
INTERNATIONAL COMET QUARTERLY

Whole Number 104	OCTOBER 1997	Vol. 19, No. 4
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SMITHSONIAN ASTROPHYSICAL OBSERVATORY
60 Garden Street • Cambridge, MA 02138 • U.S.A.

The *International Comet Quarterly* (ICQ) is a journal devoted to news and observation of comets, published by the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts. Regular issues are published 4 times per year (January, April, July, and October), with an annual *Comet Handbook* of ephemerides published normally in the first half of the year as a special fifth issue. An index to each volume normally is published in every other October issue (odd-numbered years); the ICQ is also indexed in *Astronomy and Astrophysics Abstracts* and in *Science Abstracts Section A*.

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Group subscription rates available upon request. Back issues are \$6.00 each — except for "current" *Comet Handbooks*, which are available for \$15.00 (\$8.00 to subscribers if ordered with their ICQ subscription; see above). Up-to-date information concerning comet discoveries, orbital elements, and ephemerides can be obtained by subscribing to the *IAU Circulars* and/or the *Minor Planet Circulars* (via postal mail and also available via computer access); for further information, contact the above e-mail address (or the ICQ at the above postal address).

Cometary observations should be sent to the Editor in Cambridge; all data intended for publication in the ICQ that is not sent via computer electronic mail should be sent on standard ICQ observation report forms, which can be obtained upon request from the Editor. Those who can send observational data (or manuscripts) in machine-readable form are encouraged to do so [especially through e-mail via the computer networks SPAN (6700::DAN) or Internet (ICQ@CFA.HARVARD.EDU), or via floppy disks that can be read on an IBM PC], and should contact the Editor for further information. The ICQ has extensive information for comet observers on the World Wide Web, including the Keys to Abbreviations used in data tabulation (see URL <http://cfa-www.harvard.edu/cfa/ps/icq.html>). In early 1997, the ICQ published a 225-page *Guide to Observing Comets*, available in first-edition form to ICQ subscribers for \$15.00 (one copy only), or to non-subscribers for \$25.00 per copy; only a few copies are still available.

Most of the Observation Coordinators (OCs) listed below have e-mail contacts with the ICQ Editor; observers in the general area of such OCs who lack access to e-mail networks may send data to the OC for relay to the ICQ in electronic form.

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This issue is No. 104 of the publication originally called *The Comet* (founded March 1973) and is Vol. 19, No. 4, of the ICQ. [ISSN 0736-6922]

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New CATALOGUE OF COMETARY ORBITS

The twelfth edition of the *Catalogue of Cometary Orbits* to be published by the IAU's Central Bureau for Astronomical Telegrams, under the direction of Brian G. Marsden, was issued in October. The 119-page *Catalogue* costs US\$30.00 (add \$10.00 for airmail delivery), and may be ordered through the ICQ.

From the Editor

We are happy to report that numerous well-known comet observers are planning or considering attending the second International Workshop on Cometary Astronomy (IWCA II) in Cambridge, England, in August 1999 (see July 1997 issue, page 156). In addition to providing information in the printed *ICQ*, we have created a World Wide Web page for up-to-date information on this meeting, at <http://cfa-www.harvard.edu/cfa/ps/icq/IWCA2.html>.

And, speaking of Web pages, the *ICQ*'s Website has been completely re-designed this past summer. Check it out at URL <http://cfa-www.harvard.edu/cfa/ps/icq.html>. Between the original information available at our CFA website and that from the best linked comet websites around the world, this may be among the very best of all websites devoted to comets.

We have tentatively decided *not* to publish an *ICQ*/SAO second edition of the *Guide to Observing Comets*, and instead focus on producing a substantially-revised second-edition manuscript for a major outside publisher. It is currently anticipated that such a second edition of the *Guide* will be published sometime in 1999. The first edition of the *Guide* was published as a 225-page *ICQ*/SAO special publication in February 1997. The first edition is almost completely sold out, and the price has been raised for the few remaining copies, effective immediately, to \$15.00 for *ICQ* subscribers and to \$25.00 for non-subscribers. — D. W. E. Green

Φ Φ Φ

Robert Burnham, Jr. (1931-1993)

Word was only recently received that Robert Burnham, Jr., discoverer of six comets in a three-year span starting in 1957 (and not to be confused with the former editor of *Astronomy* magazine), died of congestive heart failure in a San Diego, CA, hospital on 1993 March 20. This word was received by way of an excellent article (titled "Sky Writer") written by award-winning journalist Tony Ortega in the 1997 Sept. 25-Oct. 1 issue of the *Phoenix* (AZ) *New Times* tabloid newspaper, and the contents of this article are available on the *ICQ* World Wide Web links page and (at least temporarily) on at URL <http://www.phoenixnewtimes.com/1997/092597/feature1-1.html> (if that URL is no longer valid, contact <http://www.phoenixnewtimes.com/archive/full/index.html> and do an archive search on keyword "Burnham" to retrieve the article). The article is superbly researched and written, and is recommended to all. The details of this brief obituary are extracted from Ortega's article.

Robert Burnham, Jr., was born on 1931 June 16 in Chicago, and the family moved to Prescott, Arizona, in 1940. As a child, young Robert developed many interests — including ancient history, music, drawing, geology, and astronomy — and he built a laboratory at home where he performed experiments and collected artifacts, coins, and rocks. His schoolmates nicknamed him "Professor". But he had no interest in working, and after his 1949 graduation from high school, Robert remained at home, consumed in his interests, until the Korean War called him into a four-year stint in the U.S. Air Force.

Upon his return home, he got a job as a shipping clerk and resumed his hobbies in his free time — especially his astronomy. He particularly put much time into his "Celestial Survey", cataloguing notebooks full of notes on deep-sky objects such as star clusters, nebulae, and galaxies, after he had become frustrated that there was no publication that he could find with detailed information on these objects throughout the sky. By the end of 1957, using several telescopes, including at least one built by himself, Burnham filled six notebooks with 1200 pages of notes about the celestial objects that he found in his systematic search of the sky. And on the night of 1957 October 18, Robert Burnham, Jr., found his first of six comets — C/1957 U1 (Latyshev-Wild-Burnham; O.S. 1957 IX = 1957f). Burnham was by then so familiar with diffuse objects in the sky that he could rapidly recognize a moving comet from a stationary galaxy or nebula, and he reported his find to both Lowell Observatory in Flagstaff, AZ, and Harvard Observatory in Cambridge, MA.

As has happened with various other comet discoverers in history, the discovery of C/1957 U1 opened doors for Robert Burnham, Jr. Arizona Senator Barry Goldwater would seek to get a political boost by visiting the young comet discoverer at this home some three weeks after the discovery, and Goldwater gave Burnham a 19th-century refracting telescope. Henry Giclas of Lowell Observatory offered Burnham a job in February 1958, commenting that "anybody that spends a lot of time out looking for comets . . . has to have a lot of patience, and he has to want to take the time to do it." Burnham also found four more long-period comets (C/1958 D1, C/1958 R1, C/1959 Y1, and C/1960 B1) and a short-period comet with Charles Slaughter on photographs taken at Lowell Observatory (56P/1959 B1; O.S. 1958 VI = 1959a).

Burnham worked on the stellar proper-motion survey at Lowell Observatory until 1979. In the early years at Flagstaff, he continued adding to his deep-sky survey notebooks with much new information now gleaned from Lowell Observatory archives and his continued observation. The mountains of information collected by Burnham were published in his highly-acclaimed *Burnham's Celestial Handbook: An Observer's Guide to the Universe Beyond the Solar System* in three volumes — first published privately in 1966, and then 12 years later by Dover Publications, Inc. (New York).

Burnham's *Guide* is a wonderful compilation, with many gems of information throughout. But a good flavor of his philosophy comes from his introduction to the first volume: "The appeal of astronomy is both intellectual and aesthetic; it combines the thrill of exploration and discovery, the fun of sight-seeing, and the sheer pleasure of firsthand acquaintance with incredibly wonderful and beautiful things. But it also offers the privilege, not to be taken lightly, of adding something to the knowledge and understanding of man." — D. W. E. Green

Comets for the Visual Observer in 1998

Alan Hale

Southwest Institute for Space Research

Following its spectacular appearance during the first few months of 1997 comet C/1995 O1 (Hale-Bopp) begins 1998 in far-southern skies at a declination, δ , of -64° , having passed opposition at the end of 1997, and should exhibit a total brightness near $m_1 \sim 7$. The comet will remain in south-circumpolar skies for many southern-hemisphere observers, steadily fading, from that point on, although observers in tropical northern latitudes should be able to observe it at $m_1 \sim 8-9$ during February-April. Following conjunction in late June, it will again be at opposition in late December, near $\delta = -74^\circ$. In mid-December, it will be located at the same heliocentric distance as at discovery ($r = 7.15$ AU), and presumably should exhibit a similar brightness ($m_1 \sim 11$).

Other long-period comets visually observable during 1998 include comet C/1997 D1 (Mueller), which will have passed perihelion on 1997 October 11 at $q = 2.246$ AU and opposition in early December 1997. In early 1998, it is well placed in the evening sky near $m_1 \sim 12.0$ and should remain observable for the next two months, fading to $m_1 \sim 13.5$ by the time it disappears in evening twilight near the beginning of March. Comet C/1997 J2 (Meunier-Dupouy) is in conjunction during the third week of January 1998, but as it is located some 57° north of the sun, it should be easily visible from the northern hemisphere near $m_1 \sim 11$. By perihelion on 1998 March 10 ($q = 3.053$ AU), it will be located in the morning sky, enroute to opposition in mid-August — by which time it should reach a peak brightness near $m_1 \sim 10.5$. Afterward it should remain visible through the end of the year, fading to $m_1 \sim 12.5$ by late December. The distant comet C/1997 BA₆ (Spacewatch), which does not reach perihelion until 1999 November 26 ($q = 3.433$ AU), may become visually observable in late 1998; at year's end, it is located in the morning sky near $\delta = -39^\circ$, possibly exhibiting a brightness near $m_1 \sim 14$. [See the *ICQ's 1998 Comet Handbook* for elements and ephemerides of these and fainter comets.]

Short-Period Comets: The Brighter Ones

55P/Tempel-Tuttle. This object, the parent of the Leonid meteors, was successfully recovered at $m_2 = 22$ on 1997 March 4 (*IAU Circular* 6579). Perihelion occurs on 1998 February 28, at $q = 0.977$ AU.

Brightness predictions for this return are problematical, but under the assumption that Vsekhsvyatskij's (1964) H_{10} determination of 8.0 for the 1866 return holds for 1998, the comet should become visually observable at $m_1 \sim 12-13$ sometime in November 1997, brightening to $m_1 \sim 9$ by year's end. During January 1998, it should brighten rapidly as it approaches the earth, and at closest approach to the earth ($\Delta = 0.356$ AU) on the 17th, it will be located at $\delta = +83^\circ$ and perhaps as bright as $m_1 \sim 6-7$. After that, it will travel southward and (presumably) commence fading, but may still be as bright as $m_1 \sim 9$ by the time it disappears into evening twilight in early March.

With this comet's return comes the possibility of a strong display from the Leonid meteors, as occurred in 1966 following the comet's previous perihelion passage in 1965. Calculations of the geometry of the Leonid meteor stream (Yeomans 1981; see also Rao 1995) suggest a reasonable chance of a major Leonid display in 1998 and/or 1999. Moonlight conditions in 1998 around the expected date of maximum (November 17) are excellent, with the moon phase being almost new.

103P/Hartley 2. Having passed perihelion on 1997 December 21 at $q = 1.032$ AU, this comet should be near its peak brightness of $m_1 \sim 8-9$ at the beginning of 1998, conveniently located in the evening sky. It remains well placed for several months thereafter, but it should fade steadily; visual observations should remain possible until about late March, by which time it will have faded to $m_1 \sim 13$.

21P/Giacobini-Zinner. Although it is not as favorable as some historical returns (*e.g.*, that of 1985, when it reached $m_1 \sim 7$ and was visited by the *International Cometary Explorer* spacecraft), this object's 1998 return is nevertheless a good one. Perihelion passage occurs on November 21, at $q = 1.034$ AU.

Following opposition in late May, the comet should become visually observable at $m_1 \sim 12-13$ around July. It should brighten fairly rapidly after that, to a peak brightness of $m_1 \sim 9$ or slightly brighter, around perihelion. It should then fade slightly by the end of the year but should remain accessible to visual instruments until February or March 1999.

Short-Period Comets: The Fainter Ones

29P/Schwassmann-Wachmann 1. This comet was at aphelion in January 1997 and is now inbound toward its next perihelion passage on 2004 July 10 ($q = 5.724$ AU). It emerges into the morning sky around the end of November 1997, is at opposition in mid-April 1998, and remains visible in the evening sky until about August. Following conjunction it again emerges into the morning sky at the very end of 1998 enroute to its next opposition in May 1999.

During the 1996-97 viewing season, the comet continued to display the fairly high level of activity it has exhibited during recent years. Prospective observers should thus continue to monitor it for continuing signs of activity during 1998.

95P = (2060) Chiron. Having passed perihelion over two years earlier, 95P/Chiron is again at opposition in early May 1998. Around that time, it may be visually accessible in larger instruments near $m_1 \sim 15$ or slightly fainter. The visual appearance will almost certainly be completely stellar.

62P/Tsuchinshan 1. Perihelion for this object occurs on 1998 April 19, at $q = 1.496$ AU. This return is not especially favorable, although visual sightings should be possible. Visual observations at the very favorable return in 1985 indicate that the light curve for this comet is quite asymmetric with respect to perihelion; if it exhibits a similar behavior in 1998 it should briefly become observable near $m_1 \sim 13$ during April and May.

88P/Howell. This object is at perihelion on 1998 September 27, at $q = 1.406$ AU; opposition will have already occurred in mid-April. The light curve of this comet is a bit problematic; observations in 1987 (the only other return at which visual observations seem to have been obtained, when the perihelion distance was 0.2 AU larger than in 1998) suggest that the brightness may be strongly asymmetric with respect to perihelion. The 1987 data suggest that the comet may be near $m_1 \sim 13$ during October and November, although a moderately high southerly declination ($\delta \sim -27^\circ$) will favor observers from the southern hemisphere. On the other hand, since the comet is relatively well placed prior to perihelion, this should allow a better determination of the pre-perihelion light curve.

93P/Lovas 1. This object's 1998 return (perihelion October 14, at $q = 1.692$ AU) is almost identical to that in 1989, the respective perihelion dates being only four days apart. Visual observations in 1989 indicate an asymmetric light curve, and suggest that the comet should become observable at $m_1 \sim 13$ near the end of October. Peak brightness, about half a magnitude brighter, should come about a month later, and observations should be possible through the end of the year, when it will be at opposition. The comet's northerly declination (between $\delta = +45^\circ$ and $+48^\circ$) during this period will favor observers in the northern hemisphere.

52P/Harrington-Abell. Visual observations have apparently never been obtained for this comet, and it is usually considered to be an extremely faint object intrinsically. The 1999 return (perihelion January 27, at $q = 1.756$ AU), however, is extremely favorable, with the comet being at opposition only three weeks earlier. It is conceivable, then, that visual observations may be obtained at this return, possibly commencing in December 1998 (at $m_1 \sim 13$ -14, perhaps). The comet's declination of $+41^\circ$ will favor northern-hemisphere observers.

60P/Tsuchinshan 2. Like the previous object, this comet also has apparently never been visually observed. It is at opposition at the very end of 1998, enroute to perihelion passage on 1999 March 8 at $q = 1.770$ AU. If the light curve is symmetric with respect to perihelion, it is possible that visual observations (at $m_1 \sim 12$ -13, perhaps) may be obtained in late 1998, with a peak brightness of perhaps an additional half-magnitude or so being achieved during the first two to three months of 1999.

REFERENCES

- Rao, J. (1995). *Sky Tel.* **90**(5), 24.
 Vsekhsvyatskij, S. K. (1964). *Physical Characteristics of Comets*, Israel Program for Scientific Translations, Jerusalem.
 Yeomans, D. K. (1981). *Icarus* **47**, 492.

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First Seminar of the Ukrainian Astronomical Group

Alexandr R. Baransky

ICQ Observation Coordinator for Ukraine

The Ukrainian Astronomical Group (UAG) was founded in 1994 in Kiev to unite active amateur astronomers from Ukraine and other countries of the former USSR; it includes the Ukrainian Comet Section (ICQ code 37); the Ukrainian Variable Star Section, which works with the AAVSO; and sections pertaining to astrophotography, telescope making, observation of deep-sky objects, and meteor streams.

Under the aegis of the Crimean Laboratory of Sternberg, Astronomical Institute of Moscow University, and Crimean Astrophysical Observatory (CrAO), the First Seminar of the Ukrainian Astronomical Group was held during July 25-August 15. The Crimean Observatory astronomers R. E. Gerschberg, V. I. Pronik, V. Yu. Terebysh, B. M. Vladimirkii, V. M. Lutytiy, and others took part in the Seminar, by invitation of the board of UAG. The meeting took place in sections, so that talks of professional astronomers and amateurs from different branches of astronomy were heard. The meeting of the comet section was led by the well-known discoverer of minor planets and comets, N. S. Chernykh.

Regarding the work of the section, the following lectures and talks were given: A. R. Baransky (UAG) spoke about "The Magazine UAG", which was founded in 1997 and is devoted to news and observations of comets, variable stars, and other celestial objects. N. S. Chernykh (CrAO) lectured on the "International Minor Planet and Comet Service", detailing the famous contributions of the astronomers at the Crimean Observatory to this program. During 30 years, Chernykh's group has discovered two short-period comets and 923 minor planets. V. V. Rumyantsev (CrAO) spoke on "CCD astrometry of asteroids and comets".

A. R. Baransky (UAG) talked about visual observations of comets by the participants of the Ukrainian Comet Section: methods, main results, and collaboration with the *ICQ*. It was noted in his talk that the UCS now numbers 28 active observers of comets, who for the last five years have obtained 2135 observations of 38 comets.

N. S. Chernykh spoke on Kuiper Belt objects, V. P. Tarashchuk (CrAO) spoke on the problems of comet physics, B. Skorichenko (UAG) spoke on searching for and discovering of comets, and N. S. Chernykh (CrAO) talked about the problem of asteroid hazards.

During the seminar, there was an excursion to the famous 40-cm double astrograph at CrAO, and other CrAO instruments and programs were discussed by N. S. Chernykh, V. V. Romyantsev, and V. A. Kozlov (UAG). The Board of UAG expresses its thanks to the manager of Crimean Laboratory, E. A. Kolotilov, and the scientific secretary of CrAO, N. I. Shahovska, for the hospitable reception of the participants of the seminar.

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Tabulation of Comet Observations

Observations contributed on paper since July will appear in the January issue; time constraints did not permit their entry into the computer for this issue.

Photometric star catalogues in electronic form

Numerous observers have been reporting use of comparison-star magnitudes from PC software packages compiled by non-professional astronomers. While much amateur-astronomical work is equal to, and sometimes far superior to, that of professional astronomers in solar-system observation, there is a well-grounded knowledge that much of the PC-produced software comes from amateur sources that are more interested in making money than in producing reliable data/calculations. Indeed, some of the amateurs producing solar-system-astronomy software are not *able* to produce high-quality results, due to limited knowledge.

Furthermore, problems continually surface in the way of people *using* such software to make “black-box” calculations that are incorrect — sometimes because the user does not know how to properly use the software or how to estimate the limitations of the software, and sometimes merely because the software has bugs or was written by somebody lacking complete knowledge of the field for which the application was intended. For this reason, the *ICQ* is being cautious in assigning new codes to sources used by observers from non-professional software programs. Full documentation of the photometry and its integration from professional catalogues into non-professional software is required.

Recently, observers have been widely reporting the use of comparison-star magnitudes that they obtain *not* from the professionally-sanctioned catalogues on compact disk or from professional catalogue centers via the Internet, but rather on cheap PC software sold through major astronomy magazines. Some of these “amateur” software services may be quite reliable, but they must all be questioned until proven reliable. We do not assign reference codes unless we feel comfortable that the data are indeed reliable. Therefore, observers should *not* make photometric comet observations with comparison-star sources that have not been assigned *ICQ* codes, *if at all possible*.

The Hipparcos/Tycho photometric catalogues

The Hipparcos and Tycho Input Catalogues were released several years ago, representing the basis for the larger, complete *Hipparcos* and *Tycho Catalogues* that were just released in mid-1997. The Input Catalogues, available in printed as well as electronic form, were assigned *ICQ* codes ‘HI’, ‘HJ’, and ‘TI’ some years ago, and have become fairly widely used by *ICQ* contributors.

The new, complete *Hipparcos* and *Tycho Catalogues* were published in June 1997 as European Space Agency Special Publication 1200 (ESA SP-1200). The photometric aspects of these catalogues have been described recently by Michael A. C. Perryman *et al.* (1997, *A. Ap.* **323**, L49), by E. Høg *et al.* (1997, *A. Ap.* **323**, L57), by F. van Leeuwen *et al.* (1997, *A. Ap.* **323**, L61), and by J. L. Halbwachs *et al.* (1997, *A. Ap.* **325**, 360). ESA SP-1200 is a 17-volume printed set that is accompanied by six ASCII CD-ROMs (Perryman *et al.*). The Hipparcos catalogue itself contains only $\sim 118,200$ stars at ~ 3 stars/deg². The Tycho catalogue, on the other hand, contains more than 1 million stars, or about 25 stars/deg², with a limiting magnitude of $V \sim 11.5$. The Tycho catalogue is said to be ~ 99.9 -percent complete for stars brighter than $V \sim 10.0$, and ~ 90 -percent complete for stars brighter than $V \sim 10.5$; this, together with the superior accuracy of the photometry, represents the first big improvement in an all-sky catalogue of stellar V photometry for amateur astronomers since the publication of the problem-filled compilation of catalogues 30 years ago known as the *SAO Star Catalog*.

The Hipparcos catalogue is printed as volumes 5-9 of the 17-volume ESA SP-1200 set, whereas the Tycho data appears therein only as part of the CD-ROM set that comprises volume 17. The new *Millennium Star Atlas*, published jointly by ESA and Sky Publishing Corporation [see, *e.g.*, the advertisement in the October 1997 issue, *Sky & Telescope* **94**(4), 108] is out in November 1997, and this 3-volume set (which is also volumes 14-16 of the ESA SP-1200) of charts has all Tycho stars plotted, making it potentially a most valuable tool for comet observers. We will review this atlas in the January issue of the *ICQ*. The 17-volume catalogue, which cost around US\$400, was printed in very limited quantities; however, at the Hipparcos World Wide Web site (see below), it is stated that limited copies are still available (and I have verified this in mid-November with the publisher); one can purchase Volumes 1 and 17 (the introductory printed volume

and the CDs, which have the data in ASCII format that can then be read via programs that you write yourself) for US\$100. As the Hipparcos/Tycho catalogues are probably going to become one of the top five primary sources for comparison-star magnitudes as recommended by the *ICQ*, serious observers are encouraged to purchase either the whole set or Volumes 1 and 17 (to be used in conjunction with the *Millennium Star Atlas*) at once, while supplies still last. There is an order form on the Hipparcos web site (http://astro.estec.esa.nl/Hipparcos/hipp_subs.html), or one can send e-mail to fdezwaan@estec.esa.nl, send a fax to +31 71 5655433 (Netherlands), or send a postal inquiry to Hipparcos Catalogue Subscriptions (Attention F. de Zwaan; ESA Publications Division, EPD; ESTEC; P.O. Box 299; 2200 AG Noordwijk; The Netherlands).

Thus, observers who do not have access to those observatories that purchased the entire catalogue must either access the information via the Internet or hope that all of the Tycho (or at least the Hipparcos) photometry is available on the forthcoming IBM-compatible *Celestia 2000* CD-ROM; once *Celestia 2000* has been released, we will inform *ICQ* readers of its usefulness in terms of comet photometry. The Hipparcos web site describes it thus: "a CD-ROM package containing the principal parts of the *Hipparcos and Tycho Catalogues* and annexes (in binary, not ASCII format) along with extensive interrogation software. The publication date for *Celestia 2000* is towards the end of 1997, and no orders for it are being taken at the present time." In ESA SP-1200 (1, 10), it is stated that *Celestia 2000* will include the Tycho astrometry and mean photometry, along with "interrogation software for accessing and extracting data from the *Celestia 2000* CD-ROM". Roger Sinnott of *Sky & Telescope* tells me that the earlier plan of producing Apple/Mac-based and Unix-based versions of *Celestia 2000* have been discarded, so that only the IBM-compatible versions will be released.

The European Space Agency has a website with a program that will produce stars from the Hipparcos and Tycho Catalogues for a given distance from a specified point on the sky. This site is at URL <http://astro.estec.esa.nl/SA-general/Macc/hip.html>, but it is a poorly-written program that may take some explanation. It is not written in universal-browser HTML code, and thus may appear garbled on some older browsers (such as my preferred Mosaic browser). It says that there are "four search criteria", but I still cannot figure out what *that* means — very confusing, but just ignore it. Skip the first three input boxes (unless you want to type in α and δ in degrees and decimals of a degree), and type in the (very awkward) six boxes the hours, minutes, and seconds of α and the degrees, arcmin, and arcsec of δ , for equinox J2000.0 (the Hipparcos people are quick to say that their catalogue is in ICRS reference frame, but it's close enough to J2000.0 that most people don't have to worry about that). Then there is a set of three boxes for "tolerance", given in degrees, arcmin, and arcsec; put a '1' in the first box to get everything within '1' degree of your position, for example. Then press the "Retrieve" button below, and you'll get a page of data that extends for some 70 unlabelled columns. The columns of interest to comet observers are the following: 3 and 4 (α and δ); 5 (V magnitude, not recommended for use); 34 (V_T magnitude); 37 ($B-V$ value); and H44 in the Hipparcos listing only (H_p magnitude). Those observers with Web access may find this immediately useful for comparison stars of mag 10 or brighter, and the just-out *Millennium Star Atlas* will be a welcome addition to these Tycho catalogue magnitudes at the telescope for comet observers.

The Tycho V magnitudes have uncertainties/errors that approach 0.1 mag when stars are fainter than $V = 10.5$ (due to the fainter signals inherent as a result of the small-aperture Hipparcos telescope; cf. Halbwachs *et al.*), so it is recommended that comet photometrists use Tycho only for stars brighter than $V \approx 10.0$. Furthermore, it appears that even for brighter stars, Tycho is not as accurate as Hipparcos and could even be off by as much as 0.1 or 0.2 mag for bright stars; one might therefore consider using the Hipparcos magnitudes before using the Tycho magnitudes, if available. Nonetheless, Tycho can be considered amongst the best such catalogues available for V magnitude data, particularly for comet observers. One needs to note that the magnitudes published in Tycho and Hipparcos are not Johnson V magnitudes (or visual magnitudes), but rather magnitudes based on systems developed for the Hipparcos satellite.

Some *ICQ* contributors have recently reported using "Tycho magnitudes" taken from the new amateur-astronomy "Guide CD-ROM Star Chart Version 6.0" software (e.g., see ad in *Sky & Telescope* 94(6), 131). On 1997 Oct. 13, Reinder J. Bouma (*ICQ* code BOU; e-mail rjbouma@pi.net) wrote the following: "I [took] a closer look at the 2-digit HT-magnitudes in *Guide 6.0*. I noted that they had small differences with the new Hipparcos/Tycho Catalogue, which I cannot explain (maybe it is explained somewhere in the Catalogue, but there are hundreds of pages explaining data and procedures), but they did not exceed 0.02 magnitude, so for visual observers it is rather irrelevant. I have also compared stars that had HT magnitudes with a set of Lasker fields [B. M. Lasker *et al.* 1988, "Guide Star Photometric Catalog — I", in *Astrophys. J. Suppl. Ser.* 68(1); *ICQ* MM code 'GA'; cf. *ICQ* 10, 124 and 15, 60], some randomly-chosen, plus a couple of variable-star fields (Z Cam, RX And, SS Cyg). This produced a set of 144 stars with magnitudes in both sources. I did divide these into four magnitude groups, as shown below, and determined the average differences (with standard deviations in parentheses). This gave the following result."

Magnitude range	N(stars)	Average (GA-HT)	Extremes
<9.00	35	-0.011 (0.033)	+0.05, -0.11
9.00 - 9.99	44	-0.005 (0.045)	+0.11, -0.12
10.00-10.99	54	+0.020 (0.073)	+0.17, -0.18
>11.00	11	+0.14 (0.10)	+0.29, 0.00

Hargwig Lüthen of Hamburg, Germany, also provided some background information on the magnitudes in this "Guide 6.0" software, some of which I repeat here for the benefit of the reader: "The catalogue data [in Guide 6.0] are the same as on the ESA CDs, since the Guide [6.0] program author always retains the full information in the data files, even if part of

the information is neither accessed nor displayed by Guide [6.0]. Alternatively, one can download Tycho/Hipparcos data from an ESA website [see discussion above]. I meanwhile had the opportunity to compare a number of star data [from] all four [media sources] (ESA-printed, ESA CD-ROM, ESA Website, GUIDE 6.0), and never noticed any differences in the magnitude values. However, both [Johnson V magnitudes (discussed above) and V_T magnitudes] are directly included in the [Guide 6.0] catalogue (V mags are not derived by GUIDE 6.0, as I initially thought)."

Regarding the extraction of Tycho/Hipparcos magnitudes (or any other professionally-catalogued magnitudes) from amateur-astronomy software packages, it is *not acceptable* to simply state a software package such as "Guide 6.0" as the source. "The source" is the professional source of data; if one must use an "amateur" software source to get the professional data, then one must do two things: (1) make certain that you have the proper magnitudes from the proper bandpass from the proper source; and (2) use the *ICQ* reference code as usual to denote the original professional source of the data (catalogue), and then either use a special-notes key 'x' (newly assigned now for this purpose) to denote the use of an amateur software package and/or state the name of the software package in descriptive notes. Bill Gray of 'Project Pluto' (the producer of "Guide 6.0") has submitted examples to me of what output his software will produce. It is important to stay clear of Guide Star Catalogue magnitudes from the GSC CD-ROM (as repeated in "Guide 6.0") and also from most other magnitudes; the USNO (S)A1.0 magnitudes, for example, are B and R magnitudes only. *NOTE: If Hipparcos/Tycho magnitudes are not available in the "Guide 6.0" data, as will be the case for most stars fainter than mag 11, do not use "Guide 6.0" for your comparison-star magnitudes, period; they are simply not reliable.* Also, I think that we are justified in asking observers who extract primary catalogue magnitudes from *secondary sources*, such as software like *Guide 6.0*, to include the new special-notes key 'x' in tabulated data and/or to specify the secondary source clearly in their descriptive notes.

Below are given the new *ICQ* codes for users of the comparison-star magnitudes in the Hipparcos and Tycho Catalogues (ESA SP-1200) when estimating the brightness of comets. While SP-1200 clearly states that the V_T magnitudes are identical in Tycho and Hipparcos listings, it is not so obvious (even though likely) that the Johnson V magnitudes are the same in both listings — thus the two different *ICQ* codes for Johnson V magnitudes. The Hipparcos/Tycho team advises against using the Johnson V magnitudes, which were not observed but rather derived from the observed B_T and V_T magnitudes from the general relationship $V = V_T - 0.090(B - V)_T$ (for non-M-type stars and for stars with $B - V < 1.8$). The team stresses that the Johnson V magnitudes were given primarily for identification purposes and recommend using the V_T data over the V data (ESA SP-1200, 1, 142 and 148).

While the V_T spectral response curve is more narrow than the human-eye rods' response curve, the H_p curve is broader than is that of the human eye. The V_T curve peaks more closely to the human eye's peak — the H_p peaking around 450 nm (ESA SP-1200, 1, 42). The difference between H_p and Johnson V ranges from a couple of full magnitudes for very red stars to generally 0.1-0.2 mag for most stars (*op.cit.*, 59). It is probably best, therefore, to use the V_T magnitudes, keeping away from very red stars ($B - V > +1.0$) — and even *carefully* correcting for visual magnitudes (m_v) whenever possible, using the equation in the *ICQ Guide to Observing Comets* (p. 65) and denoting this by giving the special note code '%'. — D.W.E.G.

Summary of new additions to *ICQ* tabulation codes

New code for magnitude method:

H = Cousins I filter with CCD.

New code for special notes:

x = denotes that a secondary source was consulted for primary-source magnitudes; an example is extracting Tycho-catalogue magnitudes from the amateur-software *Guide 6.0*.

