25000	17.3543	16.4389
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	30000	17.0884	16.1729
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	40000	16.7128	15.7974
1996-08-23	05:36:12	n135	R	300	2.49083	1.52436	50000	16.3723	15.4568
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	2000	19.5449	18.6295
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	4000	18.8625	17.947
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	6000	18.5181	17.6027
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	8000	18.2926	17.3771
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	10000	18.1098	17.1943
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	15000	17.7296	16.8141
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	20000	17.3938	16.4783
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	25000	17.1104	16.195
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	30000	16.9081	15.9927

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	40000	16.5586	15.6432
1996-08-23	06:12:48	n141	R	300	2.49083	1.52436	50000	16.2856	15.3702
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	2000	19.5563	18.6409
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	4000	18.872	17.9565
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	6000	18.5443	17.6288
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	8000	18.2714	17.356
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	10000	18.0725	17.157
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	15000	17.641	16.7256
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	20000	17.2731	16.3576
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	25000	16.9734	16.0579
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	30000	16.727	15.8115
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	40000	16.3303	15.4149
1996-08-23	06:19:32	n142	R	300	2.49083	1.52436	50000	15.9886	15.0731
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	2000	19.5895	18.6741
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	4000	18.7738	17.8584
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	6000	18.4099	17.4944
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	8000	18.1724	17.257
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	10000	17.9672	17.0518
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	15000	17.5808	16.6654
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	20000	17.361	16.4456
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	25000	17.1787	16.2633
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	30000	17.0083	16.0929
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	40000	16.8271	15.9116

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-08-23	08:00:18	n150	R	300	2.49083	1.52436	50000	16.6662	15.7508
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	2000	19.7584	18.843
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	4000	18.9614	18.046
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	6000	18.685	17.7696
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	8000	18.5412	17.6258
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	10000	18.447	17.5316
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	15000	18.4464	17.531
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	20000	18.4464	17.5309
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	25000	18.4463	17.5309
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	30000	18.4463	17.5309
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	40000	18.4463	17.5309
1996-08-23	08:35:33	n152	R	300	2.49083	1.52436	50000	18.4463	17.5308
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	2000	19.7185	18.803
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	4000	18.9575	18.042
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	6000	18.6536	17.7381
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	8000	18.4446	17.5292
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	10000	18.3362	17.4208
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	15000	18.0633	17.1479
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	20000	17.9612	17.0458
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	25000	17.8514	16.936
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	30000	17.7154	16.7999
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	40000	17.5688	16.6534
1996-08-23	08:42:32	n153	R	300	2.49083	1.52436	50000	17.222	16.3065

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	2000	19.443	18.5746
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	4000	18.7642	17.8958
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	6000	18.4267	17.5583
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	8000	18.1675	17.2991
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	10000	17.9417	17.0733
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	15000	17.5153	16.6469
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	20000	17.2331	16.3648
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	25000	16.9872	16.1188
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	30000	16.7441	15.8757
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	40000	16.313	15.4446
1996-09-08	03:26:53	p026	R	300	2.36714	1.49168	50000	15.9359	15.0676
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	2000	20.9914	20.123
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	4000	20.0499	19.1815
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	6000	19.6694	18.8011
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	8000	19.4074	18.539
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	10000	19.2149	18.3465
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	15000	18.8601	17.9917
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	20000	18.6129	17.7445
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	25000	18.3988	17.5304
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	30000	18.1928	17.3245
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	40000	17.8821	17.0137
1996-09-08	03:51:39	p028	B	600	2.36714	1.49168	50000	17.5853	16.7169
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	2000	20.4579	19.5895

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	4000	19.8109	18.9425
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	6000	19.4467	18.5783
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	8000	19.1969	18.3285
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	10000	18.9954	18.1271
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	15000	18.6046	17.7362
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	20000	18.3146	17.4462
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	25000	18.0854	17.217
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	30000	17.8873	17.019
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	40000	17.5606	16.6922
1996-09-08	04:08:02	p029	B	600	2.36714	1.49168	50000	17.2772	16.4088
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	2000	19.4289	18.5606
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	4000	18.7337	17.8653
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	6000	18.3953	17.5269
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	8000	18.1526	17.2842
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	10000	17.9789	17.1106
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	15000	17.6325	16.7641
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	20000	17.3169	16.4485
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	25000	17.0472	16.1789
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	30000	16.8264	15.958
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	40000	16.4147	15.5464
1996-09-08	04:31:19	p031	R	300	2.36714	1.49168	50000	15.9978	15.1294
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	2000	19.4787	18.6103
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	4000	18.7283	17.8599

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	6000	18.3563	17.488
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	8000	18.0927	17.2243
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	10000	17.8793	17.011
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	15000	17.4497	16.5813
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	20000	17.1324	16.264
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	25000	16.8572	15.9888
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	30000	16.6285	15.7601
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	40000	16.2423	15.374
1996-09-08	05:37:59	p035	R	300	2.36714	1.49168	50000	15.9215	15.0531
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	2000	19.7686	18.8998
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	4000	18.8776	18.0088
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	6000	18.5272	17.6583
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	8000	18.2775	17.4087
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	10000	18.0899	17.2211
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	15000	17.7396	16.8708
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	20000	17.4413	16.5724
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	25000	17.2073	16.3385
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	30000	17.0079	16.1391
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	40000	16.6542	15.7854
1996-09-11	02:54:29	p114	R	300	2.34355	1.49198	50000	16.3055	15.4367
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	2000	19.2079	18.3391
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	4000	18.6222	17.7534
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	6000	18.3352	17.4663

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	8000	18.1237	17.2549
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	10000	17.9613	17.0925
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	15000	17.6633	16.7945
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	20000	17.4259	16.5571
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	25000	17.2385	16.3697
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	30000	17.0624	16.1936
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	40000	16.7814	15.9126
1996-09-11	04:22:17	p119	R	300	2.34355	1.49198	50000	16.5347	15.6658
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	2000	19.8743	19.0055
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	4000	19.2844	18.4156
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	6000	19.0211	18.1523
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	8000	18.8181	17.9492
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	10000	18.6644	17.7955
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	15000	18.3904	17.5216
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	20000	18.1587	17.2899
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	25000	18.0043	17.1355
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	30000	17.8752	17.0064
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	40000	17.6847	16.8159
1996-09-11	04:32:44	p120	V	300	2.34355	1.49198	50000	17.5361	16.6673
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	2000	20.7143	19.8455
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	4000	19.998	19.1292
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	6000	19.6194	18.7506
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	8000	19.3415	18.4727

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	10000	19.1231	18.2543
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	15000	18.6829	17.814
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	20000	18.3554	17.4865
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	25000	18.0819	17.2131
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	30000	17.836	16.9671
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	40000	17.376	16.5072
1996-09-11	05:32:54	p123	B	600	2.34355	1.49198	50000	17.0087	16.1399
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	2000	19.3943	18.5255
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	4000	18.7812	17.9124
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	6000	18.4309	17.5621
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	8000	18.203	17.3342
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	10000	18.0347	17.1659
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	15000	17.6678	16.799
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	20000	17.3997	16.5309
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	25000	17.2136	16.3448
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	30000	17.017	16.1482
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	40000	16.6565	15.7876
1996-09-11	05:45:53	p124	R	300	2.34355	1.49198	50000	16.3286	15.4598
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	2000	19.2135	18.3447
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	4000	18.4543	17.5855
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	6000	17.9588	17.09
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	8000	17.5586	16.6897
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	10000	17.2256	16.3568