New codes for comparison-star references:

FG = from variable star charts published in *A Field Guide to the Stars and Planets*, by D. H. Menzel and J. M. Pasachoff (part of the Peterson Field Guide Series); charts by Wil Tirion for SS Cyg (visual mag 5.1-11.4), R CrB (7.5-12.6), Algol (2.9-5.5), β Lyr, and Mira (3.5-9.2) are given on pages 158-161 of the second edition and pages 198-201 of the third ed. (magnitude source is not specified, but probably AAVSO); **NOTE:** this source is *not* recommended by the *ICQ* for comet-magnitude work (though it is currently being accepted as a source because some observers have used it and the magnitudes have not been shown to be in error).

HK = H_p magnitudes from the Hipparcos Catalogue (ESA SP-1200).

HV = Johnson V magnitudes from Hipparcos Catalogue, ESA SP-1200 [not recommended by the *ICQ* as a source of comparison-star magnitudes]

TJ = Tycho Catalogue Johnson V magnitudes from ESA SP-1200. [not recommended by the *ICQ* as a source of comparison-star magnitudes]

TT = Tycho/Hipparcos Catalogue V_T magnitudes from ESA SP-1200. [highly recommended by the *ICQ* as a source of comparison-star magnitudes]

♦ ♦ ♦

Descriptive Information, to complement the Tabulated Data (all times UT):

♦ Comet C/1983 V1 (Hartley-IRAS; O.S. 1983v = 1984 III) $\Rightarrow$ 1983 Dec. 28.73: w/ 26-cm $f/6$ L (63 $\times$), $m_1 = 10.8$, 4'.5 coma, DC = 3 [MER]. Dec. 29.73: w/ 26-cm $f/6$ L (63 $\times$), $m_1 = 10.8$, 4'.0 coma, DC = 3 [MER]. 1984 Jan. 25.75: w/ 53-cm L, $m_1 = 11.5$ [VER02]. Mar. 4.78: w/ 15-cm L (25 $\times$), $m_1 = 9.0$, coma dia. 7'.6, DC = 3 [MER].

◊ *Comet C/1995 O1 (Hale-Bopp)* $\Rightarrow$ 1996 Aug. 10.0, 16.9, and 1997 May 23.4: naked-eye VBM estimates done by removing spectacles [FAR01]. Aug. 10.83: w/ 8.0-cm f/8 L (135 $\times$), m_1 [8.9 (note = &, MM = M, ref = S, coma = ! 5')] [KOS01]. Aug. 10.86: w/ 11-cm f/8 L (45 $\times$), coma dia. 7', DC = 4 [BEN04]. Oct. 8.7: w/ 15-cm T (52 $\times$), coma dia. $\sim$ 10', DC = D6 [FAR01]. Oct. 21.7-23.6: RASNZ chart 729 (IX Vel) comparison stars [FAR01]. Oct. 23.6: w/ 38-cm T (80 $\times$) showed coma dia. $\sim$ 5', DC = D3; no obvious tail, but the coma appeared flattened — $\approx$ 10' $\times$ 7', centered on the nucleus, with longest axis oriented toward p.a. 170°; glare from γ Vel [FAR01].

1997 Jan. 13.21: w/ B, also 0°4 tail in p.a. 10° [HAV]. Jan. 15.21: w/ 10 $\times$ 50 B, 0°4 tail in p.a. 5° [HAV]. Feb. 9.18: w/ 18-cm f/7 L (40 $\times$), $m_1 \approx 1.0$ (MM = B, ref = S), coma dia. $\sim$ 20', DC = 7 [WLO]. Feb. 17.14: w/ 15-cm f/6 L (30 $\times$), $m_1 = 1.5$ (MM = S, ref = S), coma dia. $\sim$ 4', DC = D6, tail $\sim$ 0°3 long in p.a. 320° [GRZ02]. Feb. 17.17: w/ 18-cm f/7 L (40 $\times$), $m_1 \approx 0.5$ (MM = B, ref = S), coma dia. $\sim$ 20', DC = 7 [WLO]. Feb. 18.12: w/ 6.6-cm f/4.5 A, 15-min exp. on Fuji G-400 film shows 28' coma, DC = 6, gas tail open in p.a. 322°-357°, w/ widths of 25', 35', and 50' at distances of 1°, 2°, and 3° from the central cond.; there is a DE in p.a. 337°, 1° from the head; at distance of 2°, main tail divides into several diffuse streams; dust tail 1°5 long open in p.a. 280°-310°; "rarefied dust train in p.a. 270°-310° along the orbit" [BAR06, w/ ISH03]. Feb. 18.16: w/ 15-cm f/6 L (30 $\times$), $m_1 = 1.5$ (MM = S, ref = S), coma dia. $\sim$ 4', DC = D6, tail $\sim$ 0°4 long in p.a. 310° [GRZ02]. Feb. 22.17: w/ 18-cm f/7 L (40 $\times$), $m_1 \approx 0.2$ (MM = B, ref = S), coma dia. $\sim$ 18', DC = 6, tail $\sim$ 1°5 long [WLO]. Feb. 24.15: w/ 15-cm f/6 L (80 $\times$), $m_1 = 1.3$ (MM = S, ref = S), coma dia. $\sim$ 4', DC = D6, tail $\sim$ 0°4 long in p.a. 315° [GRZ02]. Feb. 25.14: w/ 15-cm f/6 L (30 $\times$), $m_1 = 1.3$ (MM = S, ref = S), coma dia. $\sim$ 5', DC = D6, tail $\sim$ 0°8 long in p.a. 320° [GRZ02].

Mar. 1.14: w/ 15-cm f/6 L (30 $\times$), $m_1 = 0.6$ (MM = S, ref = S), coma dia. $\sim$ 5', DC = D6, tail $\sim$ 1°1 long in p.a. 310° [GRZ02]. Mar. 2.17: w/ 15-cm f/6 L (30 $\times$), $m_1 = 0.4$ (MM = S, ref = S), coma dia. $\sim$ 5', DC = D6, tail $\sim$ 0°7 long in p.a. 310° [GRZ02]. Mar. 3.16: w/ 15.0-cm f/15 R (140 $\times$), two hoods 8" and 17" from nucleus open in p.a. 185°-280° [FIL05]. Mar. 4.17: w/ naked eye, 2° tail in p.a. 270° [HAV]. Mar. 5.13: w/ 6.7-cm f/1.8 A, 20-min exp. on ASA-250 film shows narrow tail $>$ 12°5 long in p.a. 330°; second fan-like dust tail 5° long open in p.a. 285°-305° [FIL05]. Mar. 6.15: narrow gas tail 11° long in p.a. 325°; second fan-like tail 4°5 long open in p.a. 295°-305° [FIL05]. Mar. 8.14: w/ naked eye, 9° tail in p.a. 284° [HAV]. Mar. 9.14: w/ naked eye, 9° tail in p.a. 290° [HAV]. Mar. 9.82: w/ 13-cm M (50 $\times$), bright arcs visible near nucleus (on the S, sunward side); ST-6 CCD + 2.7-cm f/4 A shows dust tail 15° long in p.a. 300° [GUR]. Mar. 10.06: w/ 5-cm f/4 A and w/ 4-cm f/2.5 A, 15-min exp. on Fuji G-400 films shows gas tail 15° long, open in p.a. 325°-328°, w/ central axis p.a. 331° — deviation from prolonged radius-vector (sun-comet direction) was 9°; the width of the tail in the central part, at the distance of 6° from head, is 1°5; immediately from the head, two separate E streams are departing (the first is 20' long in p.a. 10°, the second 50' long in p.a. 2°); "the base of the plasma tail is three powerful streams, divided by the ruptures", which are most notable within 1°-3° of the head; dust tail 4° long, open in p.a. 280°-320°; "the tail branches into the bright, more clear, E part and the diffuse W one — between them, bright synchroes 70' long in p.a. 305° are visible; in the E part of the tail, shorter synchroes are visible; along the orbit is visible a rarefied dust train" [BAR06 w/ ISH03]. Mar. 10.14: w/ naked eye, 10° tail in p.a. 289° [HAV]. Mar. 10.95: w/ 5-cm f/4 A, 25-min exp. on Kodak-400 film shows gas tail 15° long open in p.a. 325°-340°; "the E boundary of the tail is broken, departing from the head; tail extends in the form of a conic, reaching the maximum width in 1° at distance of 3°5, then the tail narrows to 40'; dust tail 4°5 long open in p.a. 285°-325°; the E boundary of the tail is the most clear and bright; five bright synchroes depart from it, the central synchroes being 3°-2° long" [BAR06]. Mar. 10.13: w/ 2.8-cm f/4.5 A, 8-min exp. on x-ray film shows main-tail length 12° [FIL05]. Mar. 11.10: w/ 6.7-cm f/4.5 A, 12-min exp. on ZU-21 film shows gas tail 13°5 long in p.a. 330°; fan-like dust tail 6° long open in p.a. 290°-300° [FIL05]. Mar. 11.73: w/ 20-cm f/15 R (175 $\times$), five envelopes in the coma (distance between them is 0'7-1'; width of the envelopes is 0'5) — "the first two are like halos (rings) that are brighter and clearer towards fountain (WSW), while the other three create concentric arcs in the background of prominent fountain" [ISH03, w/ BAR06]. Mar. 12.16: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.2$ (MM = S, ref = S), coma dia. $\sim$ 9', DC = D6, tail $\sim$ 1°8 long in p.a. 315° [GRZ02]. Mar. 13.12: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.5$ (MM = S, ref = S), coma dia. $\sim$ 11', DC = D6, tail $\sim$ 2° long in p.a. 320° [GRZ02]. Mar. 13.15: w/ naked eye, 10° tail in p.a. 292° [HAV]. Mar. 13.10: w/ 11-cm L (32 $\times$), "distinct starlike nucleus of dia. 1'5; coma observed as a small spherical triangle containing three or four bright arcs away from nucleus" [MOS03]. Mar. 13.17: w/ 7.0-cm f/6.5 R, four hoods located 25", 48", 75", and 100" from the nucleus, open in p.a. 170°-330° [FIL05].

Mar. 16.14: w/ naked eye, 8° tail in p.a. 298° [HAV]. Mar. 17.12: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.5$ (MM = S, ref = S), coma dia. $\sim$ 11', DC = D6, tail $\sim$ 2°3 long in p.a. 320° [GRZ02]. Mar. 17.56: w/ 13-cm M (50 $\times$), non-starlike (diffuse) nucleus w/ two bright arcs in p.a. 145°-280° (distance between the nucleus and first arc was $\sim$ 30"); w/ 2.7-cm f/4 A + ST-6 CCD, dust tail 7° long in p.a. 320° [GUR]. Mar. 18.08: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.2$ (MM = S, ref = S), coma dia. $\sim$ 12', DC = D6, tail $\sim$ 1°5 long in p.a. 340° [GRZ02]. Mar. 18.90: 1-min unfiltered exp. w/ 2.7-cm f/4 A + ST-6 CCD shows ion tail in p.a. 348°; "dust tail 10° long in p.a. 321° w/ synchroes — the brightest inclined in p.a. 328°, 327°, and 332°" [GUR]. Mar. 19.61: w/ 13-cm M (50 $\times$), three arcs in the sector near the nucleus in p.a. 163° up to 278° (brightest part in p.a. 237°; distance between arcs $\approx$ 30"); full size of this whole structure $\sim$ 2' [GUR]. Mar. 20.12: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.3$ (MM = S, ref = S), coma dia. $\sim$ 11', DC = D6, tail $\sim$ 1°6 long in p.a. 340° [GRZ02]. Mar. 20.75: 1-min unfiltered exp. w/ 2.7-cm f/4 A + ST-6 CCD shows ion tail in p.a. 352°, dust tail 10° long in p.a. 326°; "many synchroes in dust tail, some cloned in p.a. 331°, 340°, 336°" [GUR]. Mar. 21.15: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.2$ (MM = S, ref = S), coma dia. $\sim$ 11', DC = D6, tail $\sim$ 1°6 long in p.a. 345° [GRZ02]. Mar. 21.67: 2.7-cm f/4 A + ST-6 CCD reveals possible 0°5 jet in p.a. 13°-14°; ion tail in p.a. 350°; dust tail 10° long, open in p.a. 315°-333° (brightest in p.a. 332°); synchroes with p.a. 334°, 340° [GUR]. Mar. 22.12: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.2$ (MM = S, ref = S), coma dia. $\sim$ 11', DC = D6, tail $\sim$ 1°4 long in p.a. 345° [GRZ02]. Mar. 23.59: w/ 13-cm M (50 $\times$), arcs in p.a. 169° up to 278°, with the brightest parts in p.a. 257°-260°; second dark arc is $\sim$ 40" from nucleus; third arc $\sim$ 70" from nucleus ($\sim$ 30" from second arc); the first bright arc ($\sim$ 20" from nucleus) is joined to the nucleus

at p.a. $\sim 165^\circ$; dust tail 7° long in p.a. 330° [GUR]. Mar. 24.09: w/ naked eye, coma dia. $\sim 8'$, tail $\sim 6^\circ$ long in p.a. 355° [BIN]. Mar. 24.12: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.5$ (MM = S, ref = S), coma dia. $\sim 12'$, DC = D5, tail $\sim 1.3^\circ$ long in p.a. 350° [GRZ02]. Mar. 24.57: "w/ 13-cm M (50 $\times$), arcs are better visible in p.a. 149° up to 292° , joining w/ nucleus (and possible jet) at p.a. $\sim 150^\circ$; in inner part, near the pseudo-nucleus on the sunward side, is one more dark arc; dust tail 8° long in p.a. 340° , formed from two streams, separated by faint (shadow?) middle" part [GUR]. Mar. 25.12: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.2$ (MM = S, ref = S), coma dia. $\sim 11'$, DC = D5, tail $\sim 1.3^\circ$ long in p.a. 350° [GRZ02]. Mar. 25.60: three arcs in p.a. 152° - 283° (brightest part in p.a. $\sim 240^\circ$) [GUR]. Mar. 26.12: w/ 15-cm f/6 L (30 $\times$), $m_1 = -0.3$ (MM = S, ref = S), coma dia. $\sim 10'$, DC = D5, tail $\sim 1.3^\circ$ long in p.a. 350° [GRZ02]. Mar. 26.57: arcs are well visible in p.a. 138° - 264° ; first arc was joined to the nucleus at p.a. 265° [GUR]. Mar. 26.73: dust tail 8° long [MOR04]. Mar. 26.80: w/ naked eye, coma dia. $\sim 7'$, tail $\sim 9^\circ$ long [BIN]. Mar. 27.73, 29.75, Apr. 1.06, and 15.74: dust tail 10° long [MOR04]. Mar. 27.79: w/ naked eye, 12° tail in p.a. 12° [HAV]. Mar. 27.81: w/ naked eye, coma dia. $\sim 18'$, DC = 8, tail 15° [BIN]. Mar. 28.60: same arcs near nucleus as earlier, in p.a. 143° - 280° , contact w/ nucleus in p.a. 280° [GUR]. Mar. 28.83: w/ 7 $\times$ 50 B, 14° tail in p.a. 9° [GRO03]. Mar. 29.79: w/ naked eye, 18° tail in p.a. 332° [HAV]. Mar. 30.79: w/ naked eye, 19° tail in p.a. 332° [HAV]. Mar. 30.80: w/ 7 $\times$ 50 B, DC = D8, 12° tail in p.a. 6° [VEL03]. Mar. 30.87: "w/ 5-cm f/4 A, 23-min exp. on Kodak-400 shows the parabolic head of the comet with a comb of short streams 30'-50' long that stand out against a background of the diffuse, rarefied base of the gas tail; the E stream in p.a. 30° is the most broad and has double structure, created by two interwoven streams 4.5° long; the central stream is the thinnest, and at 2.5° from nucleus divides into 2 branches (the W branch is thin, bright, and divides into more branches at 2.5° , the W branch is more bright and clear, and again divides at 4.20°); dust tail 9.5° long in p.a. 387° " [BAR06]. Mar. 31.63: near-nucleus arcs at p.a. $\sim 160^\circ$ up to 270° ; dust tail 12° long in p.a. 350° [GUR]. Mar. 31.73: dust tail 13° long [MOR04].

Apr. 1.75, 2.75, 3.75, 12.75, and 27.75: dust tail 15° long [MOR04]. Apr. 1.81: w/ 7 $\times$ 50 B, DC = D8, 16° tail in p.a. 9° [VEL03]. Apr. 1.87: "w/ 5-cm f/4 A, 23-min exp. on Kodak-400 shows coma dia. $45'$; gas tail 17° long, passes more to the W from open cluster h, x Per, to the W boundaries of diffuse nebula I 1805 (Cas), open in p.a. 8° - 20° , central axis p.a. 12° ; in the field of the head, the comb of the short streams $40'$ long departs to the E; the main part of the tail at 2° from the head divides into two streams, which at the distance of 4° divide into 4 streams, which bend, interweave and create a complex lace of streams; the E streams wash off and disappear at 4° ; the W streams, more clear and bright, extend for 17° ; dust tail, 11° long; at 5° from the head, the tail is open in p.a. 328° - 348° ; at 4° , the tail opens in p.a. 328° - 348° and it divides into two flows more diffuse W (general length 6°); three synchrones toward W" [BAR06]. Apr. 2.80, 7.80, 11.79, 18.81, 21.82, and 29.83: dust tail [KYS]. Apr. 3.79: w/ naked eye, 12° tail in p.a. 345° [HAV]. Apr. 3.95: "w/ 5-cm f/4 A, 20-min exp. on Kodak-400 shows coma dia. $45'$; gas tail open in p.a. 12° - 36° , w/ central axis in p.a. 16° ; in the head, the tail divides into one short (the remains of the comb) and three long streams, which at 3.5° divide additionally into 6 streams; dust tail open in p.a. 325° - 356° ; in the E part of the tail there are 6-7 synchrones; the region in p.a. 305° - 325° is also illuminated" [BAR06]. Apr. 4.82: tab. tail is dust tail; ion tail 16° long [KYS]. Apr. 5.75: dust tail 14° long [MOR04]. Apr. 5.80: w/ naked eye, 16° tail in p.a. 350° [HAV]. Apr. 6.20: "w/ 20-cm T (64 $\times$ -101 $\times$), the yellowish-tinged coma shows a complex structure of three hoods; one bright hood comes from the comet's SW side and curves around some 180° + from the false-nucleus towards the solar vector" [SPR]. Apr. 7.66: w/ 2.7-cm f/4 A + ST-6 CCD, ion tail with two streams in p.a. 24° and 37° , dust tail 10° long curves and opens at p.a. 340° - 10° (center line in p.a. $\sim 352^\circ$ - 353°) [GUR]. Apr. 7.80 and 9.80: w/ naked eye, 20° tail in p.a. 346° [HAV]. Apr. 7.81, 8.83, and 13.81: tab. tail is dust tail; ion tail $> 3^\circ$ long [KYS]. Apr. 7.85: w/ 18-cm f/11 M (50 $\times$), $m_1 = -0.1$ (MM = I, ref = S), DC = S8/, 3.5° tail [ZYW]. Apr. 8.57: dust tail 12° long in p.a. 354° [GUR]. Apr. 8.76: "w/ 20 $\times$ 50 B, during March and the first half of April, length of gas tail has remained at 15° - 18° , but the inner structure has been changing, and the tail has been becoming more and more broad, the heterogeneities in the wavy and the stream structure of the tail have been increasing; in the plasma tail, where it meets the dust tail, two bright divided streams were visible; in general, the W side of the plasma tail is brighter and clearer than the E one; during February-April, the length and the capacity of the dust tail have been constantly increasing, so that now the dust tail looks even longer than the gas tail; terminal synchrones and alternation of bright and faint parts of the tail are visible; the bright E side of the dust tail extends nearly up to the cluster x, h Per; the W side of the dust tail is bent to the E in the field of the head" [BAR06]. Apr. 10.57: dust tail 12° long in p.a. 0° [GUR]. Apr. 10.75: dust tail 20° long [MOR04]. Apr. 18.81: tab. tail is dust tail; ion tail 5° long [KYS]. Apr. 20.83 and 23.83: tab. tail is dust tail; ion tail 3° long [KYS]. Apr. 23.83: tab. tail is dust tail; ion tail 4° long [KYS]. Apr. 24.78: w/ naked eye, dust tail 10° long in p.a. 340° [BOR04]. Apr. 25.75 and 29.76: dust tail 15° long [MOR08]. Apr. 25.83: w/ naked eye, 20° tail in p.a. 352° [HAV]. Apr. 26.81: w/ naked eye, dust tail 15° long in p.a. 345° [BOR04]. Apr. 28.76: dust tail 18° long [MOR08].

May 4.76: dust tail 10° long [MOR08]. May 5.76, 6.77, 7.77, and 8.77: dust tail 5° long [MOR08]. May 9.27: comet lower than comparison star [JON]. May 10.77: dust tail 4° long [MOR08].

July 14.77: comet 4.5° below comparison star [JON]. July 15.77: cloud curtailed observing [JON]. July 19.81: viewed through cloud [SEA01]. July 21.80 and 25.80: fog and/or moon interference [SEA01]. July 27.79: fan $15'$ long in p.a. 220° [SEA01]. July 31.78: fan $25'$ long in p.a. 240° visible to naked eye [SEA01]. July 31.82: broad tail spreading through several deg of p.a. [SEA].

Aug. 1.78: fan $22'$ long in p.a. 240° [SEA01]. Aug. 2.78: fan $25'$ long in p.a. 240° [SEA01]. Aug. 3.79: viewed through cloud [SEA01]. Aug. 5.76: w/ 31.7-cm L (64 $\times$), 0.5° tail [JON]. Aug. 7.75: w/ 31.7-cm L, 0.5° tail in p.a. 225° [JON]. Aug. 16.79: w/ 10 $\times$ 50 B, comet visible in presence of full moon; significant moon interference until Aug. 25.79 [SEA01]. Aug. 26.78: elongated fan in p.a. 260° , max width $10'$, length $20'$ [SEA01]. Aug. 28.74 and 29.76: w/ naked eye, a bright fan visible in p.a. 270° and 290° , respectively; main tail in p.a. 10° , w/ much lower surface brightness, only visible w/ 10 $\times$ 50 B [SEA01]. Aug. 31.78: w/ 10 $\times$ 50 B, comet closely resembles M42 w/ bright stars shining through coma [SEA01].

◇ *Comet C/1995 O1 (Hale-Bopp)* [text continued from page 228] ⇒

Sept. 16.76: observed from Cowra, N.S.W., during total lunar eclipse [SEA]. Sept. 24.80: tail appeared broad and diffuse w/ a surface brightness not much brighter than the sky background; very difficult to accurately define the true extent of the tail [PEA]. Sept. 26.70: in 25×100 B, faint, wide, fan-shaped tail w/ center at p.a. ~ 270°, length at least 0°5, and possibly curving at extremity; obs. cut short by cloud [SEA]. Sept. 29.71: in 25×100 B, broad slightly curving tail to at least 1° in p.a. 270°; appearance of comet not unlike that of one year ago, but the surface intensity of tail is less [SEA]. Sept. 29.73: fan-shaped tail in p.a. 290°-330° [SEA01]. Sept. 30.70: tail more distinct than coma to naked eye [SEA01].

Oct. 3.86: very faint broad tail ~ 0°3 long [PEA]. Oct. 4.84: very faint broad tail ~ 0°4 long in p.a. 275° [PEA]. Oct. 5.84: comet observed through cloud breaks [PEA]. Oct. 6.84: very faint broad tail ~ 0°6 long in p.a. 270°; through 20-cm L, central cond. appeared elongated along N-S direction, w/ bright nucleus offset slightly towards S edge; parabolic-shaped coma adjacent to central cond. [PEA]. Oct. 11.84: obs. made through breaks in the cloud [PEA]. Oct. 14.65-21.59: moonlight interfered [SEA01]. Oct. 24.60: interference from star of mag 1.8 [SEA]. Oct. 24.80: distinct fade in brightness since last observation, 11-12 days ago, although comet located only 8' from γ Vel; moderately condensed coma with slightly-less-pronounced central cond. [PEA]. Oct. 28.80: comet very close to a 5th-mag star [PEA]. Oct. 29.56: w/ 25×100 B, faint broad tail ~ 0°5 long to N and very distinct; non-stellar central cond. was less pronounced using Swan Band filter; comet glimpsed w/ naked eye [SEA]. Oct. 29.80: distinct increase in the prominence of the central cond. over the last day or so [PEA]. Oct. 31.80: broad, diffuse, fan-shaped tail [PEA].

◇ *Comet C/1996 J1 (Evans-Drinkwater)* ⇒ 1997 July 28.07: (nucleus B) four 60-sec exp.; tail ~ 20° wide; seeing 3" [PRA02, w/ GAL03]. Aug. 8.76: *V* comparison-star magnitudes taken from Guide Star Catalogue, but Cousins *I* filter used, so m_1 must be considered very approximate [FUK02]. Aug. 28.10: (nucleus B) three unfiltered 90-sec exp. w/ SBIG ST-6 CCD; diffuse tail ~ 20° wide; seeing 3"3 [GAL03, w/ PRA02].

◇ *Comet C/1996 Q1 (Tabur)* ⇒ 1996 Aug. 21.11: 20-cm *f*/2 Baker-Schmidt camera + *V* filter + ST-6 CCD [MIK].

◇ *Comet C/1997 D1 (Mueller)* ⇒ 1997 Oct. 9.43: central cond. of mag 15.3; although no tail was readily apparent, the outer coma was noticeably asymmetrical toward p.a. 30° [ROQ]. Oct. 10.51: tail curves from length 2'26 at p.a. 34° to length 19'65 at p.a. 49° [SCO01]. Oct. 13.49: central cond. of dia. $\approx$ 2" and mag 14.9; although no tail was noted, the coma was asymmetrical toward p.a. 4°; jet activity was obs. at scattered position angles, but appeared more concentrated throughout the region of asymmetry [ROQ]. Oct. 30.13: central cond. of mag 15.1 w/ dia. $\approx$ 2"; outer coma appeared slightly asymmetrical toward p.a. 11°; image structure was essentially similar in the *R*, *V*, and *B* images [ROQ].

◇ *Comet C/1997 J1 (Mueller)* ⇒ 1997 July 14.48 and 22.46: *V* comparison-star magnitudes taken from Guide Star Catalogue, but Cousins *I* filter used, so m_1 must be considered very approximate [FUK02]. Aug. 4.83: unfiltered SBIG ST-6 CCD; circular coma; seeing 3"5 [GAL03, w/ PRA02]. Sept. 4.10: five 60-sec exp.; faint coma; seeing 3"3 [GAL03, w/ PRA02].

◇ *Comet C/1997 J2 (Meunier-Dupouy)* ⇒ 1997 July 26.87-Sept. 26.79: 36-cm *f*/6.7 T + *V* filter + CCD [MIK]. July 28.91: seeing 3" [PRA02, w/ GAL03]. Aug. 29.98: central cond. w/ disk-like shape [MAR02]. Aug. 30.91: central cond. stronger than previous obs. and still w/ disk shape; no enhancement w/ Swan Band filter [MAR02]. Aug. 30.91: windy conditions; estimate w/ an 11.2-mag Tycho star in the comet's vicinity and an 11.7-mag AAVSO star in M81 field [VIT01]. Aug. 30.93: comet was easy; windy conditions [PER01]. Sept. 16.80: obs. during total lunar eclipse [OKS]. Sept. 28.81: round coma w/ prominent central cond. [AND01]. Oct. 2.84: 13th-mag stellar nucleus [PER01]. Oct. 5.96: coma roundish, w/ very slight extension towards p.a. 300°; starlike pseudo-nucleus of mag 14.5; field star of mag *V* = 14.8 in the outer S portions of coma [WAR01]. Oct. 21.04: comparison-star mags for R CrB [CRE01]. Oct. 27.75: star of mag 10.7 in coma [ZNO]. Oct. 28.86: nearly-stellar nucleus of mag ~ 12.6 [PER01].

◇ *Comet C/1997 N1 (Tabur)* ⇒ 1997 Sept. 8.430-8.444: six 30-sec and two 60-sec CCD frames taken w/ 26-cm *f*/6.0 L of the predicted position of this comet under the best conditions (though 5.6-day-old Moon in sky) — w/ good images and stars clearly visible to mag 15 — revealed no cometary image [H. Abe, Yatsuka, Japan]. Sept. 15.79: very strong moonlight [OKS]. Sept. 16.78: obs. during total lunar eclipse [OKS].

◇ *Comet C/1997 O1 (Tilbrook)* ⇒ 1997 July 26: this comet was independently discovered by SEA01 = John Seach [SEA]. July 27.33: faint, diffuse coma [JON]. Aug. 1.39: comet close to star [SEA]. Aug. 7.38: slightly enhanced in Lumicon Swan band filter [SEA01]. Aug. 7.88: comet 5° over the horizon, obs. in twilight [MAR02]. Aug. 30.85: difficult due to low alt. [MAR02].

◇ *Comet C/1997 T1 (Utsunomiya)* ⇒ 1997 Oct. 6.07: coma elliptical with 13th-mag stellar cond. in the NW (sunward) part [GLI]. Oct. 9.00: comet easily seen in 14×100 B; an estimate with MM = S yields $m_1 = 9.4$ (ref: TI); coma dia. ~ 6', but some 11th-mag stars surrounding comet make the dia. unreliable, and thus the m_1 too (with this instrument) [PER01]. Oct. 12.18: strong moonlight; comet brighter w/ strong, condensed core in a No. 8 yellow filter, w/ hint of a 5' tail at p.a. 130° (not visible w/o the filter) [SPR]. Oct. 14.87 and 19.79: photometry obtained w/ 36-cm *f*/6.7 T + *V* filter + CCD [MIK]. Oct. 16.07-16.08: strong moonlight [PER01 and VIT01]. Oct. 18.72: diffuse oval coma 3' × 4' [BAR06]. Oct. 21.03: comparison-star chart for SS Cyg [CRE01]. Oct. 23.00: comet close to 12th-mag star; well seen in 14×100 B w/ DC = 2, dia. > 2', but no m_1 estimate due to incoming clouds and moonrise [PER01]. Oct. 25.85: coma elongated 4' × 8' in p.a. 28°-208°, possible tail [BAR06]. Oct. 27.78: central cond. of mag 12.9 w/ dia. $\approx$ 2"; tail showed a short, faint radial feature w/in the inner coma at p.a. 60° the *R*, *V*, and *B* images [ROQ]. Oct. 27.79: comet surprisingly easy and well-condensed; even at 77×, a false nucleus of mag 13 is discernible [KAM01]. Oct. 28.84: central

cond. of mag 11; "the background coma has a rather flattened, smooth brightness profile w/ $DC = 2/$; method 'M' not adequate, due to ill-defined outer coma that would drop below sky background w/ any defocusing attempt to blend the central cond. in the coma" [PER01]. Oct. 29.82: at $161\times$, a false nucleus of mag 13 is easily visible [KAM01]. Oct. 30.81: "non-stellar nucleus; method 'M' not adequate, due to coma surrounded by 11th-mag stars" [PER01].

◊ *Comet 2P/Encke* $\Rightarrow$ 1997 July 4.38: comet brighter in Swan Band Filter (25.4-cm L at $46\times$) [SEA01]. July 14.47: significant moon interference [SEA01].

◊ *Comet 43P/Wolf-Harrington* $\Rightarrow$ 1997 Aug. 26.11: three 40-sec exp. [GAL03, w/ PRA02]. Sept. 12.44: central cond. of dia. $\approx 3''$ and mag 14.5; tail length, as tabulated, was limited by the system field-of-view; no substructure was readily apparent w/in the tail or coma [ROQ]. Oct. 3.87: comet not visible (stars to mag 14.0 seen in vicinity) [PEA]. Oct. 6.45: central cond. w/ dia. $2''$ and mag 14.8; coma generally symmetrical, blending into a broad, prominent dust tail that appeared smooth, w/ no evident sub-structure [ROQ]. Oct. 13.45: central cond. of dia. $\approx 3''$ and mag 14.9; tail very diffuse w/ no obvious substructure [ROQ].

◊ *Comet 48P/Johnson* $\Rightarrow$ 1997 July 22.98: four co-added images; slight diffuseness around nucleus; seeing $\sim 4''$ [GAL03, w/ PRA02].

◊ *Comet 53P/Van Biesbroeck* $\Rightarrow$ 1991 Aug. 7.96: w/ 14-cm $f/2$ A, photo shows coma dia. $< 1'$, $m_1 = 14.0$, $DC = 8$ [HAS02].

◊ *Comet 65P/Gunn* $\Rightarrow$ 1997 Aug. 30.08: faint object w/ diffuse coma at the predicted position; much effort was expended on several nights to put confidence in a positive detection, using predicted motion, reference to Digital Sky Survey, etc. [MAR02]. Aug. 31.08: still a diffuse object, fainter than yesterday; no enhancement w/ Swan-Band filter [MAR02].

◊ *Comet 78P/Gehrels 2* $\Rightarrow$ 1997 Aug. 12.08 and Sept. 11.10: photometry obtained w/ 36-cm $f/6.7$ T + V filter + CCD [MIK]. Sept. 2.08: four 30-sec exp.; coma fan spans $\sim 60^\circ$ in p.a. [GAL03, w/ PRA02]. Oct. 6.48: central cond. of dia. $\approx 1''$ and mag 14.7; a short, tapering tail ($18''$ long) merged into the longer and fainter primary tail [ROQ]. Oct. 13.42: central cond. of dia. $\approx 1''$ and mag 14.2; tail showed a $1''5$ -long initial segment that merged into the fainter and slightly-curved general tail structure [ROQ]. Oct. 26.33: central cond. of dia. $\approx 2''$ and mag 14.5; an unfiltered image of the tail showed only a hint of substructure at its emergence from the brighter and irregularly-defined, but generally symmetrical, inner coma [ROQ].

◊ *Comet 81P/Wild 2* $\Rightarrow$ 1997 Mar. 6.80: w/ 12×80 B, coma dia. $8'$, $DC = d2$ [NAU]. Aug. 7.89: comet 7° over the horizon, obs. in twilight [MAR02].

◊ *Comet 103P/Hartley 2* $\Rightarrow$ 1997 July 22.95: no coma; seeing $\sim 4''$ [GAL03, w/ PRA02]. Aug. 2.91-Sept. 26.78: 36-cm $f/6.7$ T + V filter + CCD [MIK]. Aug. 4.88: Landolt standard sequence was used for better precision [MIK]. Aug. 23.87: four 60-sec exp.; faint coma [GAL03, w/ PRA02]. Sept. 16.81: obs. during total lunar eclipse, about 5 min after the end of totality [OKS]. Oct. 1.12: central cond. of dia. $\approx 2''$ and mag 15.1; although no tail was readily apparent, the coma was asymmetrical toward p.a. 104° [ROQ]. Oct. 3.50: comet not visible (stars to mag 14.5 seen in vicinity) [PEA]. Oct. 4.19: central cond. of dia. $\approx 2''$ and mag 14.7 [ROQ]. Oct. 20.44: w/ 25.4-cm L ($71\times$), little change when using Swan Band filter [SEA].

◊ *Comet 104P/Kowal 2* $\Rightarrow$ 1997 July 23.03: four co-added frames; seeing $3''5$ [GAL03, w/ PRA02].

◊ *Comet 131P/Mueller 2* $\Rightarrow$ 1997 Oct. 9.35: broad tail [SCO01].

◊ *Comet 133P/1996 N2 (Elst-Pizarro)* $\Rightarrow$ 1997 Oct. 10.46: comet stellar in appearance; the magnitudes were published on MPC 30726 as V magnitudes, to which Scotti responds: "the magnitude system is nearly identical to what we've used in the past; we do have a blue-cutoff filter in place now in front of a coma corrector (so images are much sharper) — since the coma corrector was installed starting with the observing run of about June 1995; we also still calibrate to V magnitudes of solar-colored stars — the band pass is in the V-R range — the sensitivity of a Tektronics Tk2048E CCD, modified only slightly by the blue-cutoff filter; the sensitivity of the CCD in the cutoff region was pretty low anyway, and there would have been a bigger discontinuity in our program from the old RCA CCD used through April 1988 to the new Tektronic CCDs we started using in 1989 and then the change from the thick Tek 2K to the thinned Tek 2K starting with the September 1992 observing run; the coma corrector itself might change things, especially in the nuclear magnitude estimates..."; the ICQ will thus continue to use ICQ codes 'C' and 'c' for the Spacewatch data, meaning 'unfiltered CCD magnitudes'; "in general, I use a normal drift scan to image most comets, and that is ~ 143 sec divided by $\cos(\delta)$; if I take 'stare' frames, they're usually either 150 or 300 sec, unless I need more or less exposure; in the future, unless I say otherwise, assume that a sidereal drift scan was used and the CCD exp. will be $143/\cos(\delta)$ " [SCO01].

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Key to observers with observations published in this issue, with 2-digit numbers between Observer Code and Observer's Name indicating source [07 = Comet Section, British Astronomical Assn.; 16 = Japanese observers (c/o Akimasa Nakamura, Kuma, Japan); 23 = Czech group (c/o P. Pravec and V. Znojil); 32 = Hungarian group (c/o K. Sarneczky); 37 = Ukrainian Comet Section (c/o A. R. Baransky and K. I. Churyumov); etc.]. Those with asterisks (*) preceding the 5-character code are new additions to the Observer Key:

ABB	07	James Abbott, Witham, England	KES01	Sándor Keszthelyi, Pécs, Hungary
ADA02	18	Jacek Adamik, Poland	KID01	18 Krzysztof Kida, Elblag, Poland
AND01		Karl-Gustav Andersson, Sweden	KOL03	18 Szymon Kolodziej, Poland
*BAJ	32	Péter Bajor, Székesfehérvár, Hungary	*KON07	18 Marcin Konopka, Rogozno, Poland
BAK01	32	Gáspár Bakos, Budapest, Hungary	KOS01	18 Janusz Kosinski, Poland
BAL02	33	Ricardas Balciunas, Ignalina, Lithuania	*KRU01	37 Grygoriy S. Kruk, Ukraine
BAN	18	Jaroslav Bandurowski, Poland	KUB	23 Pavel Kubicek, Czech Republic
BAR05	05	Lewiss Bartha, Hungary	KWI	18 Maciej Kwinta, Krakow, Poland
BAR06	37	Alexandr R. Baransky, Okhnovka, Ukraine	KYS	23 J. Kysely, Czech Republic
BEN04	18	Leszek Benedyktowicz, Poland	LAN02	32 Zsolt Lantos, Budapest, Hungary
*BIN	18	Andrzej Binkiewicz, Kozlow, Poland	LOU	35 Romualdo Lourencon, Brazil
*BIN01	07	John Bingham, Kidderminster, U.K.	LUE	Hartwig Luethen, Germany
BOR04	37	Sergiy A. Borysenko, Ukraine	*MAC03	18 Gracjan Maciejewski, Torun, Poland
BOU	11	Reinder J. Bouma, The Netherlands	*MAJ	18 Urszula Majewska, Chelm, Poland
BRL	12	Pál Brlás, Budapest, Hungary	MAR02	13 Jose Carvajal Martinez, Spain
BUS04	32	Sandor Busa, Harkakötöny, Hungary	MAR12	18 Leszek Marcinek, Poland
CEL	18	Tomasz Celeban, Poland	MAR13	18 Jerzy Marcinek, Poland
CHO01	18	Franciszek Chodorowski, Poland	*MAR22	18 Michal Marek, Zawiercie, Poland
CHR	18	Antoni Chrapek, Pikulice, Poland	MEN03	07 Haldun I. Menali, Istanbul, Turkey
CHV	37	V. V. Chvak, Ukraine	MEY	28 Maik Meyer, Germany
CNO	18	Ryszard Cnota, Poland	*MIG01	18 Adam Migulski, Jasien, Poland
CRE01		Phillip J. Creed, OH, U.S.A.	MIK	Herman Mikuz, Slovenia
CZE01	18	Waclaw Czerniewski, Starachowice, Poland	MIL02	Giannantonio Milani, Italy
DEM01	18	Andrej Dementjev, Vilnius, Lithuania	MIY01	16 Osamu Miyazaki, Tsukuba, Japan
DER	18	Oskar Deren, Poland	MOE	Michael Moeller, Germany
DES01		Jose Guilherme de Souza Aguiar, Brazil	MOR04	37 Vladimir G. Mormyl, Ukraine
DIE02		Alfons Diepvens, Belgium	MOR08	37 Alexandra M. Mormyl, Ukraine
DIN01	07	E. L. Dinham, Plymouth, Devon, England	MOS03	37 Yuriy A. Moskalenko, Ukraine
DOB	32	Szabolcs Dobra, Székesfehérvár, Hungary	MUS01	18 Pawel Musialski, Poland
DRA02	18	Michal Drahos, Krakow, Poland	NAG02	16 Takashi Nagata, Akashi, Hyogo, Japan
*DYG	18	Jaroslav Dygos, Czernice Borowe, Poland	NAG08	16 Yoshimi Nagai, Matsumoto, Japan
*FAR01		Fraser Farrell, S. Australia	NAK01	16 Akimasa Nakamura, Kuma, Ehime, Japan
FIL04	18	Marcin Filipek, Poland	NAU	37 Alexandr V. Naumov, Ukraine
FIL05	37	Alexander V. Filatov, Kiev, Ukraine	*NEM	32 László Németh, Székesfehérvár, Hungary
FUK02	16	Hideo Fukushima, Mitaka, Tokyo, Japan	NEV	42 Vitali S. Nevski, Vitebsk, Belarus
*GAL03		Adrián Galád, Modra-Piesok, Slovakia	OHM	16 Fumihiko Ohmori, Miyazaki, Japan
GAM	18	Mariusz Gamracki, Poland	OKS	07 Gabriel Oksa, Starohajska, Slovakia
*GAN	18	Slawomir Gandecki, Miedzyrzecz, Poland	OLE	18 Arkadiusz Olech, Poland
GAR03	33	Andrius Garbaras, Varena, Lithuania	OSS	18 Piotr Ossowski, Poland
GAS01	33	Darius Gasiunas, Lithuania	PAR03	18 Mieczyslaw L. Paradowski, Poland
GLI		Gunnar Glitscher, Germany	*PAT02	32 Sebestyen Patyi, Budapest, Hungary
GNI	18	Katarzyna Gniazdowska, Wyszki, Poland	PEA	14 Andrew R. Pearce, Australia
GRE		Daniel W. E. Green, U.S.A.	PER01	Alfredo Jose Serra Pereira, Portugal
GRO03	18	Radoslaw Grochowski, Poland	PER05	18 Piotr Perek, Poland
*GRZ02	18	Michal Grzyb, Sosnowiec, Poland	*PIN01	32 András Pintér, Székesfehérvár, Hungary
GUR	37	S. Guryanov, Krasnoyarsk, Russia	PIO	18 Tomasz Piotrowski, Poland
HAS02		Werner Hasubick, Germany	PLE01	18 Janusz Pleszka, Poland
HAV		Roberto Haver, Italy	PLS	23 Martin Plšek, Czech Republic
HOR02	23	Kamil Hornoch, Czechoslovakia	*PRA02	Alexander Pravda, Modra, Slovakia
IVA03	37	Vladimir Ivanov, Russia	*RAV01	32 Bálint Ravasz, Gyopárosfürdő, Hungary
JAR01	18	Marcin Jarski, Niezabitow, Poland	*REM	18 Tomasz Remza, Swiebodzin, Poland
JON	09	Albert F. Jones, New Zealand	RES	18 Maciej Reszelski, Szamotuly, Poland
*JON05	18	Wojciech Jonderko, Rybnik, Poland	ROQ	Paul Roques, AZ, U.S.A.
KAM01		Andreas Kammerer, Ettlingen, Germany	RYZ	37 Igor V. Ryzhkov, Ukraine
KAM05	18	Krzysztof Kaminski, Poznan, Poland	SAD	18 Piotr Sadowski, Poland

SAJ 32	András Sajtz, Satu-Nou, Romania	STE12 33	Domas Steponenas, Lithuania
SAN04 38	Juan Manuel San Juan, Madrid, Spain	SWI 18	Mariusz Swietnicki, Poland
SAN07 32	Gábor Sánta, Kisujszállás, Hungary	SZA02 32	Levente Szarka, Kecskemét, Hungary
SAR02 32	Krisztián Sárneckzy, Budapest, Hungary	SZA05 18	Konrad Szaruga, Telatyn, Poland
SCI	Tomasz Sciezor, Poland	*SZA06 32	Andrea Szarka, Székesfehérvár, Hungary
SCO01	James V. Scotti, AZ, U.S.A.	*SZA07 18	Jaroslav Szal, Glubczyce, Poland
SCO02	T. Gehrels and J. Scotti, Kitt Peak, AZ	SZC01 18	Robert Szczerba, Sieradz, Poland
SCO04 37	Borys Skorichenko, Ukraine	SZE03 18	Maciej Szelagawski, Gdansk, Poland
SEA 14	David A. J. Seargent, Australia	SZU01 18	Stanislaw Szumowicz, Pilzno, Poland
SEA01 14	John Seach, Australia	*TRY 18	Pawel Trybus, Lajsce, Poland
SHA02 07	Jonathan D. Shanklin, Cambridge, England	TSU02 16	Mitsunori Tsumura, Wakayama, Japan
SHU 42	Sergey E. Shurpakov, Baran, Belarus	VELO3 37	Peter Velestschuk, Ukraine
*SID 33	Deimantas Sidorenko, Varena, Lithuania	VIT01 40	Catarina Vitorino, Portugal
SIE 33	Henryk Sielewicz, Lithuania	*WAL03 18	Lukasz Walec, Stalowa Wola, Poland
SIW01 18	Michal Siwak, Tuchow, Poland	WAR01	Johan Warell, Sweden
*SKO04 18	Andrzej Skoczewski, Tarnow, Poland	WLO 18	Robert Wlodarczyk, Czestochowa, Poland
*SMY 18	Jaroslav Smyslo, Busko Zdroj, Poland	YOS02 16	Katsumi Yoshimoto, Hirao, Japan
SOC 18	Krzysztof Socha, Poland	YOS04 16	Seiichi Yoshida, Ibaraki, Japan
SOU01 35	Willian Carlos de Souza, Brazil	ZNO 23	Vladimír Znojil, Czech Republic
SPE01 18	Jerzy Speil, Poland	*ZOL 18	Przemyslaw Zoladek, Poland
SPR	Christopher E. Spratt, BC, Canada	*ZYW 18	Tomasz Zywczyak, Krakow, Poland
SRA 32	Márta Sragner, Pécs, Hungary		

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Comet C/1995 01 (Hale-Bopp)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1995 08 28.85	\$	B	10.1	TI	10.0	B		25	1.2	3			PLE01
1995 08 29.89		S	10.4:	S	10.0	B		25	& 4	3			RES
1995 08 30.90		S	10.4	AC	10.0	B		25	4	3			RES
1995 10 25.71	\$	B	9.9	TI	10.0	B		25	2.0	3/			PLE01
1995 10 27.70	\$	B	10.0	TI	10.0	B		25	1.8	3			PLE01
1996 04 11.12	\$	B	9.5	S	35	M	10	90	2.2	2			PLE01
1996 04 13.10	\$	B	8.6	S	10.0	B		25	2.0	2/			PLE01
1996 04 13.11	&	S	8.8	S	8	R	7	35	2	3			KWI
1996 04 19.09	&	S	8.7	S	8	R	7	35	2	3			KWI
1996 04 19.12	\$	B	8.5	S	6.6	B		20	2.0	3			PLE01
1996 04 23.04	&	B	8.6	S	25	L	6	100	& 1	2			SWI
1996 04 23.06	&	S	8.5	S	14.7	L	6	26	& 5	s6			SIW01
1996 04 26.08	a	B	8.2	S	6.6	B		20	2.2	3			PLE01
1996 04 28.06	&	B	8.5:	S	10	M	10	56	0.5	s4			MAR12
1996 05 03.06		S	8.1:	S	6.0	B		20	& 7	5			SCI
1996 05 04.06		S	8.1:	S	6.0	B		20	& 7	5			SCI
1996 05 10.75		B	8.5:	AA	25.0	L	6	45	2	3			GAS01
1996 05 10.76		B	8.5:	AA	25.0	L	6	45	2	3			DEM01
1996 05 14.04	&	B	8.3:	S	10	M	10	56	0.5	s5			MAR12
1996 05 17.01	&	B	8.2	S	7.5	A	6	0	0.5	s5			MAR12
1996 05 18.03	a	B	7.4	S	5.0	B		10	2.0	3/			PLE01
1996 05 18.04	&	S	7.6	S	8	R	7	35	3	4			KWI
1996 05 19.02		S	7.9	S	25.0	L	6	50	12	4			RES
1996 05 19.02		S	8.2	S	5.0	B		10	10	3			RES
1996 05 21.03	&	B	8.2	S	7.5	A	6	0	0.5	s5			MAR12
1996 05 21.96	&	B	8.5	S	25	L	6	100	& 2	3			SWI
1996 05 22.00	&	B	8.2	S	7.5	A	6	0	0.5	s5			MAR12
1996 05 25.02	&	B	8.2:	S	10	M	10	56	0.6	s5			MAR12
1996 05 27.01	&	B	8.0	S	7.5	A	6	0	0.6	s5			MAR12
1996 05 31.00	a	B	6.9	S	10.0	B		25	3.2	4			PLE01
1996 05 31.01	&	S	7.0	S	8	R	7	35	3	4			KWI
1996 05 31.98		S	6.7:	S	6.0	B		20	& 7	5			SCI
1996 06 03.00	!	B	7.4	S	15.0	L	6	80	4.8	d5/			PIO
1996 06 05.94	&	B	8.0	S	10	M	10	56	0.7	s5			MAR12
1996 06 06.85		I	7.2	S	14.0	L	6	60	& 5	4			ADA02
1996 06 06.90		S	7.8	S	5.0	B		10	9	5			RES
1996 06 06.91		S	7.6	S	25.0	L	6	50	12	3			RES

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 06 06.92	&	B	8.0	S	10	M	10	56	0.7	s5	0.01		MAR12
1996 06 06.93	&	B	8.2	S	25	L	6	100	& 3	3/			SWI
1996 06 06.94		M	8.2	S	14.7	L	6	70	& 8	5			SIW01
1996 06 06.94	&	B	7.4	S	15.0	L	6	80	5.0	d5/	0.05	55	PIO
1996 06 06.94	&	S	8.3	S	15	L	6	80	2	d5			DRA02
1996 06 06.97		S	6.6	S	9.0	R	6	16	& 6	d4			PAR03
1996 06 07.91	&	S	7.1:	S	5.0	B		10	& 5				SIW01
1996 06 07.92		B	7.4:	S	6.0	B		20	&10	d3			CNO
1996 06 07.95		S	8.0:	S	8.0	B		20	& 4	3			SPE01
1996 06 07.95	&	B	7.9	S	10	M	10	56	0.7	s5	0.01		MAR12
1996 06 07.97		S	6.3	S	9.0	R	6	16	& 6	d4			PAR03
1996 06 08.11		S	8.8	S	35	M	10	80	2	s6/			DRA02
1996 06 09.96	&	S	6.7	S	8	R	7	35	4	4			KWI
1996 06 09.99	a	B	6.5	S	10.0	B		25	3.8	4			PLE01
1996 06 10.88	\$	B	7.5	S	6.4	R	12	32	& 5	s3			CH001
1996 06 10.98		S	7.7:	S	8.0	B		20	6.9	3			SPE01
1996 06 11.98		S	7.4	S	5.0	B		10	14	2			RES
1996 06 12.00	&	B	7.4	S	15.0	L	6	80	5.4	d5/			PIO
1996 06 13.94		B	7.3:	S	4.0	B		12	&15	2			KOL03
1996 06 13.94		M	6.7	S	5.0	B		10	&10	5			SIW01
1996 06 13.95		S	7.1	S	5.0	B		10	11	4			RES
1996 06 13.95	&	B	7.5	S	5.0	B		10	2.0	s6	0.01		MAR12
1996 06 13.97		S	7.0	S	25.0	L	6	50	9	5/			RES
1996 06 14.92	\$	B	8.0	S	6.4	R	12	32	& 5	s3			CH001
1996 06 14.94		S	6.7	S	5.0	B		10	10	4/			RES
1996 06 15.94		S	6.7	S	5.0	B		10	12	3			RES
1996 06 16.96		S	6.8	S	5.0	B		10	10	4			RES
1996 06 16.97		B	7.4	S	5.0	B		10	2.5	s6	0.01		MAR12
1996 06 16.98		I	7.0:	S	4.0	B		12	&10	2			WLO
1996 06 17.90		B	7.5	S	5.0	B		10	2	1/			DER
1996 06 17.93		S	6.8	S	5.0	B		10	12	3/			RES
1996 06 17.96		B	7.2:	S	6.0	B		20	&10	d3			CNO
1996 06 17.98		B	7.3	S	5.0	B		10	2.5	s6	0.01		MAR12
1996 06 17.98		M	6.5:	S	5.0	B		10	& 8				SIW01
1996 06 17.99		M	7.1:	S	8.0	B		20	7.3	3			SPE01
1996 06 17.99		S	6.2	S	5.0	B		7	&10	d4			PAR03
1996 06 18.93		S	6.5	S	8	R	7	35	5	4			KWI
1996 06 18.93		S	6.7	S	5.0	B		10	14	5			RES
1996 06 18.98		I	6.9:	S	4.0	B		12	&11	2			WLO
1996 06 19.00	a	B	6.4	S	6.6	B		20	4.7	4			PLE01
1996 06 20.97		B	7.6	S	4.0	B		12	10	3			KOL03
1996 06 21.91		S	6.6	S	5.0	B		10	14	5			RES
1996 06 24.98	a	B	6.2	S	6.6	B		20	5.8	4			PLE01
1996 06 25.93		S	6.6	S	5.0	B		10	15	3			RES
1996 06 25.96		B	7.3	S	10	M	10	56	3.0	s6	0.01		MAR12
1996 06 25.98		I	6.7:	S	4.0	B		12	&11	3			WLO
1996 06 25.99	s	B	6.1	S	5.0	B		7	6.0	4/			PLE01
1996 06 26.01		S	6.3	S	8	R	7	35	5	4			KWI
1996 06 26.93		B	6.5	S	11.0	L	7	32	10	5			BAL02
1996 06 26.95		S	6.3	S	5.0	B		10	14	4/			RES
1996 06 27.01		B	6.6	S	5	R	6	20	&12	3/			WLO
1996 07 02.98		S	5.9	S	5.0	B		10	& 9	4			RES
1996 07 03.86		S	8.3	S	15	L	6	80	6	s5			DRA02
1996 07 03.90		S	5.8	S	5.0	B		10	11	3/			RES
1996 07 03.93	!	B	7.0	AA	6.8	R	12	40		d4			CHR
1996 07 04.87		B	7.5	S	4.0	B		12	8	3			KOL03
1996 07 04.88		B	7.0	S	5.0	B		10	12	1			DER
1996 07 04.88	&	B	7.3	S	25	L	6	100	& 3	4			SWI
1996 07 04.88	s	B	6.1	S	10.0	B		25	6.5	4/	0.17	38	PLE01
1996 07 04.89		S	6.3	S	8	R	7	35	6	4			KWI
1996 07 04.92		S	8.0	S	35	M	10	80	5	s5			DRA02
1996 07 04.92	!	B	7.0	AA	6.8	R	12	40		d4			CHR
1996 07 04.93		B	6.9	S	10	M	10	56	3.0	s6	0.01		MAR12
1996 07 04.94		S	7.7	S	15	L	6	80	5	s4			DRA02
1996 07 04.95		S	6.0	S	5.0	B		10	12	4/			RES

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 07 05.89		S	6.3	S	8	R	7	35	6	4			KWI
1996 07 05.91		B	6.9	S	5.0	B		10	3	S6	0.02		MAR12
1996 07 05.91		S	7.4	S	15	L	6	30	8	s4			DRA02
1996 07 05.91	s	B	6.1	S	10.0	B		25	6.5	4/	0.2	40	PLE01
1996 07 05.92		B	8.0	S	8.0	B		40	& 2	d1			SOC
1996 07 05.92		S	5.8	S	5.0	B		10	12	3/			RES
1996 07 05.93		B	6.1	S	9.0	R	6	16	& 6	d4			PAR03
1996 07 06.88		B	6.8	S	5.0	B		10	8.5	2			DER
1996 07 06.90		S	5.8	S	5.0	B		10	16	3			RES
1996 07 06.91		B	6.5	S	4.0	B		12	&15	4			WLO
1996 07 06.92		B	6.8	S	8.0	B		20	7.7	s4			SPE01
1996 07 09.90		B	5.7	S	5.0	B		10	&10				SIW01
1996 07 09.93		B	6.5	S	5.0	B		10	4	S6	0.05		MAR12
1996 07 10.89		B	6.1	S	5.0	B		15	& 4	d2			SOC
1996 07 13.88		B	6.1	S	5.0	B		15	& 3	d3			SOC
1996 07 13.88		S	5.7	S	5.0	B		15	15	3			RES
1996 07 13.94		B	6.4	S	3.0	B		6	&18	3/			OLE
1996 07 13.94		S	6.0	S	5.0	B		7	&13	d4			PAR03
1996 07 13.95		B	6.3	S	5.0	B		10	5	S6	0.08		MAR12
1996 07 13.96		B	6.4	S	6.0	B		20	& 7	4			SCI
1996 07 14.88		O	6.8	S	5.0	R	7	20	5	4			ZOL
1996 07 14.94		B	5.7	S	5.0	B		15	& 7	d3			SOC
1996 07 14.94		B	6.7	S	5.0	B		7	8.6	s3			SPE01
1996 07 14.94		S	5.7	S	5.0	B		15	11	3			RES
1996 07 14.95		S	5.8	S	0.0	E		1	& 8	6			RES
1996 07 14.96		B	6.7	S	8.0	B		20	10.6	s4			SPE01
1996 07 15.89		B	5.7	S	5.0	B		10	& 7	d3			SOC
1996 07 15.89		S	5.6	S	5.0	B		10	12	3	0.25	170	RES
1996 07 15.90		B	6.3	S	3.0	B		6	&18	3			OLE
1996 07 15.90		B	6.8	S	4.0	B		12	& 9	3			KOL03
1996 07 15.90		S	5.7	S	0.0	E		1	&15	6			RES
1996 07 15.92		B	6.2	S	5.0	B		10	5	S6	0.08		MAR12
1996 07 15.92	s	B	6.0	S	6.6	B		20	6.5	5			PLE01
1996 07 15.93		S	6.2	S	8	R	7	35	6	4			KWI
1996 07 15.94		B	6.9	S	6.4	R	6	20	&10	d4			CNO
1996 07 16.88		S	5.5	S	0.0	E		1	&15	6			RES
1996 07 16.88		S	5.6	S	6.0	B		20	12	3		170	RES
1996 07 16.90		B	5.8	S	5.0	B		10	& 7	d3			SOC
1996 07 16.94		S	5.5	S	25.0	R	15	100	11	6	0.23	180	RES
1996 07 16.95		B	6.2	S	5.0	B		10	5	S6	0.08		MAR12
1996 07 16.96		B	6.4	S	4.0	B		12	&12	4			WLO
1996 07 16.99		B	6.3	S	3.0	B		6	&18	4			OLE
1996 07 17.85		O	6.8	S	5.0	R	7	20	5	4			ZOL
1996 07 17.89	&	B	7.0	S	3.6	B		4	7	d6/	&0.2		PIO
1996 07 17.90		B	6.4	S	5.0	B		10	&14	6			SIW01
1996 07 17.96		B	6.2	S	5.0	B		10	5	S6	0.08		MAR12
1996 07 18.92	s	B	5.9	S	6.6	B		20	6.0	5			PLE01
1996 07 18.93		B	6.2	S	5.0	B		10	&18	3			OLE
1996 07 18.94		S	5.7	S	5.0	B		10	16	2			RES
1996 07 18.95		B	6.3	S	3.0	B		6	&14				MAJ
1996 07 18.95		S	6.2	S	8	R	7	35	6	4			KWI
1996 07 18.96		S	5.5	S	0.0	E		1	&26	3			RES
1996 07 18.96		S	5.7	S	3.0	B		7	18	2			RES
1996 07 19.01		I	6.3	S	4.0	B		12	&10	4			WLO
1996 07 19.84		I	7.3	S	5.2	R		30	15	0			MUS01
1996 07 19.85		B	6.9	S	5.0	B		10	18	2			DER
1996 07 19.88		B	6.3	S	5.0	B		10	5	S6	0.08		MAR12
1996 07 19.93		B	6.6	S	8.0	B		20	10.2	s4			SPE01
1996 07 20.86		S	5.7	S	5.0	B		10	15	3	0.12	170	RES
1996 07 20.88		S	5.4	S	0.0	E		1	&21	2			RES
1996 07 20.89		B	6.2	S	5.0	B		10	6	S6	0.10		MAR12
1996 07 20.89		S	6.0	S	5.0	B		7	&13	d4			PAR03
1996 07 20.90		B	6.2	S	5.0	B		10	&14	6/			SIW01
1996 07 20.90		B	6.6	S	6.4	R	6	40	& 7	s4			MAR13
1996 07 20.91		B	6.6	S	5.0	B		7	11.2	s3			SPE01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 07 20.92		B	6.6	S	8.0	B		20	12.7	s4			SPE01
1996 07 20.93		B	6.6	S	5.0	B		7	&12	d5			CNO
1996 07 21.00		B	6.1	S	3.0	B		6	&20	4			OLE
1996 07 21.01		B	6.3	S	3.0	B		6	&11	4			MAJ
1996 07 21.01		B	6.3	S	5	R	6	20	&14	4			WLO
1996 07 21.87		S	6.1	S	8	R	7	35	6	4/			KWI
1996 07 21.88		B	6.2	S	5.0	B		10	6	S6	0.10		MAR12
1996 07 21.88		B	6.3	S	4.0	B		12	&18	4/			OLE
1996 07 21.88	&	B	6.6	S	25	L	6	100	& 4	4/			SWI
1996 07 21.89	&	B	7.3	S	11	L	7	32	& 8	s3	&0.1	30	CH001
1996 07 21.89	s	B	6.0	S	6.6	B		20	6.2	5	0.2	36	PLE01
1996 07 21.90		B	6.3	S	4.0	B		12	&18	5			MAJ
1996 07 21.90		B	6.6	S	6.4	R	6	40	& 7	s4			MAR13
1996 07 21.90		S	5.4	S	0.0	E		1	&26	1			RES
1996 07 21.90		S	5.6	S	5.0	B		10	17	3	0.13	170	RES
1996 07 22.81		B	6.9	S	5.0	B		10	10	2			DER
1996 07 22.84		O	6.7	S	5.0	R	7	20	5	4			ZOL
1996 07 22.86		B	6.3	S	4.0	B		12	&18	4/			OLE
1996 07 22.87		B	5.8	S	7.0	B		25	& 6	d4			SOC
1996 07 22.88		B	6.3	S	4.0	B		12	&15	5/			MAJ
1996 07 22.88		B	6.5	S	6.4	R	6	40	& 6.5	s4			MAR13
1996 07 22.88		S	5.8	S	5.0	B		10	15	3	0.10	170	RES
1996 07 22.89		B	6.2	S	5.0	B		10	6	S6	0.10		MAR12
1996 07 22.89		B	6.8	S	4.0	B		12	12	3			KOL03
1996 07 22.91		B	6.6	S	5.0	B		7	12.6	s3			SPE01
1996 07 22.92		B	6.7	S	5.0	B		7	&11	6/			CEL
1996 07 22.92		B	6.7	S	8.0	B		20	13.7	s4			SPE01
1996 07 22.92		S	5.5	S	0.0	E		1	&21	1			RES
1996 07 22.93		B	6.5	S	5.0	B		7	&12	d5			CNO
1996 07 22.93		B	6.8	S	5.0	B		7	10	4/			FIL04
1996 07 22.95		B	6.4	S	5.0	B		10	&15	6/			SIW01
1996 07 22.95		S	6.5:	S	10	B		25	16	s4/			DRA02
1996 07 22.96	!	B	6.8	AA	6.8	R	12	40		d5			CHR
1996 07 22.97	&	B	7.0	S	3.6	B		4					PIO
1996 07 22.97	&	B	7.0	S	5.0	B		8	12	d			PIO
1996 07 23.01		B	6.2	S	4.0	B		12	&12	4			WLO
1996 07 23.02		S	7.7	S	35	M	10	80	16	s4	0.7	315	DRA02
1996 07 23.83		B	6.1:	S	7.0	B		25	& 3	d1			SOC
1996 07 23.88		B	6.3	S	4.0	B		12	&17	4			OLE
1996 07 23.88		B	6.3	S	5.0	B		10	6	S6	0.10		MAR12
1996 07 23.89		B	6.3	S	4.0	B		12	&17	5			MAJ
1996 07 23.90		B	6.4	S	6.4	R	6	40	7	s4			MAR13
1996 07 23.98		S	6.2	S	5	R	4	20	& 4	3			SK004
1996 07 24.90	s	B	6.0	S	6.6	B		20	7	5			PLE01
1996 07 25.92		B	6.4	S	5.0	B		10	&14	3			OLE
1996 07 26.90		S	6.3	S	5.0	B		10	&14				OLE
1996 07 26.93		S	7.7	S	15	L	6	30	8	s4			DRA02
1996 07 27.01		B	6.4:	S	6.4	R	6	40	7	s4			MAR13
1996 07 30.84		S	5.5	S	5.0	B		10	&17	1			RES
1996 08 01.75		B	6.4	S	4.5	B	4	12	5	2			GAM
1996 08 01.87		B	6.7	S	4.0	B		12		3			KOL03
1996 08 01.87		I	6.8	S	25.0	L	6	100	& 5	4			ADA02
1996 08 01.89	!	B	6.7	AA	6.8	R	12	40		d5			CHR
1996 08 02.91		S	5.6	S	5.0	B		10	17	2/			RES
1996 08 03.87		S	5.6	S	5.0	B		10	12	3			RES
1996 08 04.86		B	6.3	S	5.0	B		7	12.5	5			BAL02
1996 08 04.87		S	5.5	S	0.0	E		1	&17	2			RES
1996 08 04.87		S	5.7	S	5.0	B		10	14	2/			RES
1996 08 05.87		B	6.3	AA	5.0	B		7	13	5			BAL02
1996 08 05.93		S	5.3	S	0.0	E		1	&21	2			RES
1996 08 05.93		S	5.4	S	5.0	B		10	18	3/	0.23	170	RES
1996 08 06.87		S	5.2	S	0.0	E		1	&18	2			RES
1996 08 06.87		S	5.3	S	5.0	B		10	13	5/	0.23	170	RES
1996 08 06.88		B	6.3	AA	5.0	B		7	13	5	1	114	BAL02
1996 08 06.88		B	6.8:	S	5.0	B		7	& 6	2			SPE01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 08 06.88		S	6.0	S	8	R	7	35	9	5			KWI
1996 08 06.89	s	B	5.8	S	10.0	B		25	10	5	0.3	38	PLE01
1996 08 06.91		B	6.9:	S	8.0	B		20	& 6	s3			SPE01
1996 08 06.91		I	6.7	S	14.0	L	6	60	& 6	4			ADA02
1996 08 06.96		B	6.3	S	6.0	B		20	& 3	5			SCI
1996 08 06.96		I	6.3	S	10	B		25		s6/	0.2		ZYW
1996 08 07.83		B	6.6	S	5.0	B		7	&12	d5			CNO
1996 08 07.84		B	6.5	S	5.0	B		10	6	S6/	0.10		MAR12
1996 08 07.84		B	6.6	S	4.0	B		12	& 9	3			KOL03
1996 08 07.84		O	6.6	S	5.0	R	7	20	5	4			ZOL
1996 08 07.85		I	6.7	S	14.0	L	6	60	& 6	4			ADA02
1996 08 07.86		B	6.3	S	6.0	B		20	& 5	5			SCI
1996 08 07.87		B	6.0	S	7.0	B		25	&10	d5			SOC
1996 08 07.87		S	5.5	S	5.0	B		10	11	3			RES
1996 08 07.87		S	6.0	S	8	R	7	35	10	5	0.2	40	KWI
1996 08 07.89		B	6.4	S	5.0	B		10	&13				SIW01
1996 08 07.89		B	6.8	S	5.0	B		7	& 8	6			CEL
1996 08 07.89	s	B	5.8	S	10.0	B		25	10	5	0.3	38	PLE01
1996 08 07.90		B	6.3	AA	5.0	B		7	13	4	0.8	114	BAL02
1996 08 07.90	&	B	6.6	S	15.0	L	6	30	13.2	d7/		57	PIO
1996 08 07.91	!	B	6.6	AA	6.8	R	12	40		d5			CHR
1996 08 08.81		O	6.6	S	5.0	R	7	20	5	4			ZOL
1996 08 08.83		B	6.3	S	5.0	B		10	&23	3/			OLE
1996 08 08.84		B	6.5	S	5.0	B		10	6	S6/	0.10		MAR12
1996 08 08.85		B	6.3	S	5.0	B		10	20	3			DER
1996 08 08.85		I	6.0:	S	4.0	B		12	&15	4			WLO
1996 08 08.86		B	6.3	S	6.0	B		20	& 5	5			SCI
1996 08 08.86		S	5.4	S	5.0	B		10	17	3	0.08	140	RES
1996 08 08.87		B	6.0	S	7.0	B		25	&10	d5			SOC
1996 08 08.87		B	6.7	S	5.0	B		7	9.5	s3			SPE01
1996 08 08.88		B	6.7	S	6.0	B		20	7	4			BEN04
1996 08 08.88		B	6.9	S	5.0	B		7	& 8	6			CEL
1996 08 08.89		B	6.8	S	8.0	B		20	9.5	s4			SPE01
1996 08 08.89	s	B	5.7	S	10.0	B		25	11	5	0.4	40	PLE01
1996 08 08.90		B	6.5	S	5.0	B		7	10				FIL04
1996 08 08.90		S	7.0:	S	6.0	B		20	10	s3/			DRA02
1996 08 08.91		B	6.9	S	6.6	B		20	8	5	0.2	25	FIL04
1996 08 08.92	\$	B	7.0	S	11	L	7	32	& 8	s3	&0.1	30	CH001
1996 08 08.98	M	6.2	S	35	M	10		80	10	s5			DRA02
1996 08 09.82		I	6.6	S	25.0	L	6	100	& 8	4			ADA02
1996 08 09.84		B	6.8	S	4.0	B		12	8	3			KOL03
1996 08 09.85		B	6.1	S	6.0	B		20	& 7	4/	&0.52	121	SCI
1996 08 09.86		B	6.7:	S	5.0	B		7	& 9	s3			SPE01
1996 08 09.87		B	6.5	S	6.0	B		20	7	4			BEN04
1996 08 09.87		B	7.2	S	6.0	B		20	&10	2/			KID01
1996 08 09.88		B	6.4	S	5.0	B		7	&12	d5			CNO
1996 08 09.88		B	6.6	S	25	L	6	100	& 5	4/			SWI
1996 08 09.88		B	6.9	S	5.0	B		7	&10	6/			CEL
1996 08 09.88		I	6.0:	S	5	R	6	20	&16	4/			WLO
1996 08 09.89		B	6.0	S	7.0	B		25	&10	d4			SOC
1996 08 09.90	s	B	5.8	S	10.0	B		25	12	5	0.4	40	PLE01
1996 08 09.91		B	6.7	S	10.0	B		25	12	5	0.6	45	FIL04
1996 08 09.91		S	5.1	S	0.0	E		1	&21	2			RES
1996 08 09.91		S	5.2	S	5.0	B		10	17	3			RES
1996 08 09.91		S	5.9	S	5.0	B		7	16	5	0.3	40	KWI
1996 08 09.94		B	6.2	AA	5.0	B		7	14	5	1.1	117	BAL02
1996 08 09.94		B	6.2	S	5.0	B		10	&25	3/			OLE
1996 08 10.0		B	5.6	YG	0.0	E		1	&15	5			FAR01
1996 08 10.02		B	6.4:	S	5.0	B		10	6	S6/	0.10		MAR12
1996 08 10.2		B	5.3	YG	20	T	7	50	&30	7			FAR01
1996 08 10.76		B	6.0	AA	5.0	B		7		3			GAS01
1996 08 10.76		B	6.5	AA	19.5	L	5	52		3			DEM01
1996 08 10.78		B	6.6	S	4.5	B	4	12	10	3			GAM
1996 08 10.80		O	6.6	S	5.0	R	7	20	5	4			ZOL
1996 08 10.83		B	6.5	S	4.0	B		12	11	3/			KOL03