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	15000	16.5546	15.6858
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	20000	16.0306	15.1618
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	25000	15.6028	14.7339
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	30000	15.2488	14.3799
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	40000	14.6707	13.8019
1996-09-11	01:07:37	p170	R	300	2.34355	1.49198	50000	14.2142	13.3454
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	2000	19.3109	18.4413
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	4000	18.72	17.8504
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	6000	18.3759	17.5063
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	8000	18.1352	17.2657
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	10000	17.9276	17.0581
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	15000	17.5102	16.6406
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	20000	17.1699	16.3004
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	25000	16.87	16.0004
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	30000	16.5998	15.7303
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	40000	16.1367	15.2671
1996-09-12	02:15:49	p177	R	300	2.33567	1.49248	50000	15.7763	14.9068
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	2000	19.3521	18.4825
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	4000	18.7047	17.8352
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	6000	18.3394	17.4699
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	8000	18.0779	17.2083
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	10000	17.8584	16.9889
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	15000	17.417	16.5474

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	20000	17.0451	16.1755
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	25000	16.7438	15.8743
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	30000	16.466	15.5965
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	40000	16.0008	15.1312
1996-09-12	03:02:10	p179	R	300	2.33567	1.49248	50000	15.5894	14.7199
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	2000	19.3267	18.4572
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	4000	18.7189	17.8494
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	6000	18.3771	17.5076
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	8000	18.1033	17.2338
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	10000	17.8635	16.9939
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	15000	17.4258	16.5562
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	20000	17.0778	16.2083
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	25000	16.7649	15.8954
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	30000	16.5006	15.6311
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	40000	16.0254	15.1559
1996-09-12	04:32:18	p184	R	300	2.33567	1.49248	50000	15.6405	14.771
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	2000	19.8384	18.9689
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	4000	19.2738	18.4042
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	6000	18.9963	18.1268
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	8000	18.801	17.9314
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	10000	18.6413	17.7718
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	15000	18.3607	17.4912
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	20000	18.1838	17.3143

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	25000	18.0552	17.1856
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	30000	17.9509	17.0814
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	40000	17.7872	16.9177
1996-09-12	04:41:16	p185	V	600	2.33567	1.49248	50000	17.7305	16.8609
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	2000	20.5602	19.6907
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	4000	19.9423	19.0728
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	6000	19.5848	18.7152
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	8000	19.3267	18.4572
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	10000	19.1201	18.2506
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	15000	18.7369	17.8674
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	20000	18.4217	17.5521
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	25000	18.1555	17.286
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	30000	17.9204	17.0508
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	40000	17.5456	16.676
1996-09-12	04:54:12	p186	B	600	2.33567	1.49248	50000	17.2282	16.3587
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	2000	19.3455	18.476
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	4000	18.6529	17.7833
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	6000	18.2702	17.4007
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	8000	17.9893	17.1197
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	10000	17.7525	16.883
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	15000	17.2809	16.4114
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	20000	16.9244	16.0549
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	25000	16.6054	15.7358

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	30000	16.3224	15.4528
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	40000	15.8163	14.9467
1996-09-12	05:59:48	p189	R	300	2.33567	1.49248	50000	15.4174	14.5479
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	2000	19.1987	18.3282
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	4000	18.5841	17.7135
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	6000	18.2153	17.3448
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	8000	17.9255	17.055
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	10000	17.6791	16.8086
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	15000	17.1633	16.2928
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	20000	16.832	15.9614
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	25000	16.5243	15.6537
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	30000	16.2674	15.3969
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	40000	15.8394	14.9689
1996-09-13	01:21:05	q022	R	600	2.32777	1.49316	50000	15.4777	14.6072
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	2000	19.1882	18.3176
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	4000	18.5757	17.7052
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	6000	18.246	17.3754
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	8000	17.9779	17.1074
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	10000	17.7482	16.8776
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	15000	17.2864	16.4159
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	20000	16.9063	16.0358
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	25000	16.5796	15.7091
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	30000	16.2931	15.4226

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	40000	15.8331	14.9626
1996-09-13	02:53:15	q028	R	600	2.32777	1.49316	50000	15.402	14.5315
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	2000	19.8425	18.9719
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	4000	19.2814	18.4109
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	6000	19.006	18.1355
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	8000	18.8418	17.9713
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	10000	18.711	17.8404
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	15000	18.4627	17.5922
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	20000	18.249	17.3785
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	25000	18.0833	17.2128
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	30000	17.9292	17.0586
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	40000	17.6409	16.7703
1996-09-13	03:07:47	q029	V	600	2.32777	1.49316	50000	17.4007	16.5302
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	2000	19.3779	18.5074
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	4000	18.7677	17.8972
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	6000	18.4152	17.5447
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	8000	18.1256	17.2551
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	10000	17.9009	17.0304
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	15000	17.4443	16.5738
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	20000	16.9702	16.0996
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	25000	16.6524	15.7819
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	30000	16.0848	15.2143
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	40000	15.644	14.7735

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-13	04:00:09	q031	R	300	2.32777	1.49316	50000	15.2996	14.4291
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	2000	20.6092	19.7387
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	4000	19.9763	19.1057
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	6000	19.604	18.7335
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	8000	19.3415	18.471
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	10000	19.1379	18.2673
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	15000	18.7361	17.8655
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	20000	18.4043	17.5338
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	25000	18.1119	17.2414
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	30000	17.8639	16.9934
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	40000	17.4432	16.5727
1996-09-13	04:08:12	q032	B	600	2.32777	1.49316	50000	17.0809	16.2104
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	2000	19.5972	18.7255
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	4000	18.9411	18.0693
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	6000	18.5936	17.7218
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	8000	18.3409	17.4691
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	10000	18.1387	17.267
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	15000	17.7281	16.8563
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	20000	17.4054	16.5336
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	25000	17.1317	16.2599
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	30000	16.8825	16.0107
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	40000	16.4564	15.5846
1996-09-14	01:29:07	q102	R	600	2.31985	1.49402	50000	16.1014	15.2296

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	2000	20.1163	19.2445
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	4000	19.4519	18.5801
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	6000	19.166	18.2942
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	8000	18.9783	18.1066
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	10000	18.8315	17.9597
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	15000	18.5987	17.7269
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	20000	18.4325	17.5607
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	25000	18.32	17.4482
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	30000	18.2425	17.3707
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	40000	18.1508	17.279
1996-09-14	01:42:31	q103	V	600	2.31985	1.49402	50000	18.1385	17.2667
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	2000	19.5851	18.7133
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	4000	18.9683	18.0965
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	6000	18.6657	17.7939
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	8000	18.4615	17.5897
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	10000	18.3052	17.4335
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	15000	18.001	17.1292
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	20000	17.7753	16.9035
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	25000	17.6127	16.7409
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	30000	17.4586	16.5868
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	40000	17.1601	16.2883
1996-09-14	02:34:42	q105	R	600	2.31985	1.49402	50000	16.9212	16.0494
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	2000	20.8457	19.974