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 08 10.85		B	6.4	S	5.0	B		10	&15				SIW01
1996 08 10.85		B	6.5	S	6.0	B		20	7				BEN04
1996 08 10.88		B	6.2	AA	5.0	B		7	14	4	1.0	120	BAL02
1996 08 10.88		B	7.2	S	6.0	B		20	&10	2/			KID01
1996 08 10.89		B	6.0	S	7.0	B		25	&10	d4			SOC
1996 08 10.89		B	6.1	S	6.0	B		20	& 6	4/	&0.52	115	SCI
1996 08 10.90		I	6.6	S	6.0	B		20	& 8	4			ADA02
1996 08 10.91		S	5.2	S	0.0	E		1	&21	2			RES
1996 08 10.91		S	5.3	S	5.0	B		10	17	3/	0.57	150	RES
1996 08 10.92	s	B	5.8	S	10.0	B		25	14	5	0.45	40	PLE01
1996 08 11.76		B	5.9	AA	5.0	B		7		3			GAS01
1996 08 11.81		O	6.6	S	5.0	R	7	20	5	4			ZOL
1996 08 11.84		B	6.2	S	4.0	B		12	9	4			KOL03
1996 08 11.84		B	6.3	S	5.0	B		10	6	S6	0.10		MAR12
1996 08 11.85		B	6.2	S	7.0	B		25	&10	d4			SOC
1996 08 11.85		I	6.6	S	6.0	B		20	& 8	4			ADA02
1996 08 11.86		B	6.1	S	6.0	B		20	& 6	4/	&0.53	113	SCI
1996 08 11.86		B	6.2	S	5.0	B		10	&25	4/			OLE
1996 08 11.87		S	5.3	S	5.0	B		10	17	3			RES
1996 08 11.88		B	6.3	S	5.0	B		7	&12	d4			CNO
1996 08 11.89		B	6.2	AA	5.0	B		7	14	4	1	125	BAL02
1996 08 11.90		S	5.6	S	5.0	B		7	&13	d4			PAR03
1996 08 11.90	s	B	5.9	S	10.0	B		25	13	5	0.38	40	PLE01
1996 08 12.81		O	6.6	S	5.0	R	7	20	5	4			ZOL
1996 08 12.86		B	6.2	S	5.0	B		10	&20	4/			OLE
1996 08 12.86		B	6.4	S	6.0	B		20	& 7	4/	&0.63	109	SCI
1996 08 12.87		M	5.6	S	5.0	B		7	& 8	d4			PAR03
1996 08 12.87		S	5.4	S	5.0	B		10	17	5	&0.17	150	RES
1996 08 12.88		S	5.9	S	5.0	B		7	17	5	0.3	39	KWI
1996 08 12.88	s	B	5.8	S	10.0	B		25	14	5	0.4	42	PLE01
1996 08 12.89		B	6.2	AA	5.0	B		7	14	5	0.9	125	BAL02
1996 08 13.85		B	6.4	S	6.0	B		20	& 6	4/	&0.58	115	SCI
1996 08 13.87		S	6.0	S	5.0	B		7	& 4	3			SK004
1996 08 13.89		S	5.5	S	5.0	B		10	15	4	0.08	155	RES
1996 08 13.89		S	5.8	S	5.0	B		7	17	5	0.3	45	KWI
1996 08 13.89	s	B	5.8	S	10.0	B		25	14	5	0.4	44	PLE01
1996 08 13.93		B	6.8:	S	5.0	B		7	7	5	0.3	65	FIL04
1996 08 13.96		I	6.2	S	10	B		25		s6/	0.2		ZYW
1996 08 13.98		I	6.2	S	20	C	5	90		s6/	0.2		ZYW
1996 08 14.84		B	6.5	S	5.0	B		10	6	S6/	0.10		MAR12
1996 08 14.87		I	6.6	S	6.0	B		20	& 8	4			ADA02
1996 08 14.89		B	6.6	S	6.6	B		20	12	5	0.2	70	FIL04
1996 08 14.92	s	B	5.7	S	10.0	B		25	15	5	0.5	45	PLE01
1996 08 14.93		B	6.4	S	6.0	B		20	& 6	4/	&0.32	124	SCI
1996 08 15.83		B	6.4	S	5.0	B		10	6	S6/	0.10		MAR12
1996 08 15.96	s	B	5.6	S	10.0	B		25	16	5	0.5	50	PLE01
1996 08 16.9		B	5.3	YG	0.0	E		1	&30	5	&10	m 135	FAR01
1996 08 16.92		S	5.5	S	5.0	B		10	17	3			RES
1996 08 16.94	s	B	5.8	S	10.0	B		25	15	5	0.5	45	PLE01
1996 08 17.76		B	6.3	AA	5.0	B		7	12	4	1	125	GAS01
1996 08 17.80		O	6.6	S	5.0	R	7	20	5	4			ZOL
1996 08 17.82		B	6.3:	S	5.0	B		10	6	S6/	0.10		MAR12
1996 08 17.87		S	4.4	S	6.0	B		20	5	s4			MIG01
1996 08 17.87		S	5.3	S	5.0	B		10	&20	2/			RES
1996 08 17.90	s	B	5.8	S	10.0	B		25	16	5	0.4	45	PLE01
1996 08 17.91		B	6.3	AA	5.0	B		7	14	4	1	125	BAL02
1996 08 18.80		O	6.6	S	5.0	R	7	20	5	4			ZOL
1996 08 18.82		B	6.2	S	5.0	B		10	&19	5			OLE
1996 08 18.83		B	6.1	S	5.0	B		10	7	S6/	0.10		MAR12
1996 08 18.83		B	6.4:	S	4.0	B		12	&10	4			KOL03
1996 08 18.85	&	B	6.4	S	15.0	L	6	30	14.6	d7/	&0.1	55	PIO
1996 08 18.87		B	6.2	S	5.0	B		7	&12	d5			CNO
1996 08 18.87		B	6.5	S	5.0	B		7	9.4	s3			SPE01
1996 08 18.87		M	5.4	S	5.0	B		7	& 8	d4			PAR03
1996 08 18.87	s	B	5.9	S	10.0	B		25	15	5	0.42	48	PLE01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 08 18.88		B	6.6	S	5.0	B		7	& 9	7			CEL
1996 08 18.88		I	5.8:	S	4.0	B		12	&15	4/			WLO
1996 08 18.90		B	6.0	S	8	L	4	14	8	4			BEN04
1996 08 18.92		S	5.2	S	3.0	B		7	17	2/			RES
1996 08 18.92		S	5.3	S	5.0	B		10	15	4	0.25	155	RES
1996 08 19.81		B	6.2	S	5.0	B		10	&19	5			OLE
1996 08 19.84		B	6.1	S	5.0	B		10	&11	6	&0.7		SIW01
1996 08 19.86		S	4.4	S	6.0	B		20	5	s4			MIG01
1996 08 19.87		B	6.6	S	5.0	B		7	& 8	7			CEL
1996 08 19.87	&	B	6.4	S	15.0	L	6	30	15	d7/	&0.2	55	PIO
1996 08 19.88		B	6.7	S	6.6	B		20	16	5	0.6	70	FIL04
1996 08 19.89		I	6.6	S	6.0	B		20	& 8	4			ADA02
1996 08 19.89		S	5.2	S	0.0	E		1	&21	3			RES
1996 08 19.89		S	5.3	S	5.0	B		10	17	3	0.57	115	RES
1996 08 19.93		I	6.2	S	10	B		25		s6/	0.2		ZYW
1996 08 19.99	s	B	6.0	S	10.0	B		25	16	5	0.4	50	PLE01
1996 08 20.81		B	6.2	S	5.0	B		10	&17	4/			OLE
1996 08 20.84	&	M	7.6:	S	5.0	B		20	6	2			KOS01
1996 08 20.85		B	6.6	S	5.0	B		7	&11	s3			SPE01
1996 08 20.87		B	6.6	S	5.0	B		7	& 8	6/			CEL
1996 08 20.87		B	6.7	S	6.6	B		20	12	5	0.4	65	FIL04
1996 08 20.87		S	5.5	S	5.0	B		10	17	3/	0.13	120	RES
1996 08 20.91	&	S	5.7	S	8	R	7	35	13	5	0.3	60	KWI
1996 08 20.94	s	B	6.1	S	10.0	B		25	18	5	0.35	55	PLE01
1996 08 21.80		I	6.7	S	14.0	L	6	60	& 8	4			ADA02
1996 08 21.83		B	6.0	S	8	L	4	14	8	4			BEN04
1996 08 21.88		S	5.7	S	8	R	7	35	14	5	0.3	56	KWI
1996 08 21.89		B	6.0	S	5.0	B		10	&13				SIW01
1996 08 21.89		B	6.6	S	5.0	B		7	11	5	0.3	70	FIL04
1996 08 21.89		B	6.7	S	6.6	B		20	11	5	0.3	70	FIL04
1996 08 21.90		S	5.5	S	5.0	B		10	17	2			RES
1996 08 22.96	s	B	6.2	S	10.0	B		25	18	5/	0.4	58	PLE01
1996 08 23.90		S	5.5	S	5.0	B		10	&15	2			RES
1996 08 23.91	s	B	6.0	S	10.0	B		25	20	5/	0.4	58	PLE01
1996 08 24.80	&	M	7.0	S	5.0	B		20	6	2			KOS01
1996 08 24.85		S	5.3	S	5.0	B		10	&15	0/			RES
1996 08 26.80	&	M	6.9	S	5.0	B		20	6	2			KOS01
1996 08 26.93		S	5.6	S	5.0	B		10	&15	1			RES
1996 08 29.83		S	4.1	S	6.0	B		20	6	s5			MIG01
1996 08 29.87		S	5.5	S	5.0	B		10	&17	2			RES
1996 08 30.90		S	5.4	S	5.0	B		10	16	2			RES
1996 08 31.90		S	5.5	S	5.0	B		10	&17	2/			RES
1996 09 01.79	&	M	6.6	S	5.0	B		20	6	2			KOS01
1996 09 02.80		B	6.3	S	5.0	B		10	6	S6/	0.10		MAR12
1996 09 02.81		B	6.3	S	5.0	B		7	&15	d5			CNO
1996 09 02.84		S	5.3	S	5.0	B		10	15	3/	0.25	120	RES
1996 09 03.81	&	M	6.6	S	5.0	B		20	6	2			KOS01
1996 09 03.87	!	B	6.4	AA	6.8	R	12	40	6	D6			CHR
1996 09 03.88		B	6.0	AA	3.0	B		8		5			GAR03
1996 09 03.88		S	5.4	S	5.0	B		10	18	3	0.20	115	RES
1996 09 03.88	&	B	7.0	S	11	L	7	32	&10	s3	&0.1	45	CH001
1996 09 03.89		B	6.1	AA	3.0	B		8		5			SID
1996 09 03.90		S	5.2	S	0.0	E		1	&20	1			RES
1996 09 04.80		B	6.3	S	5.0	B		10	7	S6/	0.10		MAR12
1996 09 05.83		S	5.4	S	5.0	B		10	18	2			RES
1996 09 06.82		S	5.2	S	0.0	E		1	&20	1			RES
1996 09 06.82		S	5.2	S	5.0	B		10	16	4	0.10	125	RES
1996 09 06.83		B	6.2:	S	5.0	B		7	& 5	7/			CEL
1996 09 06.83	&	M	6.4	S	5.0	B		20	7	2/			KOS01
1996 09 09.83	&	M	6.3	S	5.0	B		20	7	2			KOS01
1996 09 09.92		I	5.5:	S	4.0	B		12	&10	5			WLO
1996 09 10.79		I	6.3	S	6.0	B		20	& 8	4			ADA02
1996 09 10.83	&	M	6.3	S	5.0	B		20	7	2			KOS01
1996 09 10.91	!	B	6.4	AA	6.8	R	12	40	6	D6			CHR
1996 09 11.77	&	B	6.1	S	15.0	L	6	30	12.6	d8		19	PIO

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 09 11.78		B	6.1	S	5.0	B		10	&11				SIW01
1996 09 11.81		B	6.0	S	7.0	B		25	&10	d3			SOC
1996 09 11.81		B	6.1	S	6.4	R	6	20	&15	d5			CNO
1996 09 11.84		I	6.3	S	14.0	L	6	60	&10	4			ADA02
1996 09 11.85	a	B	5.9	S	6.6	B		20	16	5/	0.5	60	PLE01
1996 09 11.86	&	S	5.5	S	8	R	7	35	12	6	0.3	59	KWI
1996 09 11.91	!	B	6.4	AA	6.8	R	12	40	6	D6			CHR
1996 09 12.80		B	6.0	AA	5.0	B		7	18	4	0.7	97	GAS01
1996 09 13.86	a	B	5.8	S	5.0	B		10	15	5/	0.4	62	PLE01
1996 09 14.79		S	4.9	S	0.0	E		1	&18	1			RES
1996 09 14.79		S	5.0	S	5.0	B		10	&16	3/	0.10	115	RES
1996 09 15.78		B	6.2	S	5.0	B		10	6	S6/	0.10		MAR12
1996 09 15.83	&	M	6.0	S	5.0	B		20	7	2			KOS01
1996 09 15.92		S	4.8	S	0.0	E		1	&18	1			RES
1996 09 18.83	&	M	6.0	S	5.0	B		20	6	2			KOS01
1996 09 19.75		B	6.4	S	5.0	B		10	25	3			DER
1996 09 19.81		B	6.1:	S	7.0	B		25	& 3	d2			SOC
1996 09 19.81		B	6.8:	S	10.0	B		25	5	5	0.3	50	FIL04
1996 09 19.83		S	5.5	S	8	R	7	35	9	6			KWI
1996 09 19.85	a	B	5.8	S	5.0	B		7	12	5/	0.6	65	PLE01
1996 09 19.87		B	5.6	AA	3.0	B		8		5			GAR03
1996 09 20.80	&	I	7.0	Y	15.0	L	6	80	& 3	s2			SMY
1996 09 22.76		S	5.7	S	5.0	B		10	&14	5			OLE
1996 09 22.81	&	M	6.0:	S	5.0	B		20	7	2			KOS01
1996 09 23.78		S	5.7	S	5.0	B		10	&16	5			OLE
1996 09 23.81	&	M	5.9:	S	5.0	B		20	7	2			KOS01
1996 09 28.89		S	4.9	S	5.0	B		10	&20	1			RES
1996 09 30.74		B	6.0	S	5.0	B		10	8	S6/	0.10		MAR12
1996 09 30.74	&	B	5.9	S	5.0	B		10	& 6	4/			SWI
1996 09 30.75		B	6.1	S	5.0	B		10	&14				SIW01
1996 09 30.77		B	5.0	S	4.0	B		12	&15	5/			WLO
1996 09 30.77		B	6.2	S	5.0	B		7	13.6	S5	0.3	80	SPE01
1996 09 30.77		S	4.9	S	5.0	B		10	&16	3/			RES
1996 09 30.81		M	5.4	S	8	R	7	35	9	6	0.3	70	KWI
1996 09 30.82	a	B	5.7	S	10.0	B		25	18	5/	0.75	69	PLE01
1996 09 30.83		M	6.0	S	6.0	B		20	6	s5			DRA02
1996 09 30.87		B	6.1	S	6.0	B		20	8	3			BEN04
1996 10 01.72		B	6.3:	S	4.0	B		12	&10	4			KOL03
1996 10 01.78		B	6.0	S	5.0	B		10	7	S6/	0.10		MAR12
1996 10 01.78		B	6.0	S	5.0	B		10	&14				SIW01
1996 10 01.78		B	6.0	S	7.0	B		25	& 6	D5			SOC
1996 10 01.79	&	O	7.1:	NP	9	L	10	120	& 1.5	S5	&0.05		JAR01
1996 10 01.80	&	B	5.5	S	15.0	L	6	30	16.2	d6	0.2	3	PIO
1996 10 01.80	a	B	5.8	S	6.6	B		20	16	5/	0.6	70	PLE01
1996 10 01.83		B	6.0	S	6.0	B		20	9	3			BEN04
1996 10 01.86	!	B	5.9	AA	6.8	R	12	40	7	S7			CHR
1996 10 02.74		S	4.8	S	5.0	B		10	&15	4/	0.45	120	RES
1996 10 02.77		B	6.0	S	5.0	B		10	7	S6/	0.10		MAR12
1996 10 02.88		B	5.4	AA	3.0	B		8		5			SID
1996 10 03.74		B	5.9	S	5.0	B		10	7	S6/	0.10		MAR12
1996 10 03.74		S	4.9	S	5.0	B		10	&16	3/			RES
1996 10 03.76		B	6.2	S	5.0	B		7	10.5	S5	0.4	75	SPE01
1996 10 03.76	&	M	5.9	S	3.0	B		8	7	2			KOS01
1996 10 03.77		B	6.3:	S	5.0	B		10	&10	4/			KOL03
1996 10 03.78	&	O	7.0:	NP	9	L	10	70	& 1.5	S5	0.04		JAR01
1996 10 03.79		B	6.0	S	7.0	B		25	& 8	D7			SOC
1996 10 03.79		B	6.4	S	5	R	7	20	3.6	4			OSS
1996 10 03.79		O	6.1	S	5.0	R	7	20	5	5			ZOL
1996 10 03.79	\$	B	5.8	S	11	L	7	32	&10	s3	&0.1	60	CH001
1996 10 03.80	&	M	5.3	S	8	R	7	35	10	6	0.4	67	KWI
1996 10 03.81		I	5.0:	S	4.0	B		12	&15	5/			WLO
1996 10 03.81	a	B	5.8	S	6.6	B		20	14	6	0.5	66	PLE01
1996 10 03.88		B	5.4	AA	3.0	B		8		5			GAR03
1996 10 04.74		B	6.4:	S	4.0	B		12	& 9	5			KOL03
1996 10 04.74	&	B	5.4	S	15.0	L	6	30	16.6	d6	0.1	26	PIO

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 10 04.75	& B	5.9	S	25	L	6		100	& 6	5			SWI
1996 10 04.76	B	5.9	S		5.0	B		10	7	S6/	0.10		MAR12
1996 10 04.76	& M	6.0	S		5.0	B		20	7	2			KOS01
1996 10 04.76	a B	5.9	S	10.0	B			25	14	6	0.9	64	PLE01
1996 10 04.77	B	5.5	S		5.0	B		10	&16	6			OLE
1996 10 04.77	B	6.3	S		5.0	B		7	&12	d4			CNO
1996 10 04.79	& O	6.6:	NP	9	L	10		70	& 1	S5	0.03		JAR01
1996 10 04.80	B	5.9	S		7.0	B		25	& 7	D7			SOC
1996 10 04.80	I	5.0:	S		4.0	B		12	&15	5/			WLO
1996 10 04.80	& M	5.3	S	8	R	7		35	10	6	0.5	65	KWI
1996 10 04.81	! B	5.7	AA	6.8	R	12		40	7	S7			CHR
1996 10 04.84	B	6.1	S		6.0	B		20	9	3			BEN04
1996 10 04.93	I	5.7	S		3.5	B		7		s7			ZYW
1996 10 06.77	S	4.8	S		5.0	B		10	&18	3/	0.20	120	RES
1996 10 07.73	& O	6.5	NP	9	L	10		70	& 1	s4/	0.03		JAR01
1996 10 07.74	B	6.0	S		5.0	B		10	7	S6/	0.10		MAR12
1996 10 07.75	B	6.0	S		6.0	B		20	& 6	3			KID01
1996 10 07.75	& B	5.9	S		6.5	R	6	28	& 6	5			SWI
1996 10 07.76	B	6.2	S		7.0	B		25	& 5	D5			SOC
1996 10 07.76	& M	6.0	S		5.0	B		20	7	2			KOS01
1996 10 07.82	! B	5.7	AA	6.8	R	12		40	7	S7			CHR
1996 10 08.74	& O	6.5	NP	5	R	6		20	1.5	s4	0.03		JAR01
1996 10 08.75	B	6.3	S		5.0	B		7	&12	d4			CNO
1996 10 08.76	S	5.7:	S		5.0	B		10	&11				OLE
1996 10 10.75	S	4.6	S		0.0	E		1	&16	2			RES
1996 10 10.75	S	4.8	S		5.0	B		10	&18	4	0.50	120	RES
1996 10 10.76	B	6.2	S		6.0	B		20	& 7	4			KID01
1996 10 11.73	S	5.8	S		5.0	B		10	&12	6			OLE
1996 10 11.75	B	6.1	S		5.0	B		10	20	4			DER
1996 10 11.75	B	6.2	S		5.0	B		7	& 9	S5	0.2	80	SPE01
1996 10 11.75	& O	6.4	NP	5	R	6		20	2	s4	0.07		JAR01
1996 10 11.76	O	6.1	S		5.0	R	7	20	5	5			ZOL
1996 10 11.76	& M	6.0	S		5.0	B		20	8	3			KOS01
1996 10 11.81	I	4.9:	S	5	R	6		20	&12	6			WLO
1996 10 11.83	B	5.9	S		6.0	B		20	10	3			BEN04
1996 10 11.85	! B	5.7	AA	6.8	R	12		40	7	S8			CHR
1996 10 11.90	B	5.8	AA		5.0	B		7					BAL02
1996 10 12.71	M	6.0	AA		5.0	B		10	15	4	2.8	85	SAJ
1996 10 12.73	M	5.7	S		5.0	B		7	&10	d5			PAR03
1996 10 12.74	B	6.1	S		5.0	B		7	& 9	S4			SPE01
1996 10 12.74	B	6.2	S		5.0	B		10	7	S6	0.10		MAR12
1996 10 12.78	S	4.9	S		5.0	B		10	&17	2			RES
1996 10 12.78	& O	6.7:	NP	9	L	10		70	2	s4	0.07		JAR01
1996 10 12.80	I	4.9:	S		4.0	B		12	&15	6			WLO
1996 10 13.72	B	5.8	S		5.0	B		10	&10				SIW01
1996 10 13.73	B	5.9	S		5.0	B		10	7	S6	0.10		MAR12
1996 10 13.73	M	5.6	S		5.0	B		7	&10	d5			PAR03
1996 10 13.74	B	6.1	S		5.0	B		7	&10	S5			SPE01
1996 10 13.74	& B	5.8	S		5.0	B		10	8	5			SWI
1996 10 13.75	B	6.3	S		5.0	B		10	& 4	4			OSS
1996 10 13.75	O	6.1	S		5.0	R	7	20	5	5			ZOL
1996 10 13.75	S	4.8	S		5.0	B		10	&16	4	0.20	140	RES
1996 10 13.75	& O	6.5	NP	5	R	6		20	2.5	s4/	0.08		JAR01
1996 10 13.75	a B	5.8	S		5.0	B		7	12	6	0.85	65	PLE01
1996 10 13.77	I	5.9	S	14.0	L	6		60	&10	5			ADA02
1996 10 13.77	& B	5.4	S	15.0	L	6		30	19.2	D6/	0.3	14	PIO
1996 10 13.83	B	5.9	S		6.0	B		20	10	3			BEN04
1996 10 14.72	M	5.8	AA		5.0	B		10	18	7	5.7	92	SAJ
1996 10 14.72	& M	6.2	S		5.0	B		20	8	3			KOS01
1996 10 14.73	M	5.7	S		6.0	B		20	7	s3			DRA02
1996 10 14.73	& B	5.4	S	15.0	L	6		30	18.2	D6/	0.3	32	PIO
1996 10 14.74	B	5.9	S		5.0	B		10	7	6	0.10		MAR12
1996 10 14.74	a B	5.8	S		6.6	B		20	14	6/	1.0	65	PLE01
1996 10 14.75	B	6.0	S		5.0	B		10	&11				SIW01
1996 10 14.75	S	4.9	S		5.0	B		10	&16	3/			RES

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 10 14.75	&	O	6.8:	NP	5	R	6	20	2	s4	0.08		JAR01
1996 10 14.80		I	4.8:	S	4.0	B		12	&12	6			WLO
1996 10 14.84	!	B	5.7	AA	6.8	R	12	40	7	S8			CHR
1996 10 15.73		O	6.0	S	5.0	R	7	20	5	5			ZOL
1996 10 15.73	&	B	5.3	S	15.0	L	6	30	17.9	D6/	0.3	30	PIO
1996 10 15.74		B	5.9	S	5.0	B		10	6	6	0.10		MAR12
1996 10 15.74		B	6.2	S	7.0	B		25	& 5	D5			SOC
1996 10 15.74	&	B	5.8	S	5.0	B		10	9	5			SWI
1996 10 15.74	&	O	6.6	NP	5	R	6	20	2	s4	0.08		JAR01
1996 10 15.75	&	M	6.1	S	5.0	B		20	8	3			KOS01
1996 10 15.77	&	B	6.2	S	6.0	B		20	& 9	3			KID01
1996 10 15.78	!	B	5.6	AA	6.8	R	12	40	7	S8			CHR
1996 10 16.74		S	4.8	S	5.0	B		10	&16	3/			RES
1996 10 16.74	&	O	6.6	NP	5	R	6	20	2.5	s4	0.08		JAR01
1996 10 16.75	&	M	6.1	S	5.0	B		20	8	3			KOS01
1996 10 16.84		B	6.1	S	7.0	B		25	& 6	D6			SOC
1996 10 16.87		B	5.2	AA	3.0	B		8		5			SID
1996 10 16.88		B	5.2	AA	3.0	B		8		5			GAR03
1996 10 17.73		B	6.0	S	4.5	B	4	12	7	4			GAM
1996 10 17.74	&	M	6.1	S	5.0	B		20	8	3			KOS01
1996 10 19.75		S	4.9	S	5.0	B		10	&15	2/			RES
1996 10 20.66		B	6.1	AA	7.0	R		12	10	4			SIE
1996 10 20.74		B	6.1	S	5.0	B		7	& 7	S5			SPE01
1996 10 20.83		B	6.0:	S	7.0	B		25	& 3	d3			SOC
1996 10 22.61		B	6.0	AA	12.0	R	5	22	8	5			SIE
1996 10 23.63		B	5.8	AA	12.0	R	5	22		5	0.2	60	SIE
1996 10 24.73	&	M	5.9	S	5.0	B		20	9	3/			KOS01
1996 10 25.60		B	5.4	AA	8.0	R	4	10		4/			SIE
1996 10 25.71		S	5.0	S	5.0	B		10	&12	4			RES
1996 10 25.73		B	6.0	S	5.0	B		10	& 4	4			OSS
1996 10 26.60		B	5.6	AA	8.0	B		10		5			SIE
1996 10 27.59		B	5.6:	AA	8.0	B		10		5			SIE
1996 10 27.69		B	5.8	S	5.0	B		10	6	6	0.10		MAR12
1996 10 28.58		B	5.4	AA	8.0	B		10	12	5	0.3	65	SIE
1996 10 29.60		B	5.2	AA	8.0	B		10	5	5			SIE
1996 10 29.72		B	4.6	S	4.0	B		12	&16	6			WLO
1996 11 01.59		B	4.9	AA	8.0	B		10		5			SIE
1996 11 02.57		B	4.9	AA	8.0	B		10		5			SIE
1996 11 03.60		B	4.9	AA	8.0	B		10		5			SIE
1996 11 04.68		O	5.7	S	5.0	R	7	20	5	5			ZOL
1996 11 04.69		B	5.7	S	5.0	B		10	6	6	0.10		MAR12
1996 11 04.69	&	B	5.3	S	15.0	L	6	30	20.8	D7	0.3	36	PIO
1996 11 04.70		B	5.1	S	5.0	B		10	&11	5/			KOL03
1996 11 04.70		B	5.8	S	7.0	B		25	& 7	D6	&0.2	70	SOC
1996 11 04.70		M	5.6	AA	5.0	B		10	18	7	3.4	92	SAJ
1996 11 04.70		S	4.9	S	5.0	B		10	&15	4	0.8	115	RES
1996 11 04.70	&	O	6.5	NP	5	R	6	20	2.5	s4/	0.08		JAR01
1996 11 04.72	w	B	5.5	S	10.0	B		25	14	6/	1.2	72	PLE01
1996 11 04.73		B	5.7:	S	5.0	B		7	&14	S6			SPE01
1996 11 04.73		S	5.0	S	0.0	E		1	&15	2			RES
1996 11 04.73	&	M	5.1	S	8	R	7	35	10	7	1	76	KWI
1996 11 04.78	!	B	5.2	AA	6.8	R	12	40	8	S8			CHR
1996 11 05.65		B	5.0:	AA	8.0	B		10	10	5			SIE
1996 11 05.68		I	5.6	S	6.0	B		20	&15	5			ADA02
1996 11 05.69		B	5.4	S	4.5	B	4	12	& 7	5			GAM
1996 11 05.70	&	B	5.5	S	5.0	B		10	9	5			SWI
1996 11 05.71		B	5.7:	S	5.0	B		10	6	6	0.10		MAR12
1996 11 05.72	&	O	6.9:	NP	5	R	6	20	& 2	s4	0.07		JAR01
1996 11 05.74		B	5.3	S	5.0	B		10	& 7	4	&0.7	70	SCI
1996 11 05.74	!	B	5.2	S	6.8	R	12	40	8	S8			CHR
1996 11 05.82		B	5.0	AA	3.0	B		8		5			GAR03
1996 11 06.57		B	5.2:	AA	8.0	B		10					SIE
1996 11 06.68		I	5.6	S	6.0	B		20	&15	5			ADA02
1996 11 06.70		B	4.5	S	4.0	B		12	&15	6/			WLO
1996 11 06.70		M	5.6	AA	5.0	B		10	18	7	3.1	110	SAJ

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 11 06.71		B	5.0	S	5.0	B		10	&10	6			SIW01
1996 11 06.71	w	B	5.3	S	6.6	B		20	15	6/	1.5	70	PLE01
1996 11 06.75		S	4.9	S	5.0	B		10	&11	5			RES
1996 11 08.57		B	5.1	AA	8.0	B		10		5			SIE
1996 11 08.68	!	B	5.0	SC	5.0	B		10	5	S0			MAC03
1996 11 08.71		B	5.4	S	5.0	B		7	&10	S6	0.3	85	SPE01
1996 11 08.71	&	M	5.7	S	5.0	B		20	9	3			KOS01
1996 11 08.72		I	4.5:	S	4.0	B		12	&15	6/			WLO
1996 11 08.73	!	B	5.6	S	5.0	B		7	10			100	GRO03
1996 11 08.74		S	4.7	S	0.0	E		1	&15	2			RES
1996 11 08.74		S	4.8	S	5.0	B		10	12	4/	1.5	110	RES
1996 11 08.92		B	5.2	S	5.0	B		7	11	5	0.9	100	BAL02
1996 11 09.57		B	4.9	AA	8.0	B		10		5			SIE
1996 11 09.68		I	5.5	S	14.0	L	6	60	&15	5			ADA02
1996 11 09.69		B	5.6	S	5.0	B		10	6	6	0.10		MAR12
1996 11 09.70		S	4.8	S	5.0	B		10	13	3/	0.3	120	RES
1996 11 09.71		M	5.2	S	5.0	B		7	10	d5			PAR03
1996 11 09.71	&	B	5.4	S	15.0	L	6	30	18.5	D7	0.3	35	PIO
1996 11 09.71	&	O	6.2	NP	5	R	6	20	1.5	s4/	0.08		JAR01
1996 11 10.59		B	4.9	AA	8.0	B		10		5	0.3	70	SIE
1996 11 11.59		B	4.9	AA	8.0	B		10	13	5			SIE
1996 11 11.69	&	M	5.7	S	5.0	B		20	9	3			KOS01
1996 11 12.71		I	4.5:	S	4.0	B		12	&15	6			WLO
1996 11 12.74		S	5.0	S	5.0	B		10	&10	3			RES
1996 11 14.58		B	4.8	AA	8.0	B		10	10	5			SIE
1996 11 15.58		B	4.9	AA	8.0	B		10		5			SIE
1996 11 16.59		B	4.9	AA	8.0	B		10	13	5			SIE
1996 11 19.69		B	5.7:	S	5.0	B		10	6	6/	0.10		MAR12
1996 11 20.58		B	4.8	AA	8.0	B		10		5			SIE
1996 11 21.58		B	4.8	AA	8.0	B		10	10	5			SIE
1996 11 21.72	!	B	6.3	S	7.0	L	8	40		3/			GRO03
1996 11 22.58		B	4.8	AA	8.0	B		10		5			SIE
1996 11 22.68		B	5.7:	S	5.0	B		10	6	6	0.10		MAR12
1996 11 22.69		S	4.7	S	5.0	B		10	10	4/			RES
1996 11 22.71	&	B	5.0	S	15.0	L	6	30	8.5	D7	0.4	42	PIO
1996 11 25.67		S	5.3	Y	6.0	B		20	10	s5	0.1	55	DRA02
1996 11 25.68	&	B	5.1	S	5.0	B		10	& 8	5			SWI
1996 11 25.69		S	4.9	S	5.0	B		10	8	5/			RES
1996 11 26.57		B	4.8	AA	12.0	R	5	22		5			SIE
1996 11 29.69		B	5.8	S	5.0	B		10	& 6	5			OSS
1996 11 30.68		B	5.8	S	5.0	B		10	& 6	5			OSS
1996 12 03.69		S	4.3	S	0.0	E		1	&10	5			RES
1996 12 03.69		S	4.4	S	5.0	B		10	&11	4	&2.0	90	RES
1996 12 04.69		S	4.4	S	5.0	B		10	&15	3/	&1.5	75	RES
1996 12 04.69	\$	B	4.2	S	6.6	B		20	14	6/	0.8		PLE01
1996 12 04.69	&	B	4.0	Y	5.0	B		10	& 8		&1.1		SIW01
1996 12 04.69	a	S	4.6	S	8	R	7	35	14	6	0.7	49	KWI
1996 12 04.70		B	5.5	Y	10	B		25	32	D6	0.1	40	DRA02
1996 12 05.68		I	4.8	S	14.0	L	6	60	&15	5			ADA02
1996 12 06.70	&	B	4.8	A	5.0	B		7	& 7	S6	0.4	55	SPE01
1996 12 09.69	&	B	4.4	A	5.0	B		7	& 6	S6	0.5	55	SPE01
1996 12 10.67	&	B	4.6	S	5.0	B		10	&10	5			SWI
1996 12 11.69	&	B	4.3	A	5.0	B		7	& 6	S6/	0.5	60	SPE01
1996 12 12.68	a	M	3.8	Y	5.0	B		10	& 7	7			SIW01
1996 12 12.70	\$	B	4.1	S	6.6	B		20	15	6/	0.7		PLE01
1996 12 14.70		S	3.9	S	5.0	B		10	&17	3/	&1.0	90	RES
1996 12 14.70		S	4.0	S	0.0	E		1	&15	4			RES
1996 12 16.66	a	S	4.4	S	8	R	7	35	12	6			KWI
1996 12 16.67		B	3.8	AA	5.0	B		7		4			GAS01
1996 12 16.67		B	4.7:	S	5.0	B		7	& 8	d5			CNO
1996 12 16.67	\$	B	4.0	S	6.6	B		20	16	6/	0.5		PLE01
1996 12 16.67	&	B	5.0	S	5.0	B		10	6	7	0.10		MAR12
1996 12 16.69	&	B	4.2	S	5	R	6	20	2.5	d5/			JAR01
1996 12 19.67	!	B	4.5	SC	5.0	B		10	6	S0	0.3	15	MAC03
1996 12 21.66	&	B	4.4	S	5.0	B		10	6	7	0.10		MAR12

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 12 21.70	!	B	4.5	S	6.8	R	12	40	9	S8			CHR
1996 12 22.68	\$	B	4.0	S	10.0	B		25	16	7	0.6		PLE01
1996 12 22.69	\$	S	4.0	S	8	R	7	35	12	6			KWI
1996 12 25.67	!	B	4.0	SC	5.0	B		10	5	S3			MAC03
1996 12 26.66	M	4.5	S	5.0	B			7	12	d5			PAR03
1996 12 26.66	&	B	5.0	S	5.0	B		10	6	7	0.10		MAR12
1996 12 26.93	B	4.0	S	5.0	B			7	14	5			BAL02
1996 12 27.67	M	4.5	S	5.0	B			7	12	d5			PAR03
1996 12 28.67	I	4.4:	S	14.0	L	6		60	&15	7			ADA02
1996 12 28.67	M	4.4	S	5.0	B			7	12	d5			PAR03
1996 12 28.67	\$	B	3.9	S	10.0	B		25	16	7	0.5		PLE01
1996 12 28.67	\$	S	3.9	S	8	R	7	35	12	6			KWI
1996 12 28.69	&	B	4.5:	S	7.0	B		25	&15	d3	&0.3		SOC
1996 12 30.71	S	3.0	S	6.0	B			20	8	S7			MIG01
1996 12 31.91	B	3.8	S	5.0	B			7					BAL02
1997 01 01.68	S	3.6	S	5.0	B			10	&14	4	0.1	100	RES
1997 01 02.69	&	B	5.2:	S	7.0	B		25	&10	1			SOC
1997 01 04.66	!	B	4.4	SC	5.0	B		10	5	S3			MAC03
1997 01 13.21	!	S	2.9	AA	5.0	B		10	10	7/	2.5	337	HAV
1997 01 13.22	&	B	3.8	S	5.0	B		7	& 5	S8	0.4	0	SPE01
1997 01 14.20	0	3.2	S	0.0	E			1	20	d5			SZU01
1997 01 14.21	B	4.0:	S	7.0	B			25	&15	D7	&0.7	40	SOC
1997 01 14.22	S	3.2	S	8	R	7		35	11	7			KWI
1997 01 14.23	w	B	3.5	S	5.0	B		7	18	7			PLE01
1997 01 16.21	B	2.0:	S	4.0	B			12	&12	5			WLO
1997 01 16.21	&	B	3.8	S	5.0	B		7	& 5	S8	0.7	345	SPE01
1997 01 16.22	B	4.2:	S	5.0	B			7	& 8	D6			CNO
1997 01 16.22	B	4.5:	S	7.0	B			25	& 5	s3			SOC
1997 01 16.22	S	2.9	S	0.0	E			1	&25	6	0.1		RES
1997 01 16.22	S	3.0	S	5.0	B			10	&26	6/	1.2		RES
1997 01 17.20	B	3.8	S	7.0	B			25	&20	D9	&1	30	SOC
1997 01 17.20	&	B	3.1	S	3.6	B		4	24	D8	&3.5	326	PIO
1997 01 17.21	B	2.0:	S	4.0	B			12	&12	5			WLO
1997 01 17.21	&	B	3.8	S	5.0	B		7	& 5	S8	0.7	340	SPE01
1997 01 17.22	S	2.9	S	0.0	E			1	&25	6			RES
1997 01 17.22	S	2.9	S	5.0	B			10	&25	6/	0.6	290	RES
1997 01 17.23	0	3.0	S	0.0	E			1	30				SZU01
1997 01 18.19	M	3.3	S	5.0	B			7	15	D6	2.1	320	PAR03
1997 01 18.19	&	B	3.7	AA	5.0	B		10	10	S7	0.20		MAR12
1997 01 18.20	B	3.9	S	7.0	B			25	&20	D9	&1	30	SOC
1997 01 18.20	!	B	3.3	S	6.8	R	12	40	10	S8	&0.1		CHR
1997 01 18.21	B	1.9:	S	4.0	B			12	&13	5/			WLO
1997 01 18.21	B	3.5:	S	4.0	B			8	&10	S6	&0.2	330	MAR13
1997 01 18.21	B	4.2	S	5.0	B			7	& 8	D6			CNO
1997 01 18.22	B	3.0	AA	5.0	B			10	25	4/	2	80	DER
1997 01 18.22	S	2.6	S	0.0	E			1	&25	6	0.5	295	RES
1997 01 18.22	S	2.8	S	5.0	B			10	&25	6	1.5	295	RES
1997 01 20.22	&	B	3.0	S	3.6	B		4	20	D8	3		PIO
1997 01 22.18	B	3.5	S	4.0	B			8	&10	S6	&0.25	330	MAR13
1997 01 22.21	B	3.6	S	7.0	B			25	&20	S9	&1	25	SOC
1997 01 23.16	B	3.9	S	5.0	B			7	& 8	D6	&1		CNO
1997 01 23.18	0	2.7	S	0.0	E			1	&35		0.5		SZU01
1997 01 23.18	&	B	3.3	AA	5.0	B		10	10	S7	0.25		MAR12
1997 01 25.16	&	I	3.3:	S	0.0	E		1					KOLO3
1997 01 25.18	&	B	3.2	AA	5.0	B		10	10	S7	0.25	320	MAR12
1997 01 25.19	B	3.4	S	4.0	B			8	&10	S6	&0.25	325	MAR13
1997 01 25.19	0	2.5	S	0.0	E			1	35				SZU01
1997 01 25.19	0	3.6	S	5.0	R	7		20	5	5	0.12	305	ZOL
1997 01 25.19	!	B	3.0	SC	5.0	B		10	10	S5	0.6	330	MAC03
1997 01 25.22	B	3.5	S	0.0	E			1	&10	D5	&1		CNO
1997 01 25.22	S	2.5	S	5.0	B			10	&30	5	0.4	290	RES
1997 01 26.18	B	3.2	S	7.0	B			25	&25	S9	&1	20	SOC
1997 01 26.18	0	3.6	S	5.0	R	7		20	5	5	0.15	303	ZOL
1997 01 26.19	B	3.4:	AA	15.0	L	5		40	&10	S6	&0.2		MAR13
1997 01 26.19	&	B	2.7	S	3.6	B		4	19	D8	2.9	334	PIO

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 01 26.19	& B	3.2	AA	5.0	B			10	10	S7	0.26	320	MAR12
1997 01 26.19	& M	3.7	S	5.0	B			20	16	5			KOS01
1997 01 26.20	& B	3.4	S	5.0	B			7	& 6	S8	0.4	330	SPE01
1997 01 26.21	B	3.4	S	5.0	B			7	&10	D7	&1		CNO
1997 01 26.22	S	2.7	S	0.0	E			1	&25	6			RES
1997 01 26.22	S	2.7	S	5.0	B			10	&30	6/	1.0	280	RES
1997 01 26.24	B	2.5	AA	5.0	B			10	15	6/	1	70	DER
1997 01 27.15	B	2.6	S	5.0	B			7					BAL02
1997 01 27.18	I	3.1	S	5.2	B			10	19	3	3.7		MUS01
1997 01 27.18	O	3.6	S	5.0	R	7		20	6	5	0.18	305	ZOL
1997 01 27.19	B	3.3:	AA	15.0	L	5		25	&11	S6/	&0.25	324	MAR13
1997 01 27.19	O	2.6	S	0.0	E			1	15	S7			KWI
1997 01 27.19	& B	3.1	AA	5.0	B			10	10	S7	0.50	320	MAR12
1997 01 27.19	& B	3.3	Y	5.0	B			10	& 7	S7			SIW01
1997 01 27.19	& M	3.7	S	5.0	B			20	17	5			KOS01
1997 01 27.20	B	3.1	S	7.0	B			25	&25	S9	&1.3	10	SOC
1997 01 27.20	M	2.8	S	8	R	7		35	13	S7	0.4	335	KWI
1997 01 27.20	O	2.3:	S	0.0	E			1	38		&1		SZU01
1997 01 27.20	! B	2.9	SC	9	L	10		70	4	S3			MAC03
1997 01 27.21	B	3.2	S	5.0	B			7	&12	D7	&2		CNO
1997 01 27.21	w B	3.0	S	5.0	B			7	20	7	7.5	335	PLE01
1997 01 27.22	S	2.5	S	0.0	E			1	&25	7			RES
1997 01 27.22	S	2.5	S	5.0	B			10	&20	7/	0.5	275	RES
1997 01 27.27	B	2.5	AA	3.0	B			8		5	1.5	310	SID
1997 01 28.19	& M	3.5	S	5.0	B			20	17	4/			KOS01
1997 01 29.16	B	3.1	S	7.0	B			25	&20	S9	&1	5	SOC
1997 01 29.18	I	3.3	S	0.0	E			1	&10	8			ADA02
1997 01 29.19	O	2.5	S	0.0	E			1	20	S7			KWI
1997 01 29.20	M	2.6	S	8	R	7		35	17	S7	1.3	330	KWI
1997 01 29.20	w B	2.9	YF	5.0	B			10	& 6	7	&3	324	SCI
1997 01 29.21	B	3.0	S	5.0	B			7	&12	D7	&2		CNO
1997 01 29.21	w B	2.9	S	5.0	B			7	22	7	8.9	332	PLE01
1997 02 01.17	O	3.3	S	5.0	R	7		20	6	6	0.30	305	ZOL
1997 02 01.17	& I	3.1:	S	0.0	E			1					KOL03
1997 02 01.18	& B	2.9	AA	5.0	B			10	10	S7	0.75	320	MAR12
1997 02 01.19	B	3.0	S	7.0	B			25	&25	S9	&1.3	0	SOC
1997 02 01.19	B	3.1	AA	4.5	B			10	&10	S6	&0.3	323	MAR13
1997 02 01.19	& M	3.2	S	3.0	B			8	19	S6	1.6	328	KOS01
1997 02 01.19	w B	2.9	YF	5.0	B			10	& 7	7	&1.8	322	SCI
1997 02 01.19	w I	2.7	S	0.0	E			1		S9			DRA02
1997 02 01.20	B	2.9	S	5.0	B			7	& 8	S8	0.8	315	SPE01
1997 02 01.20	! B	2.6	S	6.8	R	12		40	10	S9	&0.5		CHR
1997 02 01.20	! B	2.8	OH	5.0	B			7	10.5	6	1.7	324	GRO03
1997 02 01.21	B	2.0	S	6.0	B			20	8	S9			MIG01
1997 02 01.21	B	2.7	S	5.0	B			7	&15	D7	&2		CNO
1997 02 01.21	S	2.1	S	0.0	E			1	&20	7/	1.0	280	RES
1997 02 01.21	S	2.3	S	5.0	B			10	&20	7/	5.1	280	RES
1997 02 01.22	I	2.0	S	3.5	B			7		S8			ZYW
1997 02 01.23	B	2.5	AA	5.0	B			10	30	7	0.5	75	DER
1997 02 01.27	B	2.5	AA	3.0	B			8		6	1.5	310	GAR03
1997 02 02.17	O	2.0	S	0.0	E			1	&40	D5/	2		SZU01
1997 02 02.17	& B	3.1	Y	5.0	B			10	& 5	S8	&2.0		SIW01
1997 02 02.18	B	2.8	S	5.0	B			7	&15	D7	&2		CNO
1997 02 02.18	& B	2.8	AA	5.0	B			10	10	S7/	0.75	318	MAR12
1997 02 02.18	w B	2.7	S	5.0	B			7	20	7	9.5	327	PLE01
1997 02 02.19	& I	3.0:	S	0.0	E			1					KOL03
1997 02 02.19	& M	3.2	S	5.0	B			20	19	6			KOS01
1997 02 02.20	B	2.8	S	5.0	B			7	& 7	S8	0.9	315	SPE01
1997 02 02.20	B	2.9	S	7.0	B			25	&25	S9	&1.5	358	SOC
1997 02 02.20	B	3.0	AA	4.5	B			10	&10	S6	&0.3		MAR13
1997 02 02.20	w B	2.6	YF	5.0	B			10	& 9	8	&2.5	317	SCI
1997 02 02.24	B	2.3	AA	3.0	B			8		5			SID
1997 02 03.15	I	3.1	S	6.0	B			20	&15	7			ADA02
1997 02 03.15	w B	3.2	S	10	B			25	9	S6	0.4	317	DRA02
1997 02 03.16	B	2.6	S	5.0	B			7	&15	D7			CNO

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 02 03.17		O	2.8	S	5.0	R	7	20	7	6	0.42	315	ZOL
1997 02 03.18		B	2.6	Y	0.0	E		1	20	8	5.8	310	FIL04
1997 02 03.18		O	2.1	S	0.0	E		1	20	S7	9.0	325	KWI
1997 02 03.18		S	2.5	S	0.0	E		1	10	D7	7	320	PAR03
1997 02 03.18	&	B	2.8	AA	5.0	B		10	10	S7/	0.75	318	MAR12
1997 02 03.18	w	I	2.9	S	0.0	E		1		S9			DRA02
1997 02 03.19		B	2.8	S	7.0	B		25	&25	S9	&1.5	358	SOC
1997 02 03.19		B	2.9:	AA	4.5	B		10	&10	S6	&0.4		MAR13
1997 02 03.19		I	2.6	S	5.2	B		10	19	3	4.0		MUS01
1997 02 03.19		M	2.3	S	8	R	7	35	18	S7	2.7	325	KWI
1997 02 03.19	w	B	2.5	S	5.0	B		7	23	7/	9.2	325	PLE01
1997 02 03.20	w	B	2.4	YF	5.0	B		10	&10	7	&2.8	318	SCI
1997 02 03.22		S	2.2	S	0.0	E		1	&20	7	5.45	280	RES
1997 02 03.22		S	2.2	S	5.0	B		10	&25	7	4	280	RES
1997 02 03.23	w	B	2.9	S	3.5	B		7	9	S5	&1.1	310	DRA02
1997 02 04.15	w	B	2.2	S	3.5	B		7	8	S5	0.6	312	DRA02
1997 02 04.16		B	2.5:	S	5.0	B		15	&45	4	2	90	JON05
1997 02 04.16		O	2.0	S	0.0	E		1	42		3		SZU01
1997 02 04.18		B	2.8:	AA	4.0	B		6	12	S6/	0.9	326	MAR13
1997 02 04.18	&	B	2.7	AA	5.0	B		10	10	S7/	0.65	318	MAR12
1997 02 04.19		B	2.2	AA	6.0	B		20	16	7	0.9	225	SIE
1997 02 04.19	&	M	3.0	S	10.0	R	10	45	18	5			KOS01
1997 02 04.20		B	2.6	S	5.0	B		7	&15	D6			CNO
1997 02 04.20		I	2.5	S	5.2	B		10	19	3	4.0		MUS01
1997 02 04.20	&	B	2.8	S	3.6	B		4	29	D8	2.4	340	PIO
1997 02 04.20	&	B	2.9	S	5	R	6	20	&10	d7			JAR01
1997 02 04.20	&	O	2.5:	S	0.0	E		1					PIO
1997 02 04.23		B	2.0	AA	3.0	B		8		6	2	320	GAR03
1997 02 05.15		B	2.2	AA	6.0	B		20	16	7	0.9	225	SIE
1997 02 06.15		B	2.0	AA	0.0	E		7	15	7	3	308	BAL02
1997 02 06.19		B	2.5	S	5.0	B		7	& 6	S8	1.1	310	SPE01
1997 02 06.20		B	2.8:	S	7.0	B		25	&20	S9			SOC
1997 02 06.20	&	M	2.9	S	10.0	R	10	45	18	5/	&1.5		KOS01
1997 02 06.22		S	2.4	S	0.0	E		1	&30	7	&5	280	RES
1997 02 06.22		S	2.4	S	5.0	B		10	&25	7	4	280	RES
1997 02 07.15		O	1.8	S	0.0	E		1	45		3.5		SZU01
1997 02 07.16		A	2.4	S	0.0	E		1	&47	4	1.5	90	JON05
1997 02 07.16		O	2.0	S	0.0	E		1	20	S7			KWI
1997 02 07.17	&	I	2.7:	S	0.0	E		1					KOL03
1997 02 07.18		B	1.0:	S	4.0	B		12	&16	6			WLO
1997 02 07.18	w	B	2.1	S	5.0	B		7	22	7/	10	318	PLE01
1997 02 07.19		B	2.3	Y	0.0	E		1	20	8	2.0	310	FIL04
1997 02 07.19		I	2.3	S	5.2	B		10	19	4	4.1		MUS01
1997 02 07.19		O	2.6:	S	4.0	B		6	&12	S6/	0.8		MAR13
1997 02 07.19	&	M	2.9	S	10.0	R	10	45	19	5/			KOS01
1997 02 07.20	w	B	2.2	YF	0.0	E		1	& 8	8	&2.5	311	SCI
1997 02 07.22		I	1.8	S	3.5	B		7		S8			ZYW
1997 02 08.18	!	S	1.8	AA	0.0	E		1	18	6/	4	320	HAV
1997 02 08.19		B	2.6	Y	5.0	B		10	&10	S7			SIW01
1997 02 08.19	w	B	2.0	S	5.0	B		7	23	7/	9.5	316	PLE01
1997 02 08.20	!	B	2.1	S	6.8	R	12	40	10	S9	&0.5		CHR
1997 02 08.21		S	2.0	S	0.0	E		1	&30	7	&3	280	RES
1997 02 08.21	w	B	2.2	YF	0.0	E		1	& 8	8	&1.5	308	SCI
1997 02 09.12		B	2.3	S	5.0	B		15	50	6	2	90	JON05
1997 02 09.13		S	1.9	S	0.0	E		1	&30	6/	3	260	RES
1997 02 09.15		B	1.8	AA	0.0	E		7	18	7	5	310	BAL02
1997 02 09.17		B	2.4	S	0.0	E		1	&15	D6	&3.5		CNO
1997 02 09.17		O	2.5	S	4.5	B		10	&11	S6/	0.6		MAR13
1997 02 09.17	&	B	2.7	AA	5.0	B		10	10	S7/	0.66	318	MAR12
1997 02 09.18		B	2.0	AA	6.0	B		20	16	7	2	320	SIE
1997 02 09.18		S	2.6	S	3.5	B		7	& 4	d7	&0.4	315	GRZ02
1997 02 09.18	!	S	1.6	AA	0.0	E		1	18	6/	4	322	HAV
1997 02 09.19		B	1.8	Y	0.0	E		1	20	8	3.3	315	FIL04
1997 02 09.19		O	1.8	S	0.0	E		1	22	S7	2.5	320	KWI
1997 02 09.19	\$	B	1.6	SC	9	L	10	70	10	S7	3	320	MAC03