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	4000	20.1248	19.253
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	6000	19.8012	18.9294
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	8000	19.5719	18.7001
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	10000	19.3808	18.509
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	15000	18.9925	18.1207
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	20000	18.7061	17.8343
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	25000	18.4603	17.5885
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	30000	18.2608	17.389
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	40000	17.9046	17.0328
1996-09-14	02:48:50	q106	B	600	2.31985	1.49402	50000	17.6026	16.7308
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	2000	19.5942	18.7224
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	4000	18.9345	18.0627
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	6000	18.6034	17.7316
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	8000	18.38	17.5082
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	10000	18.1836	17.3118
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	15000	17.8469	16.9751
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	20000	17.5654	16.6937
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	25000	17.3834	16.5116
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	30000	17.2235	16.3518
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	40000	16.9171	16.0454
1996-09-14	03:38:03	q108	R	600	2.31985	1.49402	50000	16.6711	15.7993
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	2000	19.6255	18.7537
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	4000	18.9621	18.0903

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	6000	18.6546	17.7828
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	8000	18.4363	17.5645
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	10000	18.2667	17.395
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	15000	17.9505	17.0787
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	20000	17.7081	16.8364
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	25000	17.4929	16.6212
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	30000	17.3478	16.476
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	40000	17.098	16.2263
1996-09-14	04:56:47	q112	R	600	2.31985	1.49402	50000	16.8802	16.0085
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	2000	19.6448	18.773
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	4000	18.9088	18.037
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	6000	18.5654	17.6936
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	8000	18.3297	17.458
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	10000	18.1407	17.269
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	15000	17.7753	16.9035
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	20000	17.4984	16.6266
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	25000	17.2824	16.4106
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	30000	17.0942	16.2224
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	40000	16.7435	15.8717
1996-09-14	06:08:34	q116	R	600	2.31985	1.49402	50000	16.4635	15.5917
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	2000	19.4776	18.6043
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	4000	18.7387	17.8654
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	6000	18.3859	17.5126

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	8000	18.1413	17.2679
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	10000	17.937	17.0637
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	15000	17.5368	16.6635
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	20000	17.2692	16.3959
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	25000	17.0462	16.1729
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	30000	16.8097	15.9364
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	40000	16.3945	15.5212
1996-09-15	02:27:21	q187	R	600	2.31193	1.49507	50000	16.0278	15.1545
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	2000	19.6157	18.7423
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	4000	18.9507	18.0774
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	6000	18.5833	17.71
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	8000	18.3282	17.4549
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	10000	18.116	17.2426
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	15000	17.6997	16.8264
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	20000	17.3641	16.4908
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	25000	17.0758	16.2024
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	30000	16.819	15.9457
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	40000	16.3832	15.5099
1996-09-15	03:36:50	q193	R	300	2.31193	1.49507	50000	16.0273	15.154
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	2000	20.1335	19.2602
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	4000	19.4102	18.5369
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	6000	19.1049	18.2316
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	8000	18.88	18.0067

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	10000	18.6948	17.8215
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	15000	18.2978	17.4245
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	20000	17.9769	17.1036
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	25000	17.7099	16.8366
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	30000	17.4964	16.6231
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	40000	17.1308	16.2575
1996-09-15	03:46:53	q194	V	300	2.31193	1.49507	50000	16.8083	15.935
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	2000	20.9328	20.0595
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	4000	20.1327	19.2594
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	6000	19.748	18.8747
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	8000	19.4995	18.6262
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	10000	19.301	18.4277
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	15000	18.9066	18.0333
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	20000	18.5622	17.6889
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	25000	18.278	17.4047
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	30000	18.0242	17.1509
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	40000	17.6046	16.7313
1996-09-15	03:54:57	q195	B	300	2.31193	1.49507	50000	17.2052	16.3319
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	2000	19.731	18.8577
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	4000	18.9685	18.0952
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	6000	18.6248	17.7515
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	8000	18.3657	17.4924
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	10000	18.154	17.2807

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	15000	17.7694	16.8961
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	20000	17.4596	16.5863
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	25000	17.2048	16.3315
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	30000	16.978	16.1046
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	40000	16.5685	15.6951
1996-09-15	04:37:57	q197	R	300	2.31193	1.49507	50000	16.2179	15.3446
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	2000	19.6667	18.7934
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	4000	18.9362	18.0629
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	6000	18.5977	17.7244
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	8000	18.3667	17.4934
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	10000	18.173	17.2996
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	15000	17.758	16.8847
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	20000	17.4096	16.5363
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	25000	17.1278	16.2545
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	30000	16.8807	16.0074
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	40000	16.4596	15.5863
1996-09-15	05:29:24	q203	R	300	2.31193	1.49507	50000	16.1331	15.2598
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	2000	20.1051	19.2318
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	4000	19.3948	18.5215
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	6000	19.0527	18.1794
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	8000	18.8196	17.9463
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	10000	18.6512	17.7779
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	15000	18.3044	17.4311

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	20000	18.0518	17.1784
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	25000	17.8451	16.9718
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	30000	17.6634	16.7901
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	40000	17.3461	16.4727
1996-09-15	05:37:57	q204	V	300	2.31193	1.49507	50000	17.104	16.2307
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	2000	20.7307	19.8574
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	4000	19.9295	19.0562
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	6000	19.5475	18.6742
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	8000	19.2544	18.3811
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	10000	19.0277	18.1544
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	15000	18.5925	17.7192
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	20000	18.2577	17.3844
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	25000	17.9579	17.0846
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	30000	17.6874	16.8141
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	40000	17.2249	16.3516
1996-09-15	05:46:02	q205	B	600	2.31193	1.49507	50000	16.8513	15.978
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	2000	19.7028	18.8294
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	4000	18.9245	18.0512
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	6000	18.5817	17.7084
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	8000	18.3489	17.4756
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	10000	18.145	17.2717
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	15000	17.7786	16.9053
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	20000	17.4903	16.617

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	25000	17.2565	16.3832
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	30000	17.0641	16.1908
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	40000	16.6799	15.8066
1996-09-15	06:58:47	q218	R	360	2.31193	1.49507	50000	16.3602	15.4869
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	2000	19.6713	18.7962
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	4000	18.9523	18.0773
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	6000	18.601	17.7259
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	8000	18.3507	17.4757
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	10000	18.1588	17.2837
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	15000	17.7992	16.9242
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	20000	17.5046	16.6295
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	25000	17.2511	16.3761
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	30000	17.0409	16.1659
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	40000	16.6778	15.8028
1996-09-16	01:37:20	r031	R	600	2.30399	1.49628	50000	16.3525	15.4775
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	2000	19.5722	18.6971
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	4000	18.8297	17.9546
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	6000	18.5267	17.6516
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	8000	18.3252	17.4502
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	10000	18.1625	17.2875
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	15000	17.8531	16.978
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	20000	17.5912	16.7161
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	25000	17.3755	16.5005

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	30000	17.1778	16.3028
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	40000	16.8279	15.9529
1996-09-16	02:57:03	r037	R	600	2.30399	1.49628	50000	16.5383	15.6632
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	2000	19.6949	18.8198
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	4000	18.9719	18.0969
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	6000	18.6529	17.7778
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	8000	18.4278	17.5527
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	10000	18.2519	17.3768
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	15000	17.9126	17.0375
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	20000	17.635	16.76
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	25000	17.4218	16.5467
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	30000	17.2115	16.3364
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	40000	16.852	15.9769
1996-09-16	03:45:24	r039	R	600	2.30399	1.49628	50000	16.5175	15.6424
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	2000	19.7581	18.883
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	4000	18.9495	18.0744
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	6000	18.585	17.7099
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	8000	18.3328	17.4578
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	10000	18.1404	17.2653
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	15000	17.8293	16.9542
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	20000	17.5774	16.7023
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	25000	17.3521	16.477
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	30000	17.1344	16.2594

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	40000	16.7933	15.9182
1996-09-16	05:29:26	r049	R	600	2.30399	1.49628	50000	16.5511	15.6761
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	2000	20.2686	19.3936
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	4000	19.4722	18.5971
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	6000	19.1529	18.2778
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	8000	18.9384	18.0633
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	10000	18.7863	17.9112
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	15000	18.5029	17.6278
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	20000	18.3357	17.4606
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	25000	18.1821	17.3071
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	30000	18.0614	17.1864
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	40000	17.9402	17.0652
1996-09-16	05:42:21	r050	B	600	2.30399	1.49628	50000	17.8696	16.9945
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	2000	20.9719	20.0969
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	4000	20.1623	19.2873
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	6000	19.802	18.9269
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	8000	19.5319	18.6568
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	10000	19.329	18.4539
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	15000	18.9186	18.0435
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	20000	18.6071	17.7321
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	25000	18.3453	17.4702
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	30000	18.1109	17.2359
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	40000	17.7043	16.8292

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-16	05:56:24	r051	B	600	2.30399	1.49628	50000	17.3964	16.5213
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	2000	19.6628	18.7877
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	4000	18.9376	18.0625
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	6000	18.6287	17.7537
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	8000	18.4142	17.5392
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	10000	18.2517	17.3766
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	15000	17.9395	17.0644
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	20000	17.6913	16.8162
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	25000	17.4933	16.6183
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	30000	17.3068	16.4317
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	40000	17.0075	16.1324
1996-09-16	06:09:17	r052	R	600	2.30399	1.49628	50000	16.7677	15.8927
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	2000	19.9348	19.0577
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	4000	19.0853	18.2083
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	6000	18.7066	17.8296
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	8000	18.4561	17.579
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	10000	18.2669	17.3899
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	15000	17.8874	17.0103
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	20000	17.5844	16.7073
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	25000	17.3467	16.4696
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	30000	17.1555	16.2785
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	40000	16.8111	15.934
1996-09-17	05:50:33	r115	R	300	2.29603	1.49766	50000	16.5319	15.6548

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	2000	20.4378	19.5607
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	4000	19.6821	18.805
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	6000	19.359	18.482
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	8000	19.1742	18.2971
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	10000	19.0413	18.1642
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	15000	18.7578	17.8807
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	20000	18.6493	17.7723
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	25000	18.5641	17.6871
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	30000	18.5337	17.6566
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	40000	18.5337	17.6566
1996-09-17	06:00:28	r116	V	300	2.29603	1.49766	50000	18.5337	17.6566
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	2000	19.1525	18.2228
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	4000	18.4905	17.5608
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	6000	18.1672	17.2375
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	8000	17.9547	17.025
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	10000	17.7971	16.8674
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	15000	17.4787	16.549
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	20000	17.2172	16.2875
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	25000	16.9717	16.042
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	30000	16.8397	15.91
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	40000	16.5902	15.6604
1996-10-02	01:30:39	s114	R	300	2.17521	1.53441	50000	16.3325	15.4028
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	2000	19.1507	18.221

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	4000	18.4682	17.5385
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	6000	18.1323	17.2026
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	8000	17.9126	16.9829
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	10000	17.7566	16.8269
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	15000	17.4075	16.4778
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	20000	17.1429	16.2132
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	25000	16.9207	15.9909
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	30000	16.7384	15.8087
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	40000	16.4447	15.515
1996-10-02	01:37:30	s115	R	300	2.17521	1.53441	50000	16.1401	15.2104
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	2000	19.1512	18.2215
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	4000	18.4795	17.5498
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	6000	18.1364	17.2067
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	8000	17.8986	16.9689
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	10000	17.6959	16.7662
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	15000	17.3255	16.3958
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	20000	17.0546	16.1249
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	25000	16.7926	15.8629
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	30000	16.5913	15.6616
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	40000	16.2527	15.323
1996-10-02	01:44:21	s116	R	600	2.17521	1.53441	50000	15.9147	14.985
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	2000	19.1541	18.2244
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	4000	18.4786	17.5489

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	6000	18.1572	17.2275
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	8000	17.9264	16.9967
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	10000	17.7473	16.8176
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	15000	17.4143	16.4846
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	20000	17.1769	16.2472
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	25000	16.9676	16.0379
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	30000	16.7789	15.8492
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	40000	16.4876	15.5579
1996-10-02	01:56:11	s117	R	600	2.17521	1.53441	50000	16.1789	15.2492
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	2000	19.6415	18.7118
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	4000	18.9276	17.9979
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	6000	18.562	17.6323
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	8000	18.309	17.3793
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	10000	18.0985	17.1688
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	15000	17.6718	16.7421
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	20000	17.3466	16.4169
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	25000	17.0527	16.123
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	30000	16.8091	15.8794
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	40000	16.3633	15.4336
1996-10-02	02:08:00	s118	V	300	2.17521	1.53441	50000	16.0105	15.0808
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	2000	20.3875	19.4578
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	4000	19.6666	18.7368
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	6000	19.304	18.3743

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	8000	19.0071	18.0774
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	10000	18.7768	17.8471
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	15000	18.3474	17.4177
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	20000	17.9753	17.0456
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	25000	17.6987	16.769
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	30000	17.4594	16.5297
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	40000	16.9846	16.0549
1996-10-02	02:14:49	s119	B	300	2.17521	1.53441	50000	16.616	15.6863
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	2000	19.1632	18.2335
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	4000	18.4802	17.5505
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	6000	18.1184	17.1887
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	8000	17.8195	16.8898
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	10000	17.5735	16.6438
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	15000	17.0937	16.164
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	20000	16.7261	15.7964
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	25000	16.4145	15.4848
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	30000	16.1257	15.1959
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	40000	15.6008	14.6711
1996-10-02	04:02:55	s136	R	600	2.17521	1.53441	50000	15.1876	14.2579
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	2000	19.0716	18.1419
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	4000	18.3356	17.4059
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	6000	17.9314	17.0017
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	8000	17.6319	16.7022

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	10000	17.411	16.4813
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	15000	16.9936	16.0639
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	20000	16.6572	15.7275
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	25000	16.357	15.4273
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	30000	16.0653	15.1356
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	40000	15.6198	14.6901
1996-10-02	04:26:52	s137	R	600	2.17521	1.53441	50000	15.2877	14.358
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	2000	19.1961	18.2618
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	4000	18.5361	17.6017
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	6000	18.1997	17.2653
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	8000	17.9602	17.0259
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	10000	17.7718	16.8375
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	15000	17.4421	16.5078
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	20000	17.2456	16.3112
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	25000	17.0864	16.1521
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	30000	16.9749	16.0406
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	40000	16.7462	15.8118
1996-10-03	01:43:30	u100	R	300	2.16706	1.53769	50000	16.5317	15.5974
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	2000	19.1672	18.2329
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	4000	18.5578	17.6235
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	6000	18.2426	17.3082
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	8000	18.0392	17.1048
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	10000	17.8695	16.9351