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 02 09.19	w	B	2.2	YF	5.0	B		10	& 8	8	&1.7	311	SCI
1997 02 09.20	!	B	2.1	S	6.8	R	12	40	10	S9	&0.5		CHR
1997 02 09.20	w	B	2.0	S	5.0	B		7	20	7/	10.5	319	PLE01
1997 02 10.17		S	2.6	S	3.5	B		7	& 4	d7	&0.3	320	GRZ02
1997 02 10.19	w	B	1.8	S	5.0	B		7	22	7/	9.0	315	PLE01
1997 02 11.12		I	2.7	S	6.0	B		20	&15	7			ADA02
1997 02 11.17		B	1.9	Y	0.0	E		1	20	8	4.3	315	FIL04
1997 02 11.17		S	1.6	S	5.0	B		7	10	D7	8	320	PAR03
1997 02 11.18		O	1.6	S	0.0	E		1	22	S7	9.0	315	KWI
1997 02 11.18		S	2.6	S	3.5	B		7	& 4	d7	&0.3	315	GRZ02
1997 02 11.18	w	B	1.7	S	5.0	B		7	21	7/	8.0	316	PLE01
1997 02 11.19		M	1.8	S	8	R	7	35	18	S7	2.3	315	KWI
1997 02 11.19	w	B	2.2	YF	0.0	E		1	& 8	8	&5.0	312	SCI
1997 02 11.20		B	2.1:	S	7.0	B		25	&20	S9	&0.8	0	SOC
1997 02 11.20	!	B	2.0	S	6.8	R	12	40	10	S9	&0.6		CHR
1997 02 11.22		I	1.6	S	8	L	8	20		S8			ZYW
1997 02 12.12		I	2.6	S	6.0	B		20	&15	7			ADA02
1997 02 12.14		O	1.8	S	5.0	R	7	20	6	6	0.67	320	ZOL
1997 02 12.14		S	2.6	S	3.5	B		7	& 4	d7	&0.4	320	GRZ02
1997 02 12.17		B	1.9	Y	0.0	E		1	18	8	4.7	315	FIL04
1997 02 12.17		B	2.2:	S	0.0	E		1	&15	D6	&3		CNO
1997 02 12.17		O	2.4:	S	0.0	E		1	&10	S6	&0.8		TRY
1997 02 12.18		S	1.8	S	5.0	B		7	&10	D7	8	320	PAR03
1997 02 12.18	\$	B	1.5	SC	5.0	B		10	25	S7	4	330	MAC03
1997 02 12.18	& B	2.3	AA	5.0	B			10	12	S7/	1.1	308	MAR12
1997 02 12.18	& O	2.0	S	0.0	E			1					PIO
1997 02 12.18	w	B	2.2	YF	0.0	E		1	& 8	8	&5.6	310	SCI
1997 02 12.19		O	2.3	S	4.5	B		10	11	S6/	0.8		MAR13
1997 02 12.19	& B	2.1	S	3.6	B			4	29	D9	3	309	PIO
1997 02 12.22		I	1.6	S	8	L	8	20		S8			ZYW
1997 02 13.13		I	2.0	S	5.2	B		10	19	5	&4.7		MUS01
1997 02 14.15		B	1.3	S	7.0	B		25	&50	S9	&5	358	SOC
1997 02 14.15		S	2.2	S	3.5	B		7	& 4	d7	&0.6	315	GRZ02
1997 02 14.19		O	1.2	S	0.0	E		1	&48		&4		SZU01
1997 02 14.19	Gw		1.7	YF	0.0	E		1	& 8	8	&4	305	SCI
1997 02 15.13		S	2.2	S	3.5	B		7	& 6	d7	&0.6	320	GRZ02
1997 02 15.15		B	1.9	AA	5.0	B		10	15	6	1.5	110	DER
1997 02 15.16		B	1.9	Y	0.0	E		1	20	8	3.6	315	FIL04
1997 02 15.17		B	2.0	S	0.0	E		1	&20	D7	&3		CNO
1997 02 15.17	& B	1.8	AA	5.0	B			10	12	S7/	1.6	305	MAR12
1997 02 15.18		B	1.9:	S	4.5	B		10	&12	S7	1.2	325	MAR13
1997 02 15.20	!	B	1.7	S	6.8	R	12	40	10	S9	&0.8		CHR
1997 02 15.21		B	1.5	S	6.0	B		20	8	S9			MIG01
1997 02 16.12		B	1.6	AA	6.0	B		20	18	7	2.5	320	SIE
1997 02 16.13		S	1.5	S	3.5	B		7	& 6	d7	&0.7	320	GRZ02
1997 02 16.16	& B	1.6	AA	5.0	B			10	12	S7/	1.5	304	MAR12
1997 02 16.17		B	1.8:	S	4.5	B		10	&12	S7	1.35	325	MAR13
1997 02 16.18		B	1.0	S	7.0	B		25	&50	S9	&3	0	SOC
1997 02 16.18	M	1.8	S	5.0	B			7	15	D7	8	315	PAR03
1997 02 16.19		S	1.6	S	0.0	E		1	&35	7			RES
1997 02 17.13		B	1.5	AA	6.0	B		20	20	7	3	320	SIE
1997 02 17.14	& B	1.4	Y	0.0	E			1	&11	S8	&5.7		SIW01
1997 02 17.15		B	1.5	AA	0.0	E		1	20	6	4	322	STE12
1997 02 17.16		B	1.5	AA	0.0	E		7	20	7	7	310	BAL02
1997 02 17.16		B	1.8:	S	4.5	B		10	&11	S7	1.4	320	MAR13
1997 02 17.17		B	0.6:	S	4.0	B		12	&15	6/			WLO
1997 02 17.17		B	1.4	AA	0.0	E		1		6	2	320	SID
1997 02 17.17		B	2.0	S	5.0	B		10	14	7			SWI
1997 02 17.17		I	1.7	S	5.2	B		10	20	6			MUS01
1997 02 17.17		M	1.6	S	5.0	B		7	15	D7	8	315	PAR03
1997 02 17.17	!	S	1.2	AA	0.0	E		1	18	6/	8	316	HAV
1997 02 17.18		B	0.9	S	7.0	B		25	&60	S9	&4	0	SOC
1997 02 17.18		B	1.6	Y	0.0	E		1	20	8	6.1	315	FIL04
1997 02 17.18		O	1.3	S	0.0	E		1	22	S7/	8.0	315	KWI
1997 02 17.18	\$	B	1.4	SC	5.0	B		10	24	S7	4.3	320	MAC03

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 02 17.18	w	B	1.4	YF	5.0	B		10	& 9	8	&5	307	SCI
1997 02 17.19		M	1.5	S	8	R	7	35	17	S7	2.0	315	KWI
1997 02 17.19		S	1.2	S	0.0	E		1	36	7	7.3	300	RES
1997 02 17.19	&	B	1.8	S	0.0	E		1	&15	S6	&3.3	310	CH001
1997 02 17.19	w	B	1.2	S	5.0	B		7	20	7/	7.0	317	PLE01
1997 02 17.22		I	1.4	S	8	L	8	20		S8/			ZYW
1997 02 18.13		O	1.6	S	5.0	R	7	20	8	6	1	300	ZOL
1997 02 18.14		B	1.5	AA	0.0	E		1	22	6	5	310	STE12
1997 02 18.15		B	1.4	AA	0.0	E		7	21	7	7	311	BAL02
1997 02 18.16		B	1.1	AA	0.0	E		1		7	6	322	GAS01
1997 02 18.16		B	1.6:	S	4.5	B		10	12	S7	&1.8	315	MAR13
1997 02 18.16	&	B	1.2	AA	5.0	B		10	11	S7/	1.5	310	MAR12
1997 02 18.17		B	1.4	AA	0.0	E		1		7	6	322	DEM01
1997 02 18.17		B	1.8	S	3.6	B		4	21	D8/	4.5	333	PIO
1997 02 18.17		O	1.3	S	0.0	E		1	22	S7	7.0	317	KWI
1997 02 18.17		O	1.9	S	0.0	E		1			3		PIO
1997 02 18.17	w	B	1.0	S	5.0	B		7	18	7/	4.5	320	PLE01
1997 02 18.18		B	1.1:	S	7.0	B		25	&30	S9	&1.5	359	SOC
1997 02 18.18		B	1.4	Y	0.0	E		1	&11	S8	&6.5		SIW01
1997 02 18.18		B	1.6	Y	0.0	E		1	12	8	4.4	320	FIL04
1997 02 18.18		M	1.4	S	8	R	7	35	17	S7	2.0	317	KWI
1997 02 18.18		O	1.0	S	0.0	E		1	50	D6			SZU01
1997 02 18.18	&	M	2.4	S	3.0	B		8	17	6			KOS01
1997 02 18.18	w	B	1.3	YF	5.0	B		10	& 9	8	&4	305	SCI
1997 02 18.19		B	2.0	S	0.0	E		1	&20	D7	&5		CNO
1997 02 18.19	\$	B	1.4	SC	5.0	B		10	24	S6	4	310	MAC03
1997 02 18.19	&	B	1.5	S	0.0	E		1	&15	S6	&3.3	310	CH001
1997 02 18.20		B	2.4	S	5	R	6	20	& 8	D7/	1.5	290	JAR01
1997 02 18.20		S	1.0:	S	0.0	E		1	&30	7	&4	300	RES
1997 02 18.20	!	B	1.3	S	6.8	R	12	40	11	S9	&1		CHR
1997 02 18.23		B	1.0	S	6.0	B		20	8	S9			MIG01
1997 02 18.24		B	1.4	AA	0.0	E		1		6	2	320	SID
1997 02 18.25		B	1.4	AA	0.0	E		1		6	2.5	320	GAR03
1997 02 19.16	w	B	0.9	S	5.0	B		7	19	7/	4.5	321	PLE01
1997 02 20.15	w	B	0.8	S	5.0	B		7	20	7/	4.0	320	PLE01
1997 02 20.17	w	B	1.2:	YF	5.0	B		7	& 8	8	&4	300	SCI
1997 02 21.16		B	1.4:	S	4.5	B		10	13	S7	&2.0	315	MAR13
1997 02 21.16		O	0.7:	S	0.0	E		1	52		&3		SZU01
1997 02 21.16	&	B	1.0	AA	5.0	B		10	10	S7/	2.0	308	MAR12
1997 02 21.18		B	1.1:	S	7.0	B		25	&20	S9	&1	355	SOC
1997 02 21.18	w	B	1.2:	YF	5.0	B		7	& 8	8	&3	300	SCI
1997 02 22.15		I	1.5	S	5.2	B		10	20	6	5.1		MUS01
1997 02 22.16		O	1.2	S	0.0	E		1	20	S7/	2.5	323	KWI
1997 02 22.17	Gw		0.8	YF	0.0	E		1	&10	8	&5	300	SCI
1997 02 22.17	w	B	0.6	S	5.0	B		7	21	7/	4.7	322	PLE01
1997 02 22.18		B	0.9	S	7.0	B		25	&40	S9	&3	355	SOC
1997 02 22.18		B	1.2:	Y	0.0	E		1	&10	S8			SIW01
1997 02 22.18		B	1.6	AA	5.0	B		10	10	6/	2	120	DER
1997 02 22.18	!	B	1.6	OH	0.0	E		1	10	7		305	GR003
1997 02 22.18	\$	B	1.1	SC	9	L	10	70	10	S5	2.3	315	MAC03
1997 02 22.20		B	1.3	Y	0.0	E		1	15	8	1.1	290	FIL04
1997 02 22.22		S	0.7	S	0.0	E		1	&20	8			RES
1997 02 23.12		B	1.0:	S	5.0	B		15	&50	8	2.5	110	JON05
1997 02 23.18		B	1.6:	S	5.0	B		7	& 8	S8	1.1	305	SPE01
1997 02 23.70		B	0.5	S	5.0	B		7	&55				SZU01
1997 02 23.70	\$	M	1.0	S	5.0	B		7	15	D8			PAR03
1997 02 23.73		B	1.5:	S	7.0	B		25	&15	S9	&0.5	260	SOC
1997 02 24.13	Gw	B	0.7	SC	0.0	E		1		4	4.5	330	FIL05
1997 02 24.15		B	1.3:	S	4.5	B		10					MAR13
1997 02 24.17		B	1.6	S	0.0	E		1	&20	D6			CNO
1997 02 24.19		B	1.3:	S	7.0	B		25	&25	S9	&1.5	355	SOC
1997 02 25.17		B	0.9:	S	7.0	B		25	&35	S9	&3	357	SOC
1997 02 25.17		B	1.2	Y	0.0	E		1	& 8	S			SIW01
1997 02 25.17		B	1.4	S	0.0	E		1	&20	D7	&5		CNO
1997 02 25.17		O	1.0	S	0.0	E		1	15	S7	2.5	321	KWI

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 02 25.17		O	1.0:	Y	0.0	E		1	&10	9		320	BIN
1997 02 25.17		& B	1.3	AA	5.0	B		10	10	S7/	2.3	308	MAR12
1997 02 25.17	Gw		0.9	YF	0.0	E		1	& 6	8	&3.5	293	SCI
1997 02 25.18		& M	2.4	S	5.0	B		20	&20	6			KOS01
1997 02 25.18	w	B	0.7	S	5.0	B		7	20	7/	2.9	321	PLE01
1997 02 25.72		B	0.3	S	5.0	B		7	57				SZU01
1997 02 26.19	\$	B	0.6	SC	5.0	B		10	20	S5	3	315	MAC03
1997 02 26.73		O	0.0	S	0.0	E		1	&60	D6/	&2		SZU01
1997 02 26.74		B	1.0:	S	7.0	B		25	&30	S9	&2	270	SOC
1997 02 27.11		& B	1.0	S	0.0	E		1	&18	S6	&4.2	325	CH001
1997 02 27.14		& M	2.0	S	5.0	B		20	&20	6			KOS01
1997 02 27.17	\$	B	0.6	SC	5.0	B		10	20	S5	4	310	MAC03
1997 02 27.22		I	0.7	S	0.0	E		1		S8/			ZYW
1997 02 27.25		B	1.1	AA	3.0	B		8		6	2.5	320	GAR03
1997 02 27.58		B	0.8:	S	5.0	B		15	&45	8	2.5	0	JON05
1997 02 27.67		I	1.3	S	6.0	B		20	&15	7			ADA02
1997 02 27.70		B	1.0:	S	7.0	B		25	&20	S9	&0.7	250	SOC
1997 02 27.71		O	0.0	S	0.0	E		1	60		1.8		SZU01
1997 02 27.74		S	0.7	S	0.0	E		1	&15	8			RES
1997 02 27.77		I	0.7	S	8	L	8	35		S8/			ZYW
1997 02 28.10		& M	1.3	S	5.0	B		20	&20	6			KOS01
1997 02 28.12		B	0.8	S	5.0	B		15	50	8	3	100	JON05
1997 02 28.13		B	0.7	AA	0.0	E		7	21	7	7	315	BAL02
1997 02 28.13		B	1.5	S	0.0	E		1	&20	D7	&8		CNO
1997 02 28.13		O	1.1	S	5.0	R	7	20	8	6	2.5	305	ZOL
1997 02 28.14		B	0.9	S	5.0	B		10	&25	6/	&2.3	310	OLE
1997 02 28.14	w	B	0.6	S	5.0	B		7	22	7/	3.6	322	PLE01
1997 02 28.15		B	0.6:	S	4.0	B		8	13	D7	2.4	314	MAR13
1997 02 28.15		B	0.6:	S	7.0	B		25	&40	S9	&5	356	SOC
1997 02 28.16	Ga		0.7	YF	0.0	E		1	&10	8	&6.5	303	SCI
1997 02 28.17		O	1.5	S	0.0	E		1			&4		PIO
1997 02 28.17		& B	1.0	S	0.0	E		1	&18	S6	&4.2	325	CH001
1997 02 28.17		& B	1.3	AA	5.0	B		10	10	S7/	3.0	310	MAR12
1997 02 28.18		B	1.5	S	3.6	B		4	21	D9	5.5	307	PIO
1997 02 28.18		I	0.6	S	0.0	E		1		S9			ZYW
1997 02 28.18		S	0.5	S	0.0	E		1	&15	7/			RES
1997 02 28.21		B	1.1	AA	3.0	B		8		6	2	320	SID
1997 03 01.04	Gw	B	0.5	SC	0.0	E		1		4	5		FIL05
1997 03 01.12		B	0.6	Y	5.0	B		7	&15	S7/	&7		SAD
1997 03 01.12		B	1.0	Y	0.0	E		1	20	8	4.8	325	FIL04
1997 03 01.12		I	0.9:	Y	0.0	E		1	&15	S8	&5.5		SAD
1997 03 01.14		B	0.0:	S	0.0	E		1	&20	6	&3		WLO
1997 03 01.14		B	0.6	Y	5.0	B		7	&20	S7	&1.8	308	BAN
1997 03 01.14		M	0.5	Y	5.0	B		10	14	s8	6	320	SAN07
1997 03 01.14		M	-0.2	Y	5.0	B		10	12	D8	5.4	280	DOB
1997 03 01.15		B	0.7	Y	0.0	E		1	& 9	S			SIW01
1997 03 01.15		B	0.8	AA	5.0	B		10	18	5	2.5	130	DER
1997 03 01.15		& B	1.0	AA	5.0	B		10	10	S7/	3.0	310	MAR12
1997 03 01.16		B	0.5	S	4.0	B		8	13	D7	2.5	317	MAR13
1997 03 01.16		S	0.5	S	0.0	E		1	&20	7	2.5	280	RES
1997 03 01.17		& M	0.5	S	5.0	B		20	22	S6	3.5	330	KOS01
1997 03 01.17	Ga		0.7	YF	0.0	E		1	&10	8	&5	302	SCI
1997 03 01.18		I	0.6	S	0.0	E		1		S9			ZYW
1997 03 01.18	!	B	1.0	S	6.8	R	12	40	12	S9	&1.7		CHR
1997 03 02.08		B	0.7	Y	5.0	B		7	&18	7/			SAD
1997 03 02.08		I	1.0	Y	0.0	E		1	&15	7/	&8		SAD
1997 03 02.13		B	0.5:	S	0.0	E		1		D7	&2.2	318	MAR13
1997 03 02.14		B	-0.1:	S	0.0	E		1	&15	7			WLO
1997 03 02.14		M	0.5	Y	16.2	L	3	21	21	D4	1.5	310	SZA02
1997 03 02.14		S	0.2	Y	0.0	E		1	16	S7	6	295	SAN07
1997 03 02.15		O	0.0:	S	0.0	E		1	60	7	4		SZU01
1997 03 02.15	!	M	0.5	S	5.0	B		7	12	D8	7	320	PAR03
1997 03 02.15		& M	0.6	S	5.0	B		20	&20	5/			KOS01
1997 03 02.15	a	B	0.5	S	5.0	B		7	20	7/	3.8	324	PLE01
1997 03 02.16		B	0.9	AA	5.0	B		10	12	5	2.5	130	DER

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 02.16		B	1.3	S	3.6	B		4	24	D9	4.8	325	PIO
1997 03 02.16		O	1.1	S	0.0	E		1			&3		PIO
1997 03 02.16		S	1.0	Y	0.0	E		1	20	6	2		BRL
1997 03 02.16		& B	1.0	AA	5.0	B		10	10	S7/	2.0	320	MAR12
1997 03 02.16	Ga	B	0.6	YF	0.0	E		1	&10	8	&2.5	305	SCI
1997 03 02.16	a	B	0.4	S	5.0	B		7	21	7/	5.8	323	PLE01
1997 03 02.17		B	0.9	Y	0.0	E		1	25	8	4.4	330	FIL04
1997 03 02.17		I	0.5	S	3.5	B		7		S9			ZYW
1997 03 02.17		O	1.2:	S	0.0	E		1	&15	6	&2.6	350	TRY
1997 03 02.69		B	0.3	S	5.0	B		15	50	8	3	0	JON05
1997 03 02.72		O	0.5	S	0.0	E		1	20	S7	3.5	325	KWI
1997 03 02.73		M	0.6	S	5.0	B		7	15	S6/	3.0	325	KWI
1997 03 02.73	!	B	0.5	S	0.0	E		1	12	D8	2	295	PAR03
1997 03 02.74		S	0.1	S	0.0	E		1	&10	8	2.5	40	RES
1997 03 02.75	& I	1.1:	S	0.0	E			1		S9			KOL03
1997 03 02.83		B	1.0	AA	3.0	B		8		6	5	330	GAR03
1997 03 03.08		O	1.0	S	0.0	E		1	&28	3	1.5		SK004
1997 03 03.14		B	0.7	AA	0.0	E		1		7			GAS01
1997 03 03.14		B	0.9	AA	0.0	E		1		7	7	315	DEM01
1997 03 03.14	a	B	0.2	S	5.0	B		7	20	7/	3.6	296	PLE01
1997 03 03.15		O	0.4	S	0.0	E		1	20	S6/	5.5	323	KWI
1997 03 03.16		S	0.0	Y	0.0	E		1	16	S8	7	295	SAN07
1997 03 03.16	& M	0.6	S	5.0	B			20	&20	5/			KOS01
1997 03 03.18	\$	B	0.5	SC	5.0	B		10	15	S5	4.2	315	MAC03
1997 03 03.74		S	0.0	S	0.0	E		1	&15	6/	2	40	RES
1997 03 03.84		B	0.9	AA	3.0	B		8		7	7	315	SID
1997 03 04.04	& S	0.6:	S	6.0	B			20	76	D4/	&3	326	SZA05
1997 03 04.06	& I	0.7	AA	0.0	E			1		6			RYZ
1997 03 04.10		B	1.0	S	0.0	E		1	&25	D7	10		CNO
1997 03 04.10		B	2.0	S	6.0	B		20	7	6	&2		OSS
1997 03 04.11		I	0.6	S	6.0	B		20	&15	7			ADA02
1997 03 04.11	& M	0.4	S	7.0	R		8	60	21	5			KOS01
1997 03 04.12	& O	0.5:	S	0.0	E			1	76	D4/	&3	330	SZA05
1997 03 04.13	Gw	B	0.2	SC	0.0	E		1		4	9		FIL05
1997 03 04.14		B	0.8	S	5.0	B		10	&26	7/	&2.1	310	OLE
1997 03 04.14		B	0.8	Y	0.0	E		1	25	7	1.6	293	FIL04
1997 03 04.14	a	B	0.0	S	5.0	B		7	23	7/	3.2	335	PLE01
1997 03 04.15		B	0.4	S	4.0	B		8	13	D7	1.7	322	MAR13
1997 03 04.16		B	0.6	S	0.0	E		1	18	7	4.5	15	GAN
1997 03 04.16		B	0.7	S	3.6	B		4	22	D9	4	328	PIO
1997 03 04.16		O	0.8	S	0.0	E		1					PIO
1997 03 04.16	& B	0.6	AA	5.0	B			10	10	S8	3.0	320	MAR12
1997 03 04.17	!	S	0.2	AA	0.0	E		1	18	7	3	325	HAV
1997 03 04.18	!	B	0.9	S	6.8	R	12	40	12	S9	&2.3		CHR
1997 03 04.18	\$	B	0.4	SC	5.0	B		10	20	S4	3.5	310	MAC03
1997 03 04.69		B	-0.5	S	5.0	B		15	50	8	3	0	JON05
1997 03 04.73	a	O	0.3	S	0.0	E		1	20	S7	2.5	300	KWI
1997 03 04.74		S	0.0	S	0.0	E		1	&15	7	7	80	RES
1997 03 04.74		S	0.9	S	5	R	4	20	&30	3	2.3		SK004
1997 03 04.74	!	M	0.2	S	3.5	B		7	12	D8	4	300	PAR03
1997 03 04.75	!	M	-0.5	Y	5.0	B		10	9	D8	3	300	DOB
1997 03 04.75	& B	0.5:	S	7.0	B			25	&40	S9	&5	280	SOC
1997 03 04.75	& B	0.8:	S	5.0	B			7	& 5	S8	2.0	305	SPE01
1997 03 04.76	& B	1.5:	S	5.0	B			7	& 5	D5/	1.0		CZE01
1997 03 04.83		B	0.8	AA	3.0	B		8					GAR03
1997 03 04.83		B	0.8	AA	3.0	B		8					GAR03
1997 03 05.11		B	0.1	AA	0.0	E		7	21	7	11	321	BAL02
1997 03 05.11	& M	0.2	S	7.0	R		8	60	21	5			KOS01
1997 03 05.12		B	0.5	AA	0.0	E		1					STE12
1997 03 05.12		S	-0.2	Y	0.0	E		1	19	S7	9	305	SAN07
1997 03 05.13		B	0.4	S	4.0	B		8	15	D7/	2.0	322	MAR13
1997 03 05.13		B	-0.5:	S	4.0	B		12	&22	6/	&4		WLO
1997 03 05.13		O	-0.2	S	0.0	E		1	62		&4.5		SZU01
1997 03 05.13	Gw	B	0.1	SC	0.0	E		1		4	7	330	FIL05
1997 03 05.14		S	-0.2	S	0.0	E		1	&15	7	12.8	250	RES

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 05.15		B	0.4	Y	0.0	E		1	&14	S	&9.8		SIW01
1997 03 05.15		B	0.5	AA	6.0	B		20	23	7	7	315	SIE
1997 03 05.15		B	1.1	S	5.0	B		10	&11	7			SWI
1997 03 05.15		B	1.6	S	6.0	B		20	&20	8	&2		KAM05
1997 03 05.15	a	B	-0.1	S	5.0	B		7	22	7/	4.6	346	PLE01
1997 03 05.16		B	0.6	S	5.0	B		7	& 7	S8	6.0	323	SPE01
1997 03 05.16		B	0.6	Y	0.0	E		1	25	8	10.6	325	FIL04
1997 03 05.16		I	0.5	S	5.2	B		10	20	D7	5.8		MUS01
1997 03 05.16		S	-0.3	Y	0.0	E		1					RAV01
1997 03 05.16	Ga		0.5	YF	0.0	E		1	&12	8	&3	311	SCI
1997 03 05.17		O	0.2	S	0.0	E		1	20	S7	5.0	335	KWI
1997 03 05.17	!	B	0.8	OH	0.0	E		1	16	6/			GR003
1997 03 05.21		B	0.7	AA	3.0	B		8		7	8	330	SID
1997 03 05.21		B	0.8	AA	3.0	B		8					GAR03
1997 03 05.73		O	-0.2	S	0.0	E		1	&60		5		SZU01
1997 03 05.73	!	M	-0.1	Y	0.0	E		1	10	7	1		SRA
1997 03 05.73	&	B	1.2	S	5.0	B		7	7	D5	1.2		CZE01
1997 03 05.74	!	M	0.2	S	3.5	B		7	&12	D8	5	300	PAR03
1997 03 05.74	a	O	0.1	S	0.0	E		1	20	S7	2.7	310	KWI
1997 03 05.75	!	M	-0.5	Y	5.0	B		10	10	D7	3.7	300	DOB
1997 03 05.75	&	B	0.3	S	7.0	B		25	&30	S9	&6	280	SOC
1997 03 05.75	&	B	1.6	S	5	R	6	20	11	D8	2.5	305	JAR01
1997 03 05.75	a	M	0.3	S	8	R	7	35	20	S6	2.3	310	KWI
1997 03 06.05	&	M	0.1:	S	7.0	R	8	60	&20	5			KOS01
1997 03 06.08	G	B	0.2	AA	0.0	E		1		D6			RYZ
1997 03 06.08	&	I	0.7:	AA	0.0	E		1		6			RYZ
1997 03 06.11		B	0.3	AA	6.0	B		20	25	7	10	315	SIE
1997 03 06.11		M	0.1	S	4.0	B		12	&10	D5			KON07
1997 03 06.12		I	0.4	AA	0.0	E		1	& 6	D5	2.0	30	SZA07
1997 03 06.13		O	-0.3	S	0.0	E		1	63	s	6		SZU01
1997 03 06.15		B	0.4:	S	4.0	B		8	14	D7/	1.8	323	MAR13
1997 03 06.15		B	0.7	S	0.0	E		1	&20	D7	10		CNO
1997 03 06.16		B	0.5	Y	5.0	B		10	15	S6	20	305	BUS04
1997 03 06.16		O	0.4	S	0.0	E		1					PIO
1997 03 06.16	&	B	0.5	AA	5.0	B		10	10	S8	2.5	320	MAR12
1997 03 06.17		B	0.4	S	3.6	B		4	22	D9	7	331	PIO
1997 03 06.22		S	0.2	AA	5.0	B		10	18.5	8	4.0	324	ABB
1997 03 06.75		S	-0.1	S	0.0	E		1	&15	6/	4	70	RES
1997 03 06.98		B	0.5	AA	0.0	E		1			9	330	GAR03
1997 03 07.11	&	M	0.0	S	7.0	R	8	60	20	5			KOS01
1997 03 07.13		B	0.6:	S	5.0	B		7	& 9	S8	5.6	325	SPE01
1997 03 07.15		B	0.6	AA	5.0	B		12	& 6				SZA07
1997 03 07.15		S	-0.3	S	0.0	E		1	&15	7	10	290	RES
1997 03 07.16		M	1.0	Y	0.0	E		1	12	7	6	315	BAR05
1997 03 07.16		S	-0.5	Y	0.0	E		1					RAV01
1997 03 07.16	!	B	0.7	OH	0.0	E		1	14	6/	6.6	316	GR003
1997 03 07.16	\$	B	0.0	SC	5.0	B		10	20	S4	6.3	315	MAC03
1997 03 07.16	a	B	-0.2	S	5.0	B		7	24	7/	7.8	341	PLE01
1997 03 07.17		B	0.7	S	5.0	B		10	&22	7/	&2.4		OLE
1997 03 07.19		B	0.6	AA	9	L	10	70	& 6.5				SZA07
1997 03 07.21		I	0.4	S	7	R	4	6		S9			ZYW
1997 03 07.71		B	-0.7	S	5.0	B		15	50	8	3.5	0	JON05
1997 03 07.73		B	0.8	S	5.0	B		7	8	D5/	1.8		CZE01
1997 03 07.73		O	0.5:	S	5.0	R	7	20	10	7	2	310	ZOL
1997 03 07.73	!	O	-0.7	S	3.5	B		7	21	S6	0.3		MAR22
1997 03 07.73	&	I	0.6:	S	0.0	E		1		S9			KOL03
1997 03 07.73	&	S	1.0:	S	5	R	6	20	35	D8	&2.1	250	REM
1997 03 07.74	!	M	0.0	S	3.5	B		7	&15	D8	8		PAR03
1997 03 07.74	w	O	-0.2	S	0.0	E		1	25	S6	7.5	340	KWI
1997 03 07.75		O	-0.3	S	0.0	E		1	65	7/	&8		SZU01
1997 03 07.75		S	-0.2	S	0.0	E		1	&20	6/	5	100	RES
1997 03 07.75	w	B	-0.3	Y	0.0	E		1	& 5	S8/	0.8	327	DRA02
1997 03 07.75	w	M	-0.1	S	8	R	7	35	22	S6/	2.2	317	KWI
1997 03 07.76		M	0.0	S	7.0	R	8	60	21	5/			KOS01
1997 03 07.76	!	S	0.0	Y	5.0	B		20	20	d5	4	295	NEM

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 07.76	!	S	-0.1:	Y	0.0	E		1	15	S6	7	330	SAN07
1997 03 07.76	&	B	1.7	S	9	L	10	70	12	D8/	2.6	300	JAR01
1997 03 07.76	w	B	0.2	S	6.0	B		20		S6/			DRA02
1997 03 07.77	&	B	1.5	S	5	R	6	20	14	D8	2.7		JAR01
1997 03 07.77	&	I	0.5:	Y	0.0	E		1	&15	6/	&4		SAD
1997 03 08.08		O	0.1	S	0.0	E		1	15	D8	2.8	324	MAR13
1997 03 08.10		B	0.0	S	7.0	B		25	&30	S9	15	355	SOC
1997 03 08.10		B	0.7:	Y	5.0	B		7	&20	7/	13		SAD
1997 03 08.10		B	-0.1	AA	0.0	E		7	20	7	12	322	BAL02
1997 03 08.10		I	0.6:	Y	0.0	E		1	&18	D7/	10		SAD
1997 03 08.11		B	0.5	S	0.0	E		1	&20	D7	&8		CNO
1997 03 08.12		M	0.9	Y	0.0	E		1	12	7	6	315	BAR05
1997 03 08.12		O	-0.4	S	0.0	E		1	65		10		SZU01
1997 03 08.12	a	B	-0.4	S	5.0	B		7	24	7/	10	345	PLE01
1997 03 08.13		B	0.5:	S	5.0	B		7	&11	S8	7.6	323	SPE01
1997 03 08.14		B	0.6	S	5.0	B		10	&27	7/	4.8		OLE
1997 03 08.14		B	1.0	S	0.0	E		1	&10	D6	&3		OSS
1997 03 08.14		M	0.0	S	4.0	B		12	&13	D5/			KON07
1997 03 08.14		O	-0.3	S	0.0	E		1	25	S6	14	348	KWI
1997 03 08.14	!	S	-0.2	AA	0.0	E		1	18	8	13	326	HAV
1997 03 08.15		B	0.2	S	0.0	E		1	16	7/	4.5	35	GAN
1997 03 08.15		B	0.3	AA	5.0	B		10	9	7/	8	110	DER
1997 03 08.15		B	0.7:	Y	0.0	E		1	20	8	14	330	FIL04
1997 03 08.15		B	-1.0:	S	0.0	E		1	&25	7			WLO
1997 03 08.15		M	0.1	S	4.5	B	4	12	15	8	6	325	GAM
1997 03 08.15		M	-0.1	S	8	R	7	35	22	S6	2.6	325	KWI
1997 03 08.15		S	-0.3	S	0.0	E		1	&25	6	6	210	RES
1997 03 08.15	&	B	0.0	AA	5.0	B		10	10	S8	5.0	315	MAR12
1997 03 08.15	Ga		0.0	YF	0.0	E		1	&10	8	14	320	SCI
1997 03 08.16		B	0.3	S	3.6	B		4	17	D9	4.8	319	PIO
1997 03 08.16		M	0.5	Y	6.0	B		20	20	D4	3	320	SZA02
1997 03 08.16		O	0.2	Y	0.0	E		1				303	BAN
1997 03 08.16		S	-0.5	Y	0.0	E		1	16	S6	10	315	SAN07
1997 03 08.16	\$	B	0.0	SC	5.0	B		10	20	S5	8.5	320	MAC03
1997 03 08.16	&	B	-0.1	S	0.0	E		1	&20	S7	&6.0	330	CH001
1997 03 08.16	w	B	0.4	Y	0.0	E		1	&15	S			SIW01
1997 03 08.17		B	1.7:	S	6.0	B		20	&12	8	&1.5		KAM05
1997 03 08.17		I	0.3	S	7	R	4	6		S9			ZYW
1997 03 08.17		O	0.3	S	0.0	E		1	&20	D	4	319	PIO
1997 03 08.18		B	0.3	AA	9	L	10	70	& 6		2.5		SZA07
1997 03 08.18	!	B	0.4	S	6.8	R	12	40	13	S9	&4		CHR
1997 03 08.19		B	0.4	AA	3.0	B		8		7	6	332	SID
1997 03 08.75	&	I	0.2:	Y	0.0	E		1	&10	7	&3.5		SAD
1997 03 08.75	w	O	-0.4	S	0.0	E		1	20	S6/	3.0	320	KWI
1997 03 08.76		S	-0.4	S	0.0	E		1	&20	6	2	100	RES
1997 03 08.76	&	B	0.4:	Y	5.0	B		7	&14	7/	&5		SAD
1997 03 08.76	w	I	-0.6:	Y	0.0	E		1	& 6	S8			SIW01
1997 03 08.77	!	O	-0.7	S	3.5	B		7	21	S6	0.3		MAR22
1997 03 08.78	!	M	-0.2	Y	5.0	B		10	15	S7	5	305	DOB
1997 03 09.06	w	O	-0.4	S	0.0	E		1	20	S6/	2.0	318	KWI
1997 03 09.08	&	O	0.5:	S	0.0	E		1	101	D5	22	330	SZA05
1997 03 09.12	a	B	-0.5	S	5.0	B		7	23	7/	12	346	PLE01
1997 03 09.13		B	0.7	Y	0.0	E		1	20	8	11.1	335	FIL04
1997 03 09.14		S	-0.5:	Y	0.0	E		1	25	S6	10	310	SAN07
1997 03 09.14	!	S	-0.3	AA	0.0	E		1	18	8	13	328	HAV
1997 03 09.16		B	0.0	S	7.0	B		25	&20	S9	&3	0	SOC
1997 03 09.16	Ga		0.1:	YF	0.0	E		1	& 8	8	&3	330	SCI
1997 03 09.73		O	0.5	S	5.0	R	7	20	10	6	2.5	310	ZOL
1997 03 09.74		B	0.8:	S	5.0	B		7	6	D5	0.9		CZE01
1997 03 09.74	!	B	0.3	S	3.6	B		4	18	D9	4	342	PIO
1997 03 09.74	!	O	0.3	S	0.0	E		1		9	4	342	PIO
1997 03 09.75		B	0.6:	S	5.0	B		10	&18	8	&2.0	305	OLE
1997 03 09.75		S	0.5	S	5	R	4	20	&32	4	2.9		SK004
1997 03 09.75		S	-0.4	S	0.0	E		1	&20	6/	2	100	RES
1997 03 09.75	&	O	0.6:	S	5	R		20	120	S5	12	335	SZA05