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	15000	17.5786	16.6443
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	20000	17.4193	16.4849
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	25000	17.2994	16.365
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	30000	17.1966	16.2623
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	40000	17.0408	16.1064
1996-10-03	01:50:20	u101	R	300	2.16706	1.53769	50000	16.9204	15.9861
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	2000	19.1874	18.2531
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	4000	18.5315	17.5971
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	6000	18.2055	17.2711
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	8000	17.9701	17.0358
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	10000	17.7914	16.8571
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	15000	17.4531	16.5188
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	20000	17.2074	16.2731
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	25000	17.0123	16.078
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	30000	16.8475	15.9131
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	40000	16.5464	15.6121
1996-10-03	01:57:02	u102	R	600	2.16706	1.53769	50000	16.2809	15.3465
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	2000	19.1955	18.2612
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	4000	18.5352	17.6009
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	6000	18.2201	17.2858
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	8000	18.0048	17.0705
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	10000	17.8289	16.8945
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	15000	17.5381	16.6037

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	20000	17.3113	16.3769
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	25000	17.1411	16.2068
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	30000	17.0081	16.0738
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	40000	16.7752	15.8409
1996-10-03	02:08:39	u103	R	600	2.16706	1.53769	50000	16.5802	15.6459
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	2000	19.6603	18.726
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	4000	18.9677	18.0333
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	6000	18.6118	17.6775
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	8000	18.3787	17.4444
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	10000	18.1905	17.2562
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	15000	17.8341	16.8998
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	20000	17.5589	16.6246
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	25000	17.3134	16.3791
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	30000	17.1107	16.1764
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	40000	16.7511	15.8168
1996-10-03	02:20:32	u104	V	300	2.16706	1.53769	50000	16.4512	15.5169
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	2000	20.4223	19.488
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	4000	19.7916	18.8572
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	6000	19.4287	18.4943
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	8000	19.1411	18.2068
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	10000	18.9535	18.0192
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	15000	18.5726	17.6382
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	20000	18.2553	17.3209

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	25000	18.0423	17.108
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	30000	17.8591	16.9248
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	40000	17.5683	16.6339
1996-10-03	02:27:17	u105	B	300	2.16706	1.53769	50000	17.3446	16.4102
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	2000	19.1718	18.2374
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	4000	18.5077	17.5734
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	6000	18.1919	17.2575
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	8000	17.9713	17.037
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	10000	17.8045	16.8701
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	15000	17.4952	16.5609
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	20000	17.2838	16.3495
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	25000	17.09	16.1556
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	30000	16.9465	16.0122
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	40000	16.6534	15.7191
1996-10-03	04:00:57	u118	R	300	2.16706	1.53769	50000	16.3756	15.4413
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	2000	19.2099	18.2755
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	4000	18.5295	17.5951
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	6000	18.2135	17.2791
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	8000	17.9791	17.0448
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	10000	17.8005	16.8662
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	15000	17.476	16.5416
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	20000	17.217	16.2827
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	25000	17.0043	16.0699

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	30000	16.8131	15.8787
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	40000	16.4961	15.5617
1996-10-03	04:07:44	u119	R	600	2.16706	1.53769	50000	16.2138	15.2794
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	2000	19.1977	18.2634
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	4000	18.5413	17.6069
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	6000	18.2278	17.2934
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	8000	17.9996	17.0653
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	10000	17.8501	16.9157
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	15000	17.5794	16.6451
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	20000	17.3589	16.4245
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	25000	17.2058	16.2715
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	30000	17.0582	16.1238
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	40000	16.8059	15.8715
1996-10-03	04:19:24	u120	R	600	2.16706	1.53769	50000	16.5519	15.6175
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	2000	19.2407	18.3063
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	4000	18.5673	17.633
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	6000	18.2438	17.3095
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	8000	18.0147	17.0803
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	10000	17.8669	16.9326
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	15000	17.5315	16.5972
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	20000	17.3004	16.366
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	25000	17.1212	16.1868
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	30000	16.9513	16.0169

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	40000	16.6184	15.6841
1996-10-03	04:31:03	u121	R	300	2.16706	1.53769	50000	16.3445	15.4101
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	2000	19.1195	18.0419
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	4000	18.3938	17.3161
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	6000	18.0077	16.9301
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	8000	17.7386	16.661
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	10000	17.5443	16.4667
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	15000	17.2019	16.1243
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	20000	16.9359	15.8583
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	25000	16.7025	15.6249
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	30000	16.4595	15.3819
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	40000	15.9775	14.8998
1996-10-31	01:00:07	w069	R	60	1.93449	1.64256	50000	15.6053	14.5277
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	2000	19.1543	18.0767
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	4000	18.3328	17.2552
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	6000	17.9601	16.8825
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	8000	17.7214	16.6438
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	10000	17.5321	16.4545
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	15000	17.1704	16.0928
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	20000	16.8955	15.8179
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	25000	16.6549	15.5773
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	30000	16.4237	15.3461
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	40000	16.0236	14.946

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-10-31	01:02:55	w070	R	300	1.93449	1.64256	50000	15.7135	14.6359
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	2000	19.6033	18.5209
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	4000	18.7049	17.6225
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	6000	18.3144	17.232
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	8000	18.0255	16.9431
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	10000	17.7921	16.7097
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	15000	17.3586	16.2762
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	20000	17.0094	15.9271
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	25000	16.7224	15.64
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	30000	16.4904	15.408
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	40000	16.1045	15.0222
1996-11-01	01:10:56	w071	V	300	1.92606	1.64617	50000	15.7636	14.6812
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	2000	20.357	19.2746
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	4000	19.4076	18.3252
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	6000	18.9686	17.8863
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	8000	18.6393	17.5569
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	10000	18.3778	17.2955
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	15000	17.8295	16.7471
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	20000	17.4336	16.3512
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	25000	17.1186	16.0363
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	30000	16.8483	15.7659
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	40000	16.4099	15.3275
1996-11-01	01:18:34	w072	B	300	1.92606	1.64617	50000	16.0641	14.9817

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	2000	19.1924	18.11
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	4000	18.4473	17.3649
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	6000	18.1019	17.0195
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	8000	17.8563	16.7739
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	10000	17.7467	16.6643
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	15000	17.417	16.3346
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	20000	17.242	16.1597
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	25000	17.0365	15.9542
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	30000	16.9496	15.8672
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	40000	16.7499	15.6675
1996-11-01	01:30:36	w073	R	30	1.92606	1.64617	50000	16.4561	15.3737
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	2000	19.1387	18.0564
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	4000	18.3525	17.2701
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	6000	17.9603	16.8779
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	8000	17.691	16.6086
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	10000	17.5013	16.4189
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	15000	17.1423	16.0599
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	20000	16.8149	15.7325
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	25000	16.5698	15.4874
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	30000	16.3773	15.2949
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	40000	16.0208	14.9384
1996-11-01	01:34:54	w074	R	30	1.92606	1.64617	50000	15.7143	14.6319
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	2000	22.007	20.9246

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	4000	20.3142	19.2318
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	6000	19.2984	18.2161
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	8000	18.6485	17.5661
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	10000	18.2754	17.1931
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	15000	17.6493	16.5669
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	20000	16.6113	15.5289
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	25000	15.2336	14.1512
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	30000	15.1908	14.1084
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	40000	15.1395	14.0571
1996-11-01	02:02:06	w076	R	60	1.92606	1.64617	50000	15.0945	14.0121
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	2000	19.0805	17.9981
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	4000	18.3967	17.3144
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	6000	18.0089	16.9265
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	8000	17.7677	16.6853
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	10000	17.5787	16.4964
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	15000	17.162	16.0796
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	20000	16.9016	15.8192
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	25000	16.6887	15.6063
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	30000	16.5054	15.423
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	40000	16.2929	15.2106
1996-11-01	01:08:36	x116	R	60	1.92606	1.64617	50000	16.0645	14.9822
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	2000	19.1083	18.0213
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	4000	18.3359	17.2488

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	6000	17.9778	16.8907
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	8000	17.7333	16.6462
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	10000	17.5519	16.4648
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	15000	17.1906	16.1035
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	20000	16.9287	15.8417
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	25000	16.7399	15.6529
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	30000	16.5752	15.4881
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	40000	16.3545	15.2675
1996-11-02	01:12:10	x117	R	300	1.91762	1.64974	50000	16.1746	15.0875
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	2000	20.259	19.1719
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	4000	19.4064	18.3193
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	6000	18.9745	17.8874
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	8000	18.6471	17.56
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	10000	18.3751	17.288
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	15000	17.8617	16.7746
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	20000	17.5069	16.4198
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	25000	17.2062	16.1192
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	30000	16.9404	15.8534
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	40000	16.5216	15.4345
1996-11-02	01:25:52	x119	B	300	1.91762	1.64974	50000	16.189	15.1019
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	2000	19.1239	18.0368
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	4000	18.2912	17.2041
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	6000	17.8972	16.8101

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	8000	17.6451	16.558
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	10000	17.4467	16.3596
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	15000	17.0693	15.9822
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	20000	16.7759	15.6888
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	25000	16.537	15.4499
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	30000	16.3251	15.238
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	40000	16.0091	14.922
1996-11-02	01:32:44	y001	R	300	1.91762	1.64974	50000	15.744	14.6569
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	2000	19.2182	18.1311
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	4000	18.2198	17.1327
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	6000	17.8478	16.7607
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	8000	17.6106	16.5235
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	10000	17.4286	16.3415
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	15000	17.086	15.999
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	20000	16.871	15.7839
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	25000	16.6928	15.6057
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	30000	16.5441	15.4571
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	40000	16.3018	15.2147
1996-11-02	02:06:27	y006	R	300	1.91762	1.64974	50000	16.0864	14.9993
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	2000	18.9787	17.8917
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	4000	18.2318	17.1448
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	6000	17.8791	16.792
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	8000	17.6311	16.544

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	10000	17.4255	16.3384
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	15000	17.0521	15.965
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	20000	16.8032	15.7161
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	25000	16.5962	15.5091
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	30000	16.3983	15.3112
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	40000	16.0718	14.9847
1996-11-02	02:13:13	y007	R	120	1.91762	1.64974	50000	15.7916	14.7045
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	2000	19.2166	18.1295
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	4000	18.2986	17.2115
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	6000	17.9353	16.8482
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	8000	17.6807	16.5936
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	10000	17.4943	16.4072
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	15000	17.115	16.0279
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	20000	16.8234	15.7363
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	25000	16.6083	15.5212
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	30000	16.4098	15.3228
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	40000	16.0836	14.9965
1996-11-02	03:00:38	y014	R	300	1.91762	1.64974	50000	15.801	14.7139
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	2000	19.1265	18.0394
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	4000	18.3307	17.2437
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	6000	17.948	16.8609
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	8000	17.687	16.5999
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	10000	17.4727	16.3856

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	15000	17.062	15.975
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	20000	16.7463	15.6592
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	25000	16.482	15.3949
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	30000	16.2712	15.1841
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	40000	15.8962	14.8091
1996-11-02	03:07:22	y015	R	300	1.91762	1.64974	50000	15.5736	14.4865
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	2000	19.0209	17.9339
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	4000	18.3092	17.2221
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	6000	17.9907	16.9036
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	8000	17.7456	16.6585
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	10000	17.5223	16.4353
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	15000	17.1366	16.0496
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	20000	16.9064	15.8194
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	25000	16.721	15.6339
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	30000	16.5382	15.4511
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	40000	16.2044	15.1173
1996-11-02	00:26:36	z088r	R	60	1.91762	1.64974	50000	15.9284	14.8413
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	2000	19.0178	17.9307
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	4000	18.3072	17.2202
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	6000	17.9144	16.8273
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	8000	17.6536	16.5665
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	10000	17.39	16.303
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	15000	16.9558	15.8687

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	20000	16.6633	15.5763
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	25000	16.4224	15.3353
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	30000	16.1847	15.0976
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	40000	15.7639	14.6768
1996-11-02	00:30:30	z089	R	30	1.91762	1.64974	50000	15.4071	14.32
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	2000	19.0837	17.9966
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	4000	18.3477	17.2606
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	6000	18.0401	16.953
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	8000	17.827	16.7399
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	10000	17.663	16.5759
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	15000	17.338	16.2509
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	20000	17.1923	16.1052
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	25000	17.1113	16.0242
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	30000	17.1112	16.0242
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	40000	17.0188	15.9317
1996-11-02	00:36:54	z090	R	30	1.91762	1.64974	50000	16.9106	15.8235
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	2000	18.9996	17.9125
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	4000	18.3549	17.2678
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	6000	18.0533	16.9662
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	8000	17.8582	16.7712
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	10000	17.7296	16.6425
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	15000	17.3683	16.2812
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	20000	17.1737	16.0866

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	25000	17.0723	15.9852
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	30000	16.9664	15.8793
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	40000	16.8805	15.7934
1996-11-02	01:04:38	z092	R	30	1.91762	1.64974	50000	16.8741	15.787
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	2000	19.0847	17.993
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	4000	18.3464	17.2547
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	6000	18.0089	16.9172
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	8000	17.7807	16.689
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	10000	17.5693	16.4776
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	15000	17.1743	16.0826
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	20000	16.8269	15.7351
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	25000	16.6039	15.5122
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	30000	16.3818	15.2901
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	40000	15.8818	14.7901
1996-11-03	01:31:53	z094	R	30	1.90917	1.65327	50000	15.5358	14.4441
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	2000	19.1201	18.0284
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	4000	18.3948	17.303
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	6000	18.0858	16.9941
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	8000	17.8337	16.742
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	10000	17.6718	16.5801
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	15000	17.4596	16.3679
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	20000	17.2132	16.1215
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	25000	17.1235	16.0317

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	30000	17.0094	15.9177
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	40000	16.8125	15.7208
1996-11-03	01:59:14	z097	R	30	1.90917	1.65327	50000	16.5922	15.5004
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	2000	19.0011	17.9094
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	4000	18.3034	17.2117
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	6000	17.9132	16.8215
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	8000	17.6526	16.5609
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	10000	17.4549	16.3632
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	15000	17.0475	15.9558
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	20000	16.718	15.6262
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	25000	16.4339	15.3422
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	30000	16.1832	15.0915
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	40000	15.8321	14.7404
1996-11-03	00:40:17	a1044	R	60	1.90917	1.65327	50000	15.58	14.4883
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	2000	19.0885	17.9968
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	4000	18.2896	17.1978
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	6000	17.9706	16.8789
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	8000	17.751	16.6592
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	10000	17.562	16.4703
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	15000	17.2315	16.1398
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	20000	16.9811	15.8894
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	25000	16.7696	15.6779
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	30000	16.622	15.5303