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 09.76	!	M	0.0	S	0.0	E		1	&20	D8	12	320	PAR03
1997 03 09.76	&	B	0.1	Y	0.0	E		1	&15	6			KID01
1997 03 09.78	&	B	1.8:	S	9	L	10	70	13.6	D8/	2.7	300	JAR01
1997 03 09.80		M	0.3	S	5.0	B		20	20	4/	8	313	KOS01
1997 03 09.81	&	B	-0.1	S	0.0	E		1	&20	S7	&6.0	330	CH001
1997 03 09.82		S	-0.3	AA	5	R	4	10	15	8	10	340	GUR
1997 03 10.06		B	-0.3	S	7.0	B		25	&30	S9	12	360	SOC
1997 03 10.10	Gw	B	-0.3	SC	0.0	E		1		4	14		FIL05
1997 03 10.11		M	-0.2	Y	5.0	B		10	12	S6	23	300	DOB
1997 03 10.13		B	0.2	S	0.0	E		1	&20	D8	&9		CNO
1997 03 10.13		B	0.6	S	5.0	B		10	&19	8	&2.4	310	OLE
1997 03 10.13		O	0.0:	S	0.0	E		1		D8/	2.9	324	MAR13
1997 03 10.13	!	S	0.0	S	0.0	E		1	&25	D8	14	320	PAR03
1997 03 10.14	!	S	-0.3	AA	0.0	E		1	18	8	14	329	HAV
1997 03 10.15		B	0.0	AA	5.0	B		12	& 6.5	D5		30	SZA07
1997 03 10.15	&	B	0.0	AA	5.0	B		10	10	S8	4.0	315	MAR12
1997 03 10.17		B	-0.5	AA	9	L	10	70	& 6.5	D5			SZA07
1997 03 10.19		B	0.3	AA	0.0	E		1	50		12	330	GAR03
1997 03 10.69		B	-1.2	S	5.0	B		15	40	8	3.5	0	JON05
1997 03 10.72		M	1.0	AA	5.0	B		10	18	D8		320	SAJ
1997 03 10.73		O	0.5	S	5.0	R	7	20	10	6	2.5	310	ZOL
1997 03 10.74	&	O	0.4:	S	0.0	E		1	110	D5/	15	260	SZA05
1997 03 10.75		B	0.5:	S	5.0	B		10	&19	8	&2.1	310	OLE
1997 03 10.75		B	0.8	S	5.0	B		7	5	D6	1.8		CZE01
1997 03 10.75		S	-0.5	S	0.0	E		1	&15	7	2	100	RES
1997 03 10.75	!	B	0.1	S	3.6	B		4	18	D9	4	339	PIO
1997 03 10.75	!	O	0.0	S	0.0	E		1			4	339	PIO
1997 03 10.76		B	-0.5:	S	5.0	B		7	&60				SZU01
1997 03 10.77	!	O	-0.8	S	3.5	B		7	&22	s5	&0.3		MAR22
1997 03 10.78					5.0	B		7	12	6/	3.6	315	GR003
1997 03 10.79	I	0.3	S		7	R	4	6		S9			ZYW
1997 03 10.84		B	1.9	S	6.0	B		20	&16	5	1.6		GNI
1997 03 10.95	P				5.0	A	4	35		6	15	332	BAR06
1997 03 11.08		M	-0.3	S	4.0	B		12	12	D5			KON07
1997 03 11.10		B	0.7	S	5.0	B		7	6	D6	2.5		CZE01
1997 03 11.10		O	-0.7	S	0.0	E		1	70	7	12		SZU01
1997 03 11.11		B	0.5	S	10.4	L	10	70	&25	S8/	&4.6		WAL03
1997 03 11.11		B	-0.3	AA	0.0	E		7	20	8	13	342	BAL02
1997 03 11.11		M	-0.3	Y	5.0	B		10	15	S7			BAJ
1997 03 11.11		M	-0.3	Y	5.0	B		10	18	S7			DOB
1997 03 11.13		B	0.0	S	6.0	B		20	16	7			SWI
1997 03 11.13		B	0.5:	S	5.0	B		7	& 8	S8	7.1	330	SPE01
1997 03 11.13		B	0.6	S	5.0	B		10	&20	8	2.6	335	OLE
1997 03 11.13		B	-0.1	AA	0.0	E		1		7	24	327	GAS01
1997 03 11.13	I	0.2	AA		0.0	E		1		7			RYZ
1997 03 11.13	N	1.5	Y		16.2	L	3	104	20			315	SZA02
1997 03 11.13		O	0.5	Y	0.0	E		1		9		310	BIN
1997 03 11.13		S	-0.5	Y	0.0	E		1	25	S7	8	315	SAN07
1997 03 11.13	\$	B	-0.2	SC	5.0	B		10	15	S5	4.5	315	MAC03
1997 03 11.13	a	B	-0.7	S	5.0	B		7	22	7/	14	347	PLE01
1997 03 11.14		B	0.2	S	0.0	E		1	&20	D7			CNO
1997 03 11.14		B	0.3	Y	0.0	E		1	25	8/	8.9	333	FIL04
1997 03 11.14		O	0.0	S	0.0	E		1		D8/	3.1	325	MAR13
1997 03 11.14		O	-0.6	S	0.0	E		1	30	S6	16	345	KWI
1997 03 11.15		B	0.0	AA	5.0	B		12	& 6.5	D5			SZA07
1997 03 11.15		M	-0.4	S	8	R	7	35	26	S6	3	324	KWI
1997 03 11.15		O	0.3:	S	0.0	E		1	&18	S6	15.7		TRY
1997 03 11.15	!	B	0.6	OH	0.0	E		1					GR003
1997 03 11.15	Ga		0.0	YF	0.0	E		1	&12	8	&6.5	320	SCI
1997 03 11.16		B	-1.2:	S	0.0	E		1	&30	6/	&5		WLO
1997 03 11.16	!	B	0.2	S	6.8	R	12	40	13	S9	&4		CHR
1997 03 11.17		B	1.5:	S	6.0	B		20	&12	7	&2		KAM05
1997 03 11.73		O	0.0	S	4.0	B		8	17	D8/	3.0	325	MAR13
1997 03 11.74	!	M	0.0	S	3.5	B		7	&12	D8	3	300	PAR03
1997 03 11.75		S	-0.2	AA	0.0	E		1			5		NAU

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 11.75	w	0	-0.6	S	0.0	E		1	20	S6/	4	321	KWI
1997 03 11.77		M	0.5	AA	5.0	B		10	18	D8		320	SAJ
1997 03 11.77	!	0	-0.8	S	0.0	E		1	22	s5	0.3		MAR22
1997 03 11.78	&	B	1.6:	S	9	L	10	70	12.2	D8	2.6	300	JAR01
1997 03 11.78	w	B	1.3	Y	0.0	E		1	&12	S8/	2.0	310	DRA02
1997 03 11.80	&	0	0.3:	S	0.0	E		1	105	D5/	18	280	SZA05
1997 03 11.83		S	-0.2	S	3.5	B		7	& 5	D6	&1.7	315	GRZ02
1997 03 12.06	&	B	0.8:	S	5.0	B		7	& 5	D5	1.2		CZE01
1997 03 12.10		M	-0.2	S	3.0	B		8	12	D5			KON07
1997 03 12.13		B	-0.2	S	7.0	B		25	&25	S9	&9	5	SOC
1997 03 12.13	&	0	0.0	S	0.0	E		1	110	D5/	25	310	SZA05
1997 03 12.14	a	B	-0.7	S	5.0	B		7	26	7/	11	343	PLE01
1997 03 12.15		M	0.6	S	4.5	B	4	12	12	7	3.6	295	GAM
1997 03 12.15	Ga		0.0:	YF	0.0	E		1	& 8	8	&2	320	SCI
1997 03 12.16		B	-1.2:	S	0.0	E		1	&30	6			WLO
1997 03 12.75	w	0	-0.7	S	0.0	E		1	20	S7/	5	319	KWI
1997 03 12.76	w	M	-0.6	S	8	R	7	35	19	S7	2.8	319	KWI
1997 03 12.78		M	-0.3	Y	5.0	B		10	18	S7			DOB
1997 03 12.81		I	0.3	AA	5.0	B		10	16	8	2.7	315	ABB
1997 03 12.83		S	-0.2	S	3.5	B		7	& 9	D6	&1.3	315	GRZ02
1997 03 13.11		0	-0.8	S	0.0	E		1	&70	s	10		SZU01
1997 03 13.12	a	B	-0.8	S	5.0	B		7	25	7/	8	336	PLE01
1997 03 13.13		B	0.4:	S	5.0	B		7	& 6	S8	3.5	310	SPE01
1997 03 13.13		M	0.6	Y	0.0	E		1	15	8	4	315	BAR05
1997 03 13.14		B	0.4	Y	0.0	E		1	15	8	12	340	FIL04
1997 03 13.14		0	-0.7	S	0.0	E		1	30	S6	14	335	KWI
1997 03 13.15		B	-1.5:	S	0.0	E		1	&30	6/	&6.5		WLO
1997 03 13.15		M	-0.6	S	8	R	7	35	27	S6/	3	315	KWI
1997 03 13.15	!	S	-0.4	AA	0.0	E		1	18	8	15	331	HAV
1997 03 13.15	Ga		-0.5	YF	0.0	E		1	&15	8	28	335	SCI
1997 03 13.19		I	0.0	AA	0.7	E		1	8	8/			ABB
1997 03 13.63		S	-0.5	AA	5	R	4	10	16	8	6	344	GUR
1997 03 13.67		B	-0.2	AA	6.0	B		20	15	7	5	295	SIE
1997 03 13.83		S	-0.5	S	3.5	B		7	&12	D6	&1.8	315	GRZ02
1997 03 15.08		B	0.0	AA	0.0	E		1	40	7	20	332	SID
1997 03 15.10		B	-0.6	AA	0.0	E		7	18	8	14	342	BAL02
1997 03 15.12		B	0.0	AA	0.0	E		1		6	8	330	STE12
1997 03 15.12		B	-0.8	AA	6.0	B		23	15	9	5	340	SIE
1997 03 15.12	a	B	-0.8:	S	5.0	B		7	&20	7/	&7	338	PLE01
1997 03 15.76	!	M	-0.8	Y	5.0	B		7	9	6	2.7	313	PIN01
1997 03 15.92		S	-1.0	S	0.0	E		1	&30	6	20	175	RES
1997 03 15.95		B	-0.6:	AA	0.0	E		1		7			GAS01
1997 03 16.10		S	-0.8	S	0.0	E		1	&20	6	18	260	RES
1997 03 16.14	!	S	-0.5	AA	0.0	E		1	18	8	12	339	HAV
1997 03 16.14	&	B	-0.3	AA	5.0	B		10	10	S8	5.5	325	MAR12
1997 03 16.15		B	-1.8:	S	0.0	E		1	&30	7			WLO
1997 03 16.59		S	-0.6	AA	5	R	4	10	18	8	6		GUR
1997 03 16.74		0	-0.3:	S	4.0	B		8	17	D8/	4.2	330	MAR13
1997 03 16.74	&	I	0.2	AA	0.0	E		1		6/			RYZ
1997 03 16.75		B	0.5	S	5.0	B		7	8	D5	3.5		CZE01
1997 03 16.75		B	-1.5	S	5	R	6	20		s5			PER05
1997 03 16.75		S	0.2	S	5.0	B		10	&22	8	3.1	322	OLE
1997 03 16.75	!	0	-0.4	S	0.0	E		1	19	D	10	343	PIO
1997 03 16.76		M	-0.3	S	5.0	B		20	18	s	10	318	KOS01
1997 03 16.76		0	0.0	S	5.0	R	7	20	10	7	2.5	325	ZOL
1997 03 16.76	!	M	-0.5	S	3.5	B		7	&25	D8	12	345	PAR03
1997 03 16.77		0	-1.0	S	0.0	E		1	60		8.5		SZU01
1997 03 16.77	\$	B	-0.6	SC	5.0	B		10	15	S5	6.5	325	MAC03
1997 03 16.78		S	-0.9	S	0.0	E		1	&20	6	10	100	RES
1997 03 16.78	!	B	-0.2	S	6.8	R	12	40	11	S9	&2.5		CHR
1997 03 16.78	&	B	0.5	S	9	L	10	70	12.8	D8	2.8	315	JAR01
1997 03 16.79		0	-1.3:	S	6.0	B		20	123	D5	14	250	SZA05
1997 03 16.79	&	0	-1.0	S	0.0	E		1	100	D5	10	280	SZA05
1997 03 16.80		B	-0.3:	S	7.0	B		25	&25	S9	&8	290	SOC
1997 03 16.81	&	B	-0.4:	Y	0.0	E		1	&20				KID01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 16.96		B	-0.1	AA	0.0	E		1		7	7	342	GAR03
1997 03 17.08		0	-0.9:	S	0.0	E		1	125	D5/	34	280	SZA05
1997 03 17.10		B	-0.7	AA	0.0	E		1		7	9	330	GAS01
1997 03 17.12	a	B	-0.9	S	5.0	B		7	24	7/	11	340	PLE01
1997 03 17.13		0	-0.3:	S	4.0	B		8	18	D8/	4.1	331	MAR13
1997 03 17.13		0	-1.0:	S	0.0	E		1	65		10		SZU01
1997 03 17.13	!	S	-0.5	S	0.0	E		1	&30	D8	20	345	PAR03
1997 03 17.13	&	B	-0.3	AA	5.0	B		10	10	S8	4.0	332	MAR12
1997 03 17.15		B	0.5	S	5.0	B		7	9	D6	4.0		CZE01
1997 03 17.17		B	0.5	S	6.0	B		20		8			KAM05
1997 03 17.70		B	-1.4	S	5.0	B		15	52	7	5	0	JON05
1997 03 17.73	!	0	-1.0	S	3.5	B		7	24	s5	0.3		MAR22
1997 03 17.74		B	0.4	AA	5.0	B		10	35	6	4	80	DER
1997 03 17.75		0	0.0	S	5.0	R	7	20	10	7	3.5	330	ZOL
1997 03 17.75		0	-1.1:	S	0.0	E		1	105	D5	10	275	SZA05
1997 03 17.75	!	0	-0.5	S	0.0	E		1	19	D9	8	355	PIO
1997 03 17.76	M	0.6	S	10.4	L	10		70	&25	S8/	&4.9		WAL03
1997 03 17.76	M	-0.4	S	7.0	R	8		60	21	S5	14		KOS01
1997 03 17.76		S	0.1	S	5.0	B		10	&22	8	2.8	330	OLE
1997 03 17.76	!	B	-0.7	S	3.6	B		4	19	D9	15	330	PIO
1997 03 17.76	a	B	-0.5:	YF	5.0	B		7	&10	8	&6	325	SCI
1997 03 17.77		B	0.5	S	5	R	6	20	14	D8	3.5	315	JAR01
1997 03 17.77	!	M	0.1	Y	5.0	B		8	8	D5	8	325	SZA06
1997 03 17.77	!	M	-0.5	S	3.5	B		7	&20	D8	6	325	PAR03
1997 03 17.78		B	0.0	S	6.0	B		20	8	D7	&3	325	OSS
1997 03 17.78	\$	B	-0.7	SC	5.0	B		10	10	S4	6.3	320	MAC03
1997 03 17.79		I	-0.1	S	0.0	E		1		S9	&6		ZYW
1997 03 17.80		B	0.0:	S	7.0	B		25	&20	S9	&4	290	SOC
1997 03 17.81		B	-1.0:	AA	0.0	E		1		6			GAS01
1997 03 17.81	w	0	-0.8	S	0.0	E		1	20	S7	6	315	KWI
1997 03 17.83		0	0.1	S	0.0	E		1	&15	5	3.5	320	GNI
1997 03 17.83		S	-0.2	S	3.5	B		7	&11	D6	&2.2	335	GRZ02
1997 03 17.85		S	-1.1	S	0.0	E		1	&20	6	14	100	RES
1997 03 18.11		B	0.4	S	5.0	B		7	8	D5	4.0		CZE01
1997 03 18.11	Gw	B	-0.5	SC	0.0	E		1	25	6	7		FIL05
1997 03 18.12		B	0.0:	AA	6.0	B		8	&6	d5/			SZA07
1997 03 18.12		M	-0.4	Y	5.0	B		10	20	S8	20	323	DOB
1997 03 18.12		S	-0.6	Y	0.0	E		1	15	S7	12	323	SAN07
1997 03 18.13		B	0.0	Y	0.0	E		1	14	8	15.1	355	FIL04
1997 03 18.13		B	-0.5:	S	5.0	B		7	&18	S8	5.0	343	SPE01
1997 03 18.13		0	-0.8	S	0.0	E		1	30	S7	9.5	312	KWI
1997 03 18.13	Ga		-0.4	YF	0.0	E		1	&15	8	12	345	SCI
1997 03 18.13	a	B	-1.0	S	5.0	B		7	23	7/	10	343	PLE01
1997 03 18.14		B	-0.1	S	0.0	E		1	20	7/	4 4		GAN
1997 03 18.14		I	-0.1	S	8	L	8	20		S9	16		ZYW
1997 03 18.14		M	-0.6	S	8	R	7	35	26	S6	5	312	KWI
1997 03 18.15		B	-0.3:	S	0.0	E		1	&20	D7			CNO
1997 03 18.15		B	-2.0:	S	0.0	E		1	&35	7			WLO
1997 03 18.16		B	0.6	AA	5.0	B		10	25	6/	5	80	DER
1997 03 18.16	!	B	-0.3	S	6.8	R	12	40	14	S9	&4		CHR
1997 03 18.75		B	0.5	S	5.0	B		7	8	D6	3.5		CZE01
1997 03 18.75		B	-0.6	Y	0.0	E		1		8			MOS03
1997 03 18.75		B	-1.4	S	5.0	B		15	50	7	5.5	0	JON05
1997 03 18.75		0	-0.3	S	4.0	B		8	18	D8/	4.5	334	MAR13
1997 03 18.75	!	B	-0.6	S	3.6	B		4	19	D9	18	40	PIO
1997 03 18.75	!	0	-0.8	S	0.0	E		1	19		18	40	PIO
1997 03 18.76		M	-0.4	S	5.0	B		20	20	s4/			KOS01
1997 03 18.76		0	0.0	S	5.0	R	7	20	10	6	3.5	320	ZOL
1997 03 18.76		S	-0.1	S	5	R	4	20	&34	4	4.4		SK004
1997 03 18.76	!	M	-0.6	S	3.5	B		7	&20	D8	7	325	PAR03
1997 03 18.77		B	0.4	S	5	R	6	20	15.5	D8/	3.7	315	JAR01
1997 03 18.77		B	-0.3:	S	7.0	B		25	&30	S9	&6	280	SOC
1997 03 18.77		B	-0.5	S	5.0	B		10	18	7			SWI
1997 03 18.77	!	M	-0.5	Y	5.0	B		8	8	D5	10	330	SZA06
1997 03 18.78	\$	B	-0.8	SC	5.0	B		10	10	S3	5.8	330	MAC03

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 18.79		S	-0.2	S	3.5	B		7	&11	D6	&1.3	335	GRZ02
1997 03 18.79	!	O	-1.0	S	3.5	B		7	24	s5	0.3		MAR22
1997 03 18.80		I	-0.8	S	5	R	6	20	120	S5/	8	130	SZA05
1997 03 18.80	&	B	-0.3	AA	5.0	B		10	10	S8	5.0	335	MAR12
1997 03 18.84		B	-0.4	S	6.0	B		20	19	5	5.5		GNI
1997 03 19.13		O	-0.3:	S	4.0	B		8	18	D8/	2.9	336	MAR13
1997 03 19.61		S	-0.6	AA	5	R	4	10	16	8			GUR
1997 03 19.80		B	-0.8	AA	6.0	B		20	15	5	5	345	SIE
1997 03 19.81		B	-0.5	AA	0.0	E		1		6			GAS01
1997 03 19.85	!	O	-0.9	S	0.0	E		1	16	9	14		PIO
1997 03 19.88	w	B	-0.7	Y	0.0	E		1	&12	S8	6.1		DRA02
1997 03 20.75		S	-0.6	AA	5	R	4	10	18	8	4	348	GUR
1997 03 20.76		B	0.5	AA	5.0	B		10	15	5	2.5	70	DER
1997 03 20.76	&	B	-0.5	AA	5.0	B		10	10	S8	3.0	335	MAR12
1997 03 20.77		O	-0.4	S	4.0	B		8	18	D8/	&3	338	MAR13
1997 03 20.77	Ga		-0.8	YF	0.0	E		1	&10	8	&6	332	SCI
1997 03 20.79		S	-0.3	S	3.5	B		7	&11	D6	&1.5	340	GRZ02
1997 03 20.80		I	-1.7	S	0.0	E		1	22	8			MUS01
1997 03 20.80		S	-1.0	S	0.0	E		1	&15	6	12	100	RES
1997 03 20.80	!	B	-0.8	S	3.6	B		4	11	D9	17		PIO
1997 03 20.80	!	O	-1.0	S	0.0	E		1		9	17		PIO
1997 03 20.84		B	-0.7	S	6.0	B		20	20	5	3.0		GNI
1997 03 20.85		I	-0.1	S	8	L	8	20		S9	&8		ZYW
1997 03 20.86					3.0	B		8	& 8	S8/	&1	310	SZE03
1997 03 20.87		I	-0.2:	AA	0.0	E		1		7			RYZ
1997 03 21.05		S	-1.0	S	0.0	E		1	&15	6	14	250	RES
1997 03 21.14	\$	B	-0.7	SC	5.0	B		10	15	S3	6.5	0	MAC03
1997 03 21.14	a	B	-1.1	S	5.0	B		7	26	7/	9	344	PLE01
1997 03 21.67		S	-0.6	AA	5	R	4	10	18	8	4	350	GUR
1997 03 21.75		B	0.7	AA	5.0	B		10	10	6/	4	85	DER
1997 03 21.77		M	-0.4	S	5.0	B		20	16	s4/			KOS01
1997 03 21.79		S	-1.0	S	0.0	E		1	&15	6	10	100	RES
1997 03 21.80		B	-0.9	AA	6.0	B		20	15	7	4	345	SIE
1997 03 21.81	w	O	-0.9	S	0.0	E		1	25	S7/	6	315	KWI
1997 03 21.82		B	-0.3:	S	6.0	B		20	&25	7	12.5		SAD
1997 03 21.82		O	0.0:	S	0.0	E		1	&30	8	&6		SAD
1997 03 21.82	w	M	-0.7	S	8	R	7	35	22	S7	3	345	KWI
1997 03 21.83		I	-0.1	S	8	L	8	20		S9	&8		ZYW
1997 03 21.83		S	-0.3	S	3.5	B		7	&12	D6	&1.6	345	GRZ02
1997 03 21.84		B	-0.4:	S	7.0	B		25	&10	S9	&3	315	SOC
1997 03 21.85		M	-0.8	AA	0.7	E		1	6	8/	>4.5	331	ABB
1997 03 21.92		B	-0.3	AA	0.0	E		1		7	4	330	SID
1997 03 21.93		B	-0.2	AA	3.0	B		8		7	4	330	GAR03
1997 03 22.10		B	-0.9	AA	6.0	B		20	15	7	6	345	SIE
1997 03 22.12		I	-1.9	S	0.0	E		1	22	8	8.9		MUS01
1997 03 22.13	!	M	-0.6	Y	0.0	E		1	10	8	6	35	BAR05
1997 03 22.19		B	-2.0:	S	0.0	E		1	&30	7/			WLO
1997 03 22.75		B	1.0:	AA	9	L	10	70	& 6				SZA07
1997 03 22.75	&	S	0.5:	S	5	R	6	20	40	D7	&3.5	280	REM
1997 03 22.77		B	-0.8	AA	0.0	E		1		7	2	348	GAS01
1997 03 22.77		I	1.0:	AA	0.0	E		1	& 7	d			SZA07
1997 03 22.77		M	-0.5	S	5.0	B		20	16	s4/			KOS01
1997 03 22.78	!	B	-0.1:	OH	0.0	E		1					GRO03
1997 03 22.79		I	0.5:	S	0.0	E		1	&12	6/	&5		SAD
1997 03 22.79		S	-0.5	S	3.5	B		7	&11	D6	&1.3	345	GRZ02
1997 03 22.79		S	-1.1	S	0.0	E		1	&15	6	14	100	RES
1997 03 22.85		B	-0.9	AA	6.0	B		20	15	7	4	345	SIE
1997 03 23.10		O	-1.2	S	0.0	E		1	&70		10		SZU01
1997 03 23.12	a	B	-1.3	S	5.0	B		7	28	7/	11	345	PLE01
1997 03 23.13	&	B	0.2:	S	5.0	B		7	& 8	D6	1.8		CZE01
1997 03 23.14		B	-2.5:	S	0.0	E		1	&32	7			WLO
1997 03 23.17		B	1.6:	S	6.0	B		20		7/			KAM05
1997 03 23.59		S	-0.5	AA	5	R	4	10	17	8		355	GUR
1997 03 23.70		A	-1.7	S	0.0	E		1	50	6	5	0	JON05
1997 03 23.72		B	0.5	AA	9	L	10	70	& 7	D5		280	SZA07

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 23.77		B	0.2:	S	5.0	B		7	& 6	D5/	1.8		CZE01
1997 03 23.77		S	-0.5	Y	0.0	E		1	18	S7	6	320	SAN07
1997 03 23.77		S	-1.0	Y	0.0	E		1	20	S7/	7	315	SAN07
1997 03 23.78		B	0.4	AA	5.0	B		10	10	5/	4.5	70	DER
1997 03 23.78		O	-1.3	S	0.0	E		1	72	7/	&8.5		SZU01
1997 03 23.78	a	O	-0.9	S	0.0	E		1	30	S6/	7	325	KWI
1997 03 23.79		M	0.5	Y	0.0	E		1	7	6	4	335	KES01
1997 03 23.79		M	-0.4	Y	7	R	10	30	20	S7	10	30	DOB
1997 03 23.79		O	0.0:	S	0.0	E		1	&10	7/	&7		SAD
1997 03 23.79		O	-0.6:	S	0.0	E		1		D8/	&3.5		MAR13
1997 03 23.79		S	-0.2	S	3.5	B		7	&11	D5	&1.3	345	GRZ02
1997 03 23.79		S	-0.9	S	3.0	B		8		D6/			KON07
1997 03 23.79	& B	-0.7	AA		5.0	B		10	10	S8	3.5	345	MAR12
1997 03 23.79	a M	-0.7	S		8	R	7	35	26	S6	4	325	KWI
1997 03 23.79	s B	-0.1:	Y		0.0	E		1	& 5	S8			SIW01
1997 03 23.80		B	-0.2:	S	6.0	B		20	&12	7/	10		SAD
1997 03 23.80	! B	-0.2:	OH		0.0	E		1	&18			340	GRO03
1997 03 23.81		B	-0.4:	Y	5.0	B		7	15	8	2.1	335	FIL04
1997 03 23.83		B	-0.6:	S	7.0	B		25	&15	S9	&4	315	SOC
1997 03 23.85		I	-0.2	S	8	L	8	20		S9	&5		ZYW
1997 03 24.08		A	-1.7	S	0.0	E		1	50	6	5	90	JON05
1997 03 24.13		B	-0.4:	S	6.0	B		20	&22	7	&9.5		SAD
1997 03 24.13		M	0.4	S	10.4	L	10	70	&27	S9	&5.3		WAL03
1997 03 24.13		O	-0.1:	S	0.0	E		1	&15	8	&5		SAD
1997 03 24.13		O	-0.9	S	0.0	E		1	25	S6/	6	325	KWI
1997 03 24.13	Ga	-0.4:	YF		0.0	E		1	&10	8	&4	337	SCI
1997 03 24.14		I	-0.2	S	0.0	E		1		S9	&5		ZYW
1997 03 24.14		I	-2.0	S	0.0	E		1	22	8	9.7		MUS01
1997 03 24.14		M	-0.8	S	8	R	7	35	23	S6	3	325	KWI
1997 03 24.15	w	B	-0.2:	Y	0.0	E		1	& 7	S8			SIW01
1997 03 24.18		I	-0.2	S	8	L	8	20		S9	18		ZYW
1997 03 24.57		S	-0.7	AA	5	R	4	10	18	8			GUR
1997 03 24.72	Gw	B	-0.5:	SC	0.0	E		1					FIL05
1997 03 24.74		S	-0.4	AA	3.0	R	5	6	30	6	8		IYA03
1997 03 24.75		S	-0.5	AA	0.0	E		1		s7	4.5		NAU
1997 03 24.76		I	-0.9	Y	0.0	E		1		8			MOS03
1997 03 24.77		O	-0.5	S	0.0	E		1	&18		&5		KOS01
1997 03 24.79		S	-0.3	S	3.5	B		7	&11	D5	&1.4	350	GRZ02
1997 03 24.80		S	-0.7:	S	5.0	B		10	&22	8	1.7	320	OLE
1997 03 24.80	a	B	-1.4	S	5.0	B		7	28	7/	8	348	PLE01
1997 03 25.12		O	-0.7	S	0.0	E		1		D8/	3.0	344	MAR13
1997 03 25.60		S	-0.6:	AA	5	R	4	10	15	8		12	GUR
1997 03 25.73		O	-0.5	S	0.0	E		1	&18				KOS01
1997 03 25.73		S	-0.4	AA	3.0	R	5	6	30	6	8		IYA03
1997 03 25.75		B	-0.7	S	7.0	B		25	&30	S9	&5	290	SOC
1997 03 25.76		B	-0.8	AA	0.0	E		1		7			GAS01
1997 03 25.76		O	-0.5	S	5.0	R	7	20	10	6	3.5	340	ZOL
1997 03 25.77		B	0.0	S	5.0	B		7	8	D5	3.5		CZE01
1997 03 25.77	! B	-1.1	S		3.6	B		4	13	D9	13	351	PIO
1997 03 25.77	! O	-0.9	S		0.0	E		1			10		PIO
1997 03 25.78		B	0.1:	AA	3.5	B		7		D6	4.3		CHV
1997 03 25.78	! B	-0.7	S		6.8	R	12	40	&18	S9	&4		CHR
1997 03 25.78	\$ B	-0.6	SC		5.0	B		10	15	S4	7.0	330	MAC03
1997 03 25.79		B	-0.2:	Y	5.0	B		7	13	8	4.4	345	FIL04
1997 03 25.79		B	-0.8	S	3.0	B		8		D7			KON07
1997 03 25.79	Ga	-0.7	YF		0.0	E		1	&10	8	&5	340	SCI
1997 03 25.79	a B	-1.4	S		5.0	B		7	26	8	16	340	PLE01
1997 03 25.79	w B	0.6	Y		0.0	E		1	& 8	S8	12.7	347	DRA02
1997 03 25.80		M	-0.6	S	5.0	B		20	18	s5	11	322	KOS01
1997 03 25.80	a O	-1.1	S		0.0	E		1	30	S6/	15	352	KWI
1997 03 25.81	a M	-0.8	S		8	R	7	35	27	S6	3	337	KWI
1997 03 25.82		B	-0.2	Y	0.0	E		1	&18		&5		KID01
1997 03 25.83		I	-0.2	S	0.0	E		1		S9	8.5		ZYW
1997 03 25.83		O	-0.9	S	0.0	E		1	&20	5/	2.7	325	GNI
1997 03 25.83		S	-0.2	S	3.5	B		7	&10	D5	&1.3	350	GRZ02