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	40000	16.451	15.3593
1996-11-03	00:43:23	a1045	R	180	1.90917	1.65327	50000	16.4172	15.3255
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	2000	19.4419	18.3502
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	4000	18.6224	17.5307
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	6000	18.2153	17.1236
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	8000	17.9091	16.8174
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	10000	17.6578	16.566
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	15000	17.1703	16.0786
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	20000	16.7976	15.7059
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	25000	16.5029	15.4112
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	30000	16.246	15.1543
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	40000	15.8362	14.7444
1996-11-03	00:48:16	a1046	V	240	1.90917	1.65327	50000	15.5013	14.4096
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	2000	20.2219	19.1302
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	4000	19.3923	18.3006
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	6000	18.9308	17.8391
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	8000	18.6097	17.518
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	10000	18.3452	17.2535
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	15000	17.8792	16.7875
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	20000	17.4876	16.3959
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	25000	17.1747	16.083
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	30000	16.9194	15.8277
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	40000	16.5044	15.4127

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-03	00:54:07	a1047	B	300	1.90917	1.65327	50000	16.1859	15.0941
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	2000	19.1039	18.0076
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	4000	18.2867	17.1904
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	6000	17.9379	16.8416
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	8000	17.7017	16.6054
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	10000	17.5091	16.4128
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	15000	17.1658	16.0695
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	20000	16.9387	15.8424
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	25000	16.7478	15.6516
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	30000	16.5924	15.4961
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	40000	16.3016	15.2054
1996-11-04	01:26:17	a1052	R	300	1.90072	1.65674	50000	16.0835	14.9873
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	2000	19.1575	18.0612
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	4000	18.3112	17.2149
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	6000	17.9442	16.8479
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	8000	17.701	16.6047
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	10000	17.5192	16.4229
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	15000	17.1941	16.0978
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	20000	16.9597	15.8634
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	25000	16.7944	15.6982
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	30000	16.6477	15.5514
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	40000	16.4198	15.3236
1996-11-04	01:33:01	a1053	R	300	1.90072	1.65674	50000	16.2511	15.1549

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	2000	19.0534	17.9571
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	4000	18.3156	17.2194
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	6000	17.9588	16.8626
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	8000	17.7323	16.636
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	10000	17.5457	16.4495
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	15000	17.1937	16.0974
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	20000	16.9963	15.9001
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	25000	16.8436	15.7473
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	30000	16.7001	15.6038
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	40000	16.5944	15.4982
1996-11-04	02:24:05	a1060	R	180	1.90072	1.65674	50000	16.571	15.4747
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	2000	19.0802	17.984
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	4000	18.2683	17.172
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	6000	17.8979	16.8017
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	8000	17.63	16.5337
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	10000	17.4255	16.3292
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	15000	17.0224	15.9262
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	20000	16.7299	15.6336
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	25000	16.4629	15.3667
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	30000	16.2511	15.1549
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	40000	15.9278	14.8315
1996-11-04	02:28:50	a1061	R	180	1.90072	1.65674	50000	15.6538	14.5575
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	2000	19.0437	17.9474

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	4000	18.261	17.1647
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	6000	17.9035	16.8072
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	8000	17.6518	16.5556
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	10000	17.4605	16.3642
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	15000	17.0807	15.9845
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	20000	16.7876	15.6914
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	25000	16.5536	15.4573
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	30000	16.3837	15.2874
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	40000	16.141	15.0448
1996-11-04	03:02:48	a1066	R	300	1.90072	1.65674	50000	15.9506	14.8543
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	2000	19.1222	18.026
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	4000	18.2201	17.1238
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	6000	17.7991	16.7028
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	8000	17.5318	16.4355
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	10000	17.3396	16.2433
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	15000	17.0101	15.9138
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	20000	16.7233	15.627
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	25000	16.4995	15.4032
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	30000	16.3005	15.2042
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	40000	16.0246	14.9283
1996-11-04	00:44:08	b1108	R	180	1.90072	1.65674	50000	15.8078	14.7115
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	2000	20.2395	19.1432
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	4000	19.4306	18.3344

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	6000	18.9711	17.8748
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	8000	18.6798	17.5835
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	10000	18.4587	17.3625
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	15000	18.0014	16.9052
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	20000	17.662	16.5658
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	25000	17.3596	16.2633
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	30000	17.1284	16.0321
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	40000	16.7638	15.6675
1996-11-04	00:53:52	b1110	B	180	1.90072	1.65674	50000	16.4968	15.4005
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	2000	19.0885	17.9877
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	4000	18.2807	17.1799
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	6000	17.9182	16.8175
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	8000	17.6628	16.562
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	10000	17.464	16.3632
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	15000	17.0613	15.9605
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	20000	16.8078	15.707
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	25000	16.6052	15.5045
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	30000	16.4273	15.3266
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	40000	16.1701	15.0694
1996-11-05	02:14:48	b1120	R	180	1.89226	1.66017	50000	15.9902	14.8895
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	2000	19.0786	17.9779
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	4000	18.2856	17.1848
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	6000	17.8917	16.7909

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	8000	17.6078	16.5071
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	10000	17.4053	16.3045
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	15000	17.0389	15.9381
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	20000	16.7613	15.6606
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	25000	16.5427	15.442
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	30000	16.3612	15.2604
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	40000	16.0535	14.9527
1996-11-05	02:19:00	b1121	R	300	1.89226	1.66017	50000	15.8142	14.7134
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	2000	19.0756	17.9749
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	4000	18.3209	17.2202
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	6000	17.9464	16.8456
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	8000	17.6979	16.5971
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	10000	17.4883	16.3876
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	15000	17.1188	16.0181
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	20000	16.8466	15.7459
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	25000	16.6367	15.5359
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	30000	16.4986	15.3978
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	40000	16.2524	15.1516
1996-11-05	03:17:16	c1002	R	180	1.89226	1.66017	50000	16.0946	14.9938
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	2000	18.4972	17.3082
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	4000	17.3488	16.1597
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	6000	16.8425	15.6534
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	8000	16.524	15.335

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	10000	16.2789	15.0898
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	15000	15.8632	14.6742
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	20000	15.5569	14.3678
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	25000	15.3244	14.1354
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	30000	15.1471	13.9581
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	40000	14.8709	13.6818
1996-12-05	01:08:35	g1017	R	120	1.63748	1.72905	50000	14.6624	13.4733
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	2000	18.393	17.2027
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	4000	17.1405	15.9503
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	6000	16.6107	15.4205
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	8000	16.2835	15.0933
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	10000	16.0344	14.8442
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	15000	15.5895	14.3992
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	20000	15.3168	14.1266
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	25000	15.1048	13.9145
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	30000	14.9246	13.7344
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	40000	14.6392	13.449
1996-12-06	01:24:47	g1018	R	600	1.62903	1.72999	50000	14.4136	13.2234
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	2000	18.3701	17.1798
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	4000	17.1454	15.9552
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	6000	16.6121	15.4219
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	8000	16.2903	15.1
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	10000	16.0577	14.8675

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	15000	15.6532	14.463
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	20000	15.3751	14.1849
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	25000	15.1665	13.9763
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	30000	14.994	13.8038
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	40000	14.7181	13.5279
1996-12-06	02:27:55	g1022	R	600	1.62903	1.72999	50000	14.5056	13.3154
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	2000	18.9914	17.8001
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	4000	17.5144	16.3232
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	6000	16.8132	15.622
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	8000	16.4648	15.2736
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	10000	16.2251	15.0339
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	15000	15.8141	14.6228
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	20000	15.5288	14.3376
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	25000	15.3146	14.1233
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	30000	15.1443	13.953
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	40000	14.8923	13.701
1996-12-07	02:04:54	g1047	R	600	1.62059	1.73083	50000	14.7159	13.5247
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	2000	19.7026	18.5113
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	4000	18.3402	17.149
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	6000	17.7602	16.569
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	8000	17.398	16.2067
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	10000	17.1192	15.928
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	15000	16.6119	15.4206

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	20000	16.2438	15.0525
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	25000	15.9614	14.7702
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	30000	15.7352	14.544
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	40000	15.376	14.1847
1996-12-07	02:16:18	g1048	B	600	1.62059	1.73083	50000	15.099	13.9077
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	2000	18.5412	17.3499
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	4000	17.4803	16.289
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	6000	17.0058	15.8145
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	8000	16.6922	15.5009
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	10000	16.4449	15.2536
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	15000	16.0142	14.8229
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	20000	15.6919	14.5006
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	25000	15.4346	14.2434
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	30000	15.2463	14.0551
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	40000	14.9187	13.7275
1996-12-07	00:43:04	h1015	R	30	1.62059	1.73083	50000	14.651	13.4597
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	2000	18.6834	17.4921
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	4000	17.4843	16.2931
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	6000	16.9905	15.7992
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	8000	16.6733	15.4821
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	10000	16.4376	15.2464
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	15000	16.0025	14.8112
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	20000	15.701	14.5097

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	25000	15.4728	14.2816
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	30000	15.2617	14.0704
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	40000	14.9087	13.7174
1996-12-07	00:48:05	h1016	R	30	1.62059	1.73083	50000	14.6679	13.4766
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	2000	18.624	17.4328
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	4000	17.1928	16.0015
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	6000	16.5656	15.3744
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	8000	16.2354	15.0442
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	10000	16.002	14.8107
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	15000	15.6029	14.4116
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	20000	15.3449	14.1536
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	25000	15.1397	13.9484
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	30000	14.9749	13.7836
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	40000	14.7203	13.529
1996-12-07	00:59:13	g1084	R	600	1.62059	1.73083	50000	14.5355	13.3442
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	2000	19.654	18.4618
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	2000	19.654	18.4618
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	4000	18.24	17.0478
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	4000	18.24	17.0478
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	6000	17.6166	16.4244
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	6000	17.6166	16.4244
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	8000	17.2342	16.042
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	8000	17.2342	16.042

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	10000	16.9496	15.7574
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	10000	16.9496	15.7574
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	15000	16.4448	15.2526
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	15000	16.4448	15.2526
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	20000	16.0831	14.8909
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	20000	16.0831	14.8909
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	25000	15.8132	14.621
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	25000	15.8132	14.621
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	30000	15.593	14.4007
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	30000	15.593	14.4007
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	40000	15.2553	14.0631
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	40000	15.2553	14.0631
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	50000	14.9974	13.8052
1996-12-08	01:10:46	g1085	B	600	1.61216	1.73158	50000	14.9974	13.8052
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	2000	18.4565	17.2643
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	2000	18.4565	17.2643
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	4000	17.2318	16.0396
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	4000	17.2318	16.0396
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	6000	16.7399	15.5477
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	6000	16.7399	15.5477
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	8000	16.4366	15.2444
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	8000	16.4366	15.2444
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	10000	16.2089	15.0167

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	10000	16.2089	15.0167
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	15000	15.8055	14.6133
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	15000	15.8055	14.6133
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	20000	15.5249	14.3327
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	20000	15.5249	14.3327
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	25000	15.313	14.1208
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	25000	15.313	14.1208
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	30000	15.1385	13.9463
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	30000	15.1385	13.9463
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	40000	14.8638	13.6716
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	40000	14.8638	13.6716
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	50000	14.6474	13.4551
1996-12-08	01:34:19	g1087	R	600	1.61216	1.73158	50000	14.6474	13.4551
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	2000	19.7919	18.5997
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	2000	19.7919	18.5997
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	4000	18.4091	17.2169
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	4000	18.4091	17.2169
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	6000	17.79	16.5978
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	6000	17.79	16.5978
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	8000	17.4104	16.2182
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	8000	17.4104	16.2182
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	10000	17.1282	15.936
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	10000	17.1282	15.936

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	15000	16.6207	15.4285
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	15000	16.6207	15.4285
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	20000	16.2644	15.0722
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	20000	16.2644	15.0722
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	25000	15.9892	14.797
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	25000	15.9892	14.797
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	30000	15.7669	14.5747
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	30000	15.7669	14.5747
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	40000	15.4209	14.2286
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	40000	15.4209	14.2286
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	50000	15.1537	13.9615
1996-12-08	01:46:05	g1088	B	600	1.61216	1.73158	50000	15.1537	13.9615
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	2000	18.5037	17.3115
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	2000	18.5037	17.3115
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	4000	17.3092	16.117
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	4000	17.3092	16.117
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	6000	16.8174	15.6252
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	6000	16.8174	15.6252
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	8000	16.5076	15.3154
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	8000	16.5076	15.3154
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	10000	16.2797	15.0875
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	10000	16.2797	15.0875
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	15000	15.8776	14.6854

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	15000	15.8776	14.6854
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	20000	15.5906	14.3984
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	20000	15.5906	14.3984
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	25000	15.3746	14.1824
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	25000	15.3746	14.1824
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	30000	15.2002	14.008
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	30000	15.2002	14.008
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	40000	14.937	13.7448
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	40000	14.937	13.7448
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	50000	14.7404	13.5482
1996-12-08	01:57:12	g1089	R	600	1.61216	1.73158	50000	14.7404	13.5482
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	2000	19.1241	17.9304
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	4000	17.6782	16.4845
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	6000	17.0059	15.8122
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	8000	16.6632	15.4695
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	10000	16.4339	15.2402
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	15000	16.0376	14.8439
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	20000	15.7621	14.5684
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	25000	15.5538	14.3601
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	30000	15.3861	14.1924
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	40000	15.1305	13.9368
1996-12-10	01:53:02	h1104	R	600	1.59534	1.73278	50000	14.9354	13.7417
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	2000	19.6931	18.4994

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	4000	18.2139	17.0202
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	6000	17.3821	16.1884
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	8000	16.94	15.7462
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	10000	16.6568	15.4631
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	15000	16.1778	14.9841
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	20000	15.8383	14.6446
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	25000	15.5697	14.3759
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	30000	15.3507	14.157
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	40000	15.0133	13.8196
1996-12-10	02:07:30	h1105	V	300	1.59534	1.73278	50000	14.7493	13.5556
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	2000	18.3371	17.1428
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	4000	17.4129	16.2186
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	6000	16.9734	15.7791
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	8000	16.6671	15.4728
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	10000	16.4309	15.2367
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	15000	16.0027	14.8084
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	20000	15.6983	14.504
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	25000	15.4632	14.2689
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	30000	15.267	14.0727
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	40000	14.9609	13.7666
1996-12-11	01:11:10	h1126	R	600	1.58694	1.73323	50000	14.7157	13.5214
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	2000	18.4776	17.2833
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	4000	17.4404	16.2461

Table 4: Measured and calibrated brightness for comet 46P/Wirtanen during its 1996 apparition.

Date (UT)	Time (UT)	Image	F	Exp. time / s	r AU	Δ AU	ρ km	Mag	Mag_{hc}
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	6000	16.983	15.7887
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	8000	16.6847	15.4904
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	10000	16.4561	15.2618
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	15000	16.0317	14.8375
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	20000	15.7234	14.5291
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	25000	15.4869	14.2926
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	30000	15.2942	14.0999
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	40000	14.9995	13.8053
1996-12-11	01:35:40	i1054	R	120	1.58694	1.73323	50000	14.7695	13.5752