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 26.57		S	-0.9	AA	5	R	4	10	18	8			GUR
1997 03 26.73		B	-0.6	HD	5.0	B		7	20	S8	10	0	MOR04
1997 03 26.74		S	-0.4	AA	0.0	E		1		s6	6		NAU
1997 03 26.75		B	-0.5	AA	9	L	10	70	& 7	D3/		280	SZA07
1997 03 26.75		I	-1.2	S	5	R	6	20	125	S5	30	90	SZA05
1997 03 26.75		M	-1.0	Y	0.0	E		1	30	6	5		BRL
1997 03 26.75		O	-1.3	S	0.0	E		1	130	D5/	35	260	SZA05
1997 03 26.76		B	0.1:	S	5.0	B		7	10	D5	2.3		CZE01
1997 03 26.76		B	-0.3	AA	3.5	B		7		D6	4.7		CHV
1997 03 26.76	&	B	-0.5	AA	5.0	B		10	10	S8	4.0	350	MAR12
1997 03 26.77		O	-0.5	S	5.0	R	7	20	10	6	4	340	ZOL
1997 03 26.77		O	-0.5:	S	0.0	E		1	&18	S6	15.1	295	TRY
1997 03 26.78		B	-0.4	Y	0.0	E		1	17	8	4.7	340	FIL04
1997 03 26.78		B	-0.5	AA	9	L	10	120	& 8	D3/		280	SZA07
1997 03 26.78		I	-0.6	S	0.0	E		1	10	S7	10.5	315	SMY
1997 03 26.78		M	0.2	Y	0.0	E		1	20	6	2.5	350	BAR05
1997 03 26.78		O	-0.8	AA	0.0	E		1		D8/	&3.6	345	MAR13
1997 03 26.78		O	-0.9	S	0.0	E		1	&20	5/			GNI
1997 03 26.78		S	-1.0:	Y	0.0	E		1	25	S8	10	0	SAN07
1997 03 26.79		B	-2.6:	S	0.0	E		1	&30	6/			WLO
1997 03 26.79		O	-1.2	S	0.0	E		1	&40	5	7.0		SK004
1997 03 26.79		S	-0.2	S	3.5	B		7	&11	D5	&1.3	345	GRZ02
1997 03 26.79		S	-1.1	Y	0.0	E		1			5		RAV01
1997 03 26.79	Ga		-0.5	YF	0.0	E		1	&20	8	13	10	SCI
1997 03 26.79	a	B	-0.2:	Y	0.0	E		1	&13	S8			SIW01
1997 03 26.79	a	I	0.5	Y	0.0	E		1	&13	S8	11.3		SIW01
1997 03 26.79	a	O	-1.2	S	0.0	E		1	30	S6	14	348	KWI
1997 03 26.80		B	0.2	S	5	R	6	20	24.3	D7/	5	325	JAR01
1997 03 26.80		B	-0.9	S	7.0	B		25	&35	D9	&9	300	SOC
1997 03 26.80		O	-1.4	S	0.0	E		1	75	8	13		SZU01
1997 03 26.80	!	B	-0.7	S	6.8	R	12	40	&18	S9	&4		CHR
1997 03 26.80	!	O	-1.3	S	0.0	E		1	26	s5	0.4		MAR22
1997 03 26.80	a	M	-0.9	S	3.5	B		7	27	S5/	4	348	KWI
1997 03 26.81		B	0.4	S	0.0	E		1	25	D8/	10	325	JAR01
1997 03 26.81		I	-0.3	S	0.0	E		1		S9	9.4		ZYW
1997 03 26.81	!	M	-0.7	S	3.5	B		7	&25	D8	7	330	PAR03
1997 03 26.81	a	B	-1.5	S	5.0	B		7	28	7/	15	346	PLE01
1997 03 26.84		S	-1.2	S	5	R	4	20	&40	5	8.1		SK004
1997 03 26.84	!	B	-1.3	S	3.6	B		4	13	D9	10	346	PIO
1997 03 26.84	!	O	-1.4	S	0.0	E		1		9	10	346	PIO
1997 03 26.85	w	B	0.3	Y	0.0	E		1	&23	S7/	11.4	349	DRA02
1997 03 26.86		B	-1.0	S	3.0	B		8	25	D6			KON07
1997 03 26.92		B	-0.3	AA	0.0	E		1		7	20	345	SID
1997 03 27.06		B	-0.4	HD	5.0	B		7	18	S8	8	1	MOR04
1997 03 27.71		B	-1.9	S	5.0	B		15	50	6	6	0	JON05
1997 03 27.73		B	-0.6	HD	5.0	B		7	30	S8	15	3	MOR04
1997 03 27.74		O	-1.0	S	0.0	E		1	&15				KOS01
1997 03 27.74		S	-0.5	AA	3.0	R	5	6	30	6	8		IVA03
1997 03 27.77		B	0.0	S	5.0	B		7	10	D5	2.3		CZE01
1997 03 27.77		O	-0.5	S	5.0	R	7	20	10	6	5	340	ZOL
1997 03 27.77	&	B	-0.5	AA	5.0	B		10	10	S8	8.0	355	MAR12
1997 03 27.78	&	I	-0.2:	S	0.0	E		1		S9			KOL03
1997 03 27.79		B	-0.4	Y	0.0	E		1	&20	7	&9.5		KID01
1997 03 27.79		B	-2.6:	S	0.0	E		1	&35	6/			WLO
1997 03 27.79		M	-1.1	S	5.0	B		20	18	s5	&7		KOS01
1997 03 27.79		S	-0.7	S	3.5	B		7	&13	D5	&1.3	350	GRZ02
1997 03 27.79		S	-0.8	S	5.0	B		10	&23	8	3.3	325	OLE
1997 03 27.79	!	S	-0.8	AA	0.0	E		1	12	8	10	5	HAV
1997 03 27.79	&	S	0.0	Y	3.0	B		8	&64	D7	11.5	355	DYG
1997 03 27.79	Ga		-0.9	YF	0.0	E		1	&20	8	15	10	SCI
1997 03 27.79	a	O	-1.3	S	0.0	E		1	25	S6/	15	5	KWI
1997 03 27.80		B	0.2	S	0.0	E		1	27	D8	10	330	JAR01
1997 03 27.80		B	-1.1	S	7.0	B		25	&40	D9	16	300	SOC
1997 03 27.80		I	-0.3	S	0.0	E		1		S9	8.5		ZYW
1997 03 27.80		O	-0.5:	S	0.0	E		1	&15	S8	10		SAD

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 27.80	!	S	-1.0	S	0.0	E		1	&25	D8	20	8	PAR03
1997 03 27.80	a	B	-1.6	S	5.0	B		7	30	8	15	359	PLE01
1997 03 27.80	a	M	-1.0	S	8	R	7	35	23	S6	3	349	KWI
1997 03 27.81		B	0.2	S	0.0	E		1	&23	S7	6.2	342	DRA02
1997 03 27.81		B	-0.5	AA	3.5	B		7		D6/	6.6		CHV
1997 03 27.81		O	-0.9	AA	4.0	B		8	18	D9	10.1	350	MAR13
1997 03 27.81		O	-1.1	S	0.0	E		1	&34	6	7.2		SK004
1997 03 27.81		O	-1.4	S	0.0	E		1	130	D6	40	270	SZA05
1997 03 27.81	a	B	-0.2:	Y	0.0	E		1	&14	S8	10.5		SIW01
1997 03 27.82		B	-0.1:	S	6.0	B		20	&18	D8/	12		SAD
1997 03 27.82	w	B	-0.4	Y	0.0	E		1	&47	S6/	9.6	333	DRA02
1997 03 27.85		O	-1.2	S	0.0	E		1	30	D6/			KON07
1997 03 27.85		S	-1.0	S	5	R	4	20	&36	6	8.0		SK004
1997 03 27.86		B	-1.2	S	6.0	B		20	18	5/	7.0		GNI
1997 03 27.89		I	-0.3	S	8	L	8	20		S9	12		ZYW
1997 03 27.90		I	-2.2	S	0.0	E		1	23	9	18.5		MUS01
1997 03 27.93		I	-0.6	S	0.0	E		1	10	S7	10.5	315	SMY
1997 03 28.06		S	-0.3	AA	11	L	7	32	30	6	4.5		IYA03
1997 03 28.60		S	-0.8	AA	5	R	4	10	16	8	2	14	GUR
1997 03 28.74		B	-2.1	S	5.0	B		15	70	6	10	0	JON05
1997 03 28.75		B	1.0:	AA	9	L	10	70	& 8	D5		285	SZA07
1997 03 28.75	!	O	-1.4	S	0.0	E		1		9	18	36	PIO
1997 03 28.76		B	0.5:	AA	9	L	10	70	& 7	D	2	285	SZA07
1997 03 28.76	!	B	-1.4	S	3.6	B		4	18	D9	18	36	PIO
1997 03 28.77		M	-1.0	S	5.0	B		20	21	5	&8		KOS01
1997 03 28.77	Ga		-0.8	YF	0.0	E		1	&20	8	10	10	SCI
1997 03 28.78		B	0.4	AA	5.0	B		10	15	7/	9	80	DER
1997 03 28.78		B	-1.2	S	7.0	B		25	&40	D9	13	290	SOC
1997 03 28.79		S	-0.5	AA	3.0	R	5	6	30	6	9		IYA03
1997 03 28.80		O	-0.5:	Y	0.0	E		1	&18	7	15		BIN
1997 03 28.80	w	B	-0.4:	Y	0.0	E		1	&14	S8	17.5		SIW01
1997 03 28.80	w	I	-0.1:	Y	0.0	E		1	&14	S8	17.5		SIW01
1997 03 28.81	!	B	-0.7	S	6.8	R	12	40	&18	S9	&7		CHR
1997 03 28.81	w	O	-1.4	S	0.0	E		1	25	S6/	16	6	KWI
1997 03 28.82	a	B	-1.7	S	5.0	B		7	30	8	17	0	PLE01
1997 03 28.82	w	M	-1.1	S	8	R	7	35	20	S6	3.5	349	KWI
1997 03 28.83		B	0.2	S	5	R	6	20	28	D7/	10	330	JAR01
1997 03 28.83		B	-0.4:	S	6.0	B		20	&24	D8	15		SAD
1997 03 28.83		O	-0.6:	S	0.0	E		1	&20	S8	10		SAD
1997 03 28.83		O	-1.0	AA	4.0	B		8		D9	&7.5	352	MAR13
1997 03 28.83		S	-0.5	S	3.5	B		7	&13	D5	&1.3	350	GRZ02
1997 03 28.84		I	-0.5	S	8	L	8	20		S9	13.5		ZYW
1997 03 28.84		S	-0.8	S	7.0	B		25	&24	7	3.6	351	OLE
1997 03 28.85	&	B	0.1	S	5.0	B		7	10	D6	4.6		CZE01
1997 03 28.89		I	-0.5	S	5	R	8	20		S9	15.4		ZYW
1997 03 28.90	!	M	-1.0	S	3.5	B		7	&25	D8	15	10	PAR03
1997 03 28.92	&	B	0.0:	S	0.0	E		1	&17		3.4		MAJ
1997 03 28.93	w	B	-0.3	S	0.0	E		1	&23	S6/	5.6	5	DRA02
1997 03 29.14	!	M	-1.1	Y	0.0	E		1	15	8			BAR05
1997 03 29.70		O	-1.6:	S	0.0	E		1	125	D5	40	270	SZA05
1997 03 29.75		B	-0.7	HD	5.0	B		7	30	S8	15	10	MOR04
1997 03 29.77		B	-0.4	Y	0.0	E		1	27	8	7.3	352	FIL04
1997 03 29.77		B	-1.2	Y	5.0	B		7	&18	S7	&4	4	BAN
1997 03 29.78		B	-0.9:	S	7.0	B		25	&25	D9	&4	295	SOC
1997 03 29.78		I	-0.2:	AA	0.0	E		1		7			RYZ
1997 03 29.78		S	-0.8	S	7.0	B		25	&24	7	3.3	5	OLE
1997 03 29.78	Ga		-0.7	YF	0.0	E		1	&15	8	&5	360	SCI
1997 03 29.79		B	-3.0:	S	0.0	E		1	&35	6/	&8		WLO
1997 03 29.79		O	-0.5:	Y	0.0	E		1	&20	7	15		BIN
1997 03 29.79		S	-1.0:	Y	0.0	E		1	40	S8	18	10	SAN07
1997 03 29.79	!	S	-0.8	AA	0.0	E		1	12	8/	15	327	HAV
1997 03 29.79	&	S	0.0:	S	5	R	6	20	60	D5	&6	300	REM
1997 03 29.80		S	-1.0	S	0.0	E		1	&20	6	15	140	RES
1997 03 29.81		B	-0.5	Y	0.0	E		1	&20	7	&9.7		KID01
1997 03 29.81	w	O	-1.4	S	0.0	E		1	25	S7	16	10	KWI

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 29.82		B	-0.5	AA	9	L	10	70	& 7	5	2	285	SZA07
1997 03 29.82		M	-1.1	S	5.0	B		20	20	5/			KOS01
1997 03 29.82	a	B	-1.7	S	5.0	B		7	30	8	18	10	PLE01
1997 03 29.82	w	M	-1.2	S	8	R	7	35	19	S6/	3	341	KWI
1997 03 29.83		I	-0.5	S	0.0	E		1		S9	10		ZYW
1997 03 29.83		S	-0.5	S	3.5	B		7	&13	D5	&1.4	350	GRZ02
1997 03 29.84		B	0.3	S	5	R	9	20	&17	S8	&1.5	315	SZE03
1997 03 29.85		B	-1.0	AA	0.0	E		1		7	12	350	GAR03
1997 03 29.85	&	S	-0.1	Y	3.0	B		8	&65	D7/	13.1	15	DYG
1997 03 29.87		S	-0.5	SC	6.3	B		9		8	15		DIN01
1997 03 29.91		B	-1.1	AA	0.0	E		1		7	8	10	GAS01
1997 03 29.91		S	-1.0	AA	0.0	E		1		7			KRU01
1997 03 30.08		B	-1.0	AA	0.0	E		1		7	20	350	SID
1997 03 30.11	&	B	0.3:	S	5.0	B		7	12	D5/	2.3		CZE01
1997 03 30.19	&	M	-1.2	S	5.0	B		20	&20	s5	10		KOS01
1997 03 30.74		O	-1.0	S	0.0	E		1	&20				KOS01
1997 03 30.76		O	-0.7	S	0.0	E		1	&30	6	2.8		SK004
1997 03 30.77		B	-0.5	AA	3.5	B		7		D7	5.9		CHV
1997 03 30.77		B	-2.5	S	3.5	B		7	&28	S8	4		PER05
1997 03 30.77		M	-0.1	Y	0.0	E		1	15	7	8	335	BAR05
1997 03 30.78		B	0.4	AA	5.0	B		10	10	7/	11	85	DER
1997 03 30.78		B	-0.5	Y	0.0	E		1	25	8	9.9	10	FIL04
1997 03 30.78		M	-1.2	Y	0.0	E		1			23	30	DOB
1997 03 30.79		B	-3.0:	S	0.0	E		1	&40	7	&9		WLO
1997 03 30.79		O	-1.4	S	0.0	E		1	19	D9	15	351	PIO
1997 03 30.79		S	-0.5:	Y	0.0	E		1	40	S8	25	10	SAN07
1997 03 30.79		S	-0.8	S	3.5	B		7	&15	D5	&1.4	350	GRZ02
1997 03 30.79	!	S	-0.8	AA	0.0	E		1	12	8/	17	14	HAV
1997 03 30.79	&	S	-0.1	Y	3.0	B		8	&66	D7/	17.4	20	DYG
1997 03 30.79	Ga		-0.8	YF	0.0	E		1	&22	8	10	360	SCI
1997 03 30.80		B	-1.2	S	3.6	B		4	12	D9	15	351	PIO
1997 03 30.80		S	-1.0	S	0.0	E		1	&20	6	14	100	RES
1997 03 30.80	!	B	-0.7	S	6.8	R	12	40	&20	S9	&7		CHR
1997 03 30.81		B	-0.2	S	0.0	E		1	&30	D7	12		CNO
1997 03 30.81		B	-0.3	S	0.0	E		1	&26		6.7		MAJ
1997 03 30.81		O	-0.5	S	5.0	R	7	20	10	7	6	340	ZOL
1997 03 30.81		O	-1.5	S	0.0	E		1	&85	s	15		SZU01
1997 03 30.81		S	-0.7	S	5	R	4	20	&32	6	7.2		SK004
1997 03 30.81	!	S	-1.2	S	0.0	E		1	&25	D8	20	10	PAR03
1997 03 30.81	a	B	-1.8	S	5.0	B		7	28	8	21	11	PLE01
1997 03 30.81	w	B	-0.3:	Y	0.0	E		1	&14	S8			SIW01
1997 03 30.81	w	I	-0.1:	Y	0.0	E		1	&14	S8			SIW01
1997 03 30.81	w	O	-1.4	S	0.0	E		1	25	S6/	22	11	KWI
1997 03 30.82		B	-0.5	Y	0.0	E		1	&17	7	11.7		KID01
1997 03 30.82		B	-0.5:	S	5.0	B		7	&12	S8	7.0	330	SPE01
1997 03 30.82		B	-0.9	S	0.0	E		1	&25	7/	11.3		OLE
1997 03 30.82		O	-0.7:	Y	0.0	E		1	&18	7		0	BIN
1997 03 30.82		O	-1.2:	AA	0.0	E		1		D9	9.5	354	MAR13
1997 03 30.82	w	M	-1.2	S	8	R	7	35	20	S6	4	340	KWI
1997 03 30.83		I	-0.5	S	8	L	8	20	22	S9	17.5		ZYW
1997 03 30.83		M	-1.2	S	5.0	B		20	22	s5/	12	337	KOS01
1997 03 30.84		I	-1.0	AA	9	L	10	120	&12	D	2	285	SZA07
1997 03 30.84	&	B	-0.7	S	0.0	E		1	&28	S9	10.3	18	CH001
1997 03 30.85		B	0.0:	S	6.0	B		20	&20	7/	12		SAD
1997 03 30.85	!	B	-0.5	OH	0.0	E		1	18	6/	13	7	GR003
1997 03 30.85	&	B	0.2	S	5.0	B		7	10	D5/	4.6		CZE01
1997 03 30.85	&	B	-0.5:	S	7.0	B		25	&30	D9	&9	340	SOC
1997 03 30.85	&	O	-0.5:	S	0.0	E		1	&19	S6	17.2	300	TRY
1997 03 30.86		I	0.2	S	0.0	E		1	&25	S9	&6.8		WAL03
1997 03 30.86		O	-0.2:	S	0.0	E		1	&12	8/	&5.5		SAD
1997 03 30.87		B	-1.4	S	3.0	B		8	30	D6/			KON07
1997 03 30.87	P				5.0	A	4		41	6	16	18	BAR06
1997 03 30.88		B	-1.6	S	6.0	B		20	10	S9	&1		MIG01
1997 03 30.88	\$	B	-0.6	Y	5.0	B		10	10	S5	8.2	325	MAC03
1997 03 30.92		B	-1.5	AA	0.0	E		1		7	15	10	GAS01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 03 30.93		I	-0.8	S	0.0	E		1	10	D7/	15	315	SMY
1997 03 30.96		I	-0.5	S	5	R	8	20		S9	18.1		ZYW
1997 03 30.96	w	B	-0.6	S	0.0	E		1	&23	S6/	4.8	332	DRA02
1997 03 31.63		S	-0.7	AA	5	R	4	10	20	8		10	GUR
1997 03 31.73		B	-0.8	HD	5.0	B		7	30	S8	18	11	MOR04
1997 03 31.75		I	-0.7	Y	0.0	E		1		S8			MOS03
1997 03 31.76		I	-1.5:	S	5	R	6	20	130	S5/	30	90	SZA05
1997 03 31.76		O	-1.6:	S	0.0	E		1	125	D5	25	280	SZA05
1997 03 31.77		B	-0.5	AA	3.5	B		7		D7	6.7		CHV
1997 03 31.77		M	-0.2	AA	5.0	B		10	23	D7	23	10	SAJ
1997 03 31.79		I	-0.2:	AA	0.0	E		1		7			RYZ
1997 03 31.79		S	-0.5	Y	0.0	E		1	30	S8	20	10	SAN07
1997 03 31.79		S	-0.8	S	3.5	B		7	&15	D5	&1.4	355	GRZ02
1997 03 31.80		B	-0.3	S	0.0	E		1	20	8			GAN
1997 03 31.80		B	-1.0	AA	9	L	10	70	&15	D3/	7.5	285	SZA07
1997 03 31.80		S	-1.0	S	0.0	E		1	&20	6	14	140	RES
1997 03 31.80		S	-1.1	AA	0.0	E		1	30		16		NAU
1997 03 31.81		B	0.5	AA	5.0	B		10	10	7/	8.5	70	DER
1997 03 31.81		B	-0.5:	S	5.0	B		7	&9	S8	6.7	17	SPE01
1997 03 31.81		M	-0.3	Y	5.0	B		10	20	S6	30	350	BUS04
1997 03 31.84		B	-1.6	S	6.0	B		20	10	S9	&7		MIG01
1997 03 31.84	!	B	-0.7	S	6.0	B		20		S9	&8.5		CHR
1997 03 31.85		B	0.3	S	5	R	9	20	&17	S8	&2.3	325	SZE03
1997 04 01.01	w	B	0.1	S	0.0	E		1	47	S6/	13.6	21	DRA02
1997 04 01.06		B	-0.9	HD	5.0	B		7	20	S8	12	10	MOR04
1997 04 01.75		B	-1.0	HD	5.0	B		7	30	S8	20	12	MOR04
1997 04 01.75		B	-2.1	S	5.0	B		15	50	6	6.5	0	JON05
1997 04 01.75		I	-0.5	Y	0.0	E		1		S9			MOS03
1997 04 01.75		I	-1.6	S	6.0	B		20	130	S5/	13	270	SZA05
1997 04 01.75	&	B	-1.6	S	5.0	B		10	18	7			SWI
1997 04 01.76		B	-0.6	AA	0.0	E		1	20	7	10	344	STE12
1997 04 01.77		B	-0.4	AA	3.5	B		7		D6/	5.6		CHV
1997 04 01.77		I	-1.5	S	5	R	6	20	130	S5/	35	90	SZA05
1997 04 01.77		O	-0.4	S	0.0	E		1	&25	6	3.2		SK004
1997 04 01.77		O	-1.5	S	0.0	E		1	125	D5	38	270	SZA05
1997 04 01.77		S	-0.8	AA	3.0	R	5	6	45	6			IVA03
1997 04 01.78	s	B	-0.1:	Y	0.0	E		1	&13	S8	14.2		SIW01
1997 04 01.78	s	I	0.1	Y	0.0	E		1	&13	S8	14.2		SIW01
1997 04 01.79		B	-0.5	AA	9	L	10	70	&13	D3/	7	285	SZA07
1997 04 01.79		B	-1.0	S	7.0	B		25	&40	D9	18	315	SOC
1997 04 01.79		S	-0.7	S	3.5	B		7	&15	D5	&1.3	350	GRZ02
1997 04 01.79	&	B	-0.7	S	0.0	E		1	&28	S9	10.3	20	CH001
1997 04 01.79	&	S	0.0:	S	5	R	6	20	50	D5	&6	300	REM
1997 04 01.79	Ga	-0.8	YF	0.0	E			1	&24	8	15	18	SCI
1997 04 01.79	a	O	-1.3	S	0.0	E		1	25	S7	20	15	KWI
1997 04 01.80		B	0.4	AA	5.0	B		10	10	6	8	65	DER
1997 04 01.80		B	-0.3	S	5	R	11	20	&20	5/	13.5	23	SZC01
1997 04 01.80		B	-0.4	S	0.0	E		1	20	8	5.5	15	GAN
1997 04 01.80	G	B	-0.8	AA	0.0	E		1		D7	14	9	VELO3
1997 04 01.80		B	-0.8	S	5.0	B		7	&10	S7/	8.6	18	SPE01
1997 04 01.80		M	-1.3	S	7.0	R	8	60	18	6	12	336	KOS01
1997 04 01.80		O	-1.5	S	0.0	E		1	65	s7	6		SZU01
1997 04 01.80		S	-0.8	S	0.0	E		1	&15	6	10	100	RES
1997 04 01.80	a	B	-1.8	S	5.0	B		7	26	8	20	12	PLE01
1997 04 01.80	a	M	-1.1	S	8	R	7	35	22	S6	3.5	344	KWI
1997 04 01.81		B	0.3	S	5.0	B		7	10	D6	5.3		CZE01
1997 04 01.81		B	-0.1:	S	6.0	B		20	&20	7	&4.5		SAD
1997 04 01.81		O	0.3:	S	0.0	E		1	&12	7/	&2.5		SAD
1997 04 01.81		O	-0.5	Y	0.0	E		1	&18	9			BIN
1997 04 01.81		S	-0.4	S	5	R	4	20	&28	6	4.8		SK004
1997 04 01.81	!	M	-1.2	S	5.0	B		7	&25	D8	15	340	PAR03
1997 04 01.81	&	S	-0.1	Y	3.0	B		8	&66	D7/	18	21	DYG
1997 04 01.82		M	-1.4	S	3.0	B		8	25	D7			KON07
1997 04 01.83		B	-0.7:	Y	0.0	E		1	&17				KID01
1997 04 01.83		B	-3.0:	S	0.0	E		1	&40	7	10		WLO

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 01.83		0	-1.2	S	0.0	E		1	15	D9	15	348	PIO
1997 04 01.83		0	-1.2: AA		5.0	B			10	D9	9.5	357	MAR13
1997 04 01.85		B	0.8: S		6.0	B		20		7			KAM05
1997 04 01.85		I	-0.5	S	8	L	8	20		S9	18.5		ZYW
1997 04 01.85	\$	B	-0.5	Y	0.0	E		1	15	S7	12	320	MAC03
1997 04 01.87	&	B	0.5: S		5	R	6	20	30	D7	10		JAR01
1997 04 01.87	P				5.0	A	4		45	6	17	12	BAR06
1997 04 01.89		0	-0.7	S	0.0	E		1	&18	6	10	335	GNI
1997 04 01.93		I	-1.0	S	0.0	E		1	15	D7/	15	315	SMY
1997 04 01.96		B	-0.9	AA	0.0	E		1		7	15	355	GAR03
1997 04 02.06		B	-0.8	HD	5.0	B		7	20	S8			MOR04
1997 04 02.06		S	-0.5	AA	11	L	7	32	20	6/			IYA03
1997 04 02.08	Gs	B	-0.3: SC		0.0	E		1					FIL05
1997 04 02.75		B	-1.0	HD	5.0	B		7	30	S8	20	12	MOR04
1997 04 02.75		M	0.2	Y	0.0	E		1	12	7	3	340	BAR05
1997 04 02.75	!	M	-1.0	S	0.0	E		1	&20	D8	10	350	PAR03
1997 04 02.76		I	-1.5	S	5	R	6	20	114	S4/	22	90	SZA05
1997 04 02.76		0	-0.3	S	0.0	E		1	&24	6	3.0		SK004
1997 04 02.77		S	-0.8	AA	3.0	R	5	6	40	6			IYA03
1997 04 02.77		S	-1.0	AA	0.0	E		1	20		10	18	NAU
1997 04 02.78		0	-1.5	S	0.0	E		1	120	D5	32	250	SZA05
1997 04 02.78	Ga		-0.8	YF	0.0	E		1	&20	8	&8	360	SCI
1997 04 02.79		B	0.0	AA	9	L	10	70	&13	D3/	6	285	SZA07
1997 04 02.79		B	0.5	S	15	L	5	50	15	D7	&6		OSS
1997 04 02.79		M	-1.3	S	7.0	R	8	60	18	6	12		KOS01
1997 04 02.79		0	-1.3	S	0.0	E		1	20	D7			KON07
1997 04 02.79		S	-0.1	Y	5.0	B		10	30	S8	8	10	SAN07
1997 04 02.79		S	-0.4	S	3.5	B		7	&16	D5	&1.3	355	GRZ02
1997 04 02.79	a	B	-1.7	S	5.0	B		7	26	8	23	346	PLE01
1997 04 02.80		B	-0.2	S	5	R	11	20	&20	5	15.2	20	SZC01
1997 04 02.80		B	-0.3	AA	5.0	B		7		D6/	6.6		CHV
1997 04 02.80		B	-0.7	S	7.0	B		25	&30	D9	15	315	SOC
1997 04 02.80		B	-2.1	S	5.0	B		15	50	6	6	350	JON05
1997 04 02.80		B	-3.0: S		0.0	E		1	&40	7			WLO
1997 04 02.80		0	-1.1: AA		0.0	E		1		D9	&6.5	359	MAR13
1997 04 02.80		S	-0.3	S	5	R	4	20	&27	6	4.0		SK004
1997 04 02.80		S	-0.4	S	0.0	E		1	&15	6	8	100	RES
1997 04 02.80	a	M	-0.4	Y	0.0	E		1	15	9	>3		KYS
1997 04 02.80	a	0	-1.3	S	0.0	E		1	23	S7	18	345	KWI
1997 04 02.81		B	0.4	S	5	R	6	20	30	D7	14	5	JAR01
1997 04 02.81		B	0.5: S		5.0	B		7	10	D5	1.8		CZE01
1997 04 02.81		B	-0.6	Y	0.0	E		1	&16	8	12.9		KID01
1997 04 02.81		0	-1.3: S		0.0	E		1	&60				SZU01
1997 04 02.81	\$	B	-0.7	Y	0.0	E		1	22	S6	23	0	MAC03
1997 04 02.81	a	M	-1.0	S	8	R	7	35	19	S6	3.5	345	KWI
1997 04 02.81	s	B	0.3	Y	0.0	E		1	&13	S8	14.5		SIW01
1997 04 02.81	s	I	0.7	Y	0.0	E		1	&13	S8	14.5		SIW01
1997 04 02.81	w	I	-0.5	S	0.0	E		1		S9			KOL03
1997 04 02.82		B	-0.8	S	5.0	B		7	&9	S7/	8.0	16	SPE01
1997 04 02.82	!	B	-0.1	OH	0.0	E		1	17	6/	10.5	340	GR003
1997 04 02.83		0	-1.2: S		0.0	E		1	15	D9	15	349	PIO
1997 04 02.84	!	B	-0.7	S	6.0	B		20	&20	S9	&8.5		CHR
1997 04 02.85	&	S	0.0	Y	3.0	B		8	&66	S7/	18.1	22	DYG
1997 04 02.86		I	0.6: S		0.0	E		1	&10	8/	&9		SAD
1997 04 02.88		B	0.3	S	5	R	9	20	&20	S8	&2.2	325	SZE03
1997 04 02.89		I	-0.4	S	8	L	8	60		S8/	12.6		ZYW
1997 04 02.93		I	-0.8	S	0.0	E		1	10	D7/	15	315	SMY
1997 04 02.97		B	-0.9	AA	0.0	E		1		7	20	5	SID
1997 04 03.06		B	-0.7	HD	5.0	B		7	20	S8			MOR04
1997 04 03.07	Gs	B	-0.3: SC		0.0	E		1					FIL05
1997 04 03.75		B	-1.1	HD	5.0	B		7	30	S8	20	13	MOR04
1997 04 03.76	G	B	-0.8	AA	0.0	E		1		D7	14	16	VEL03
1997 04 03.76	&	B	-1.0	S	5.0	B		10	18	7			SWI
1997 04 03.77					5.0	B		7	14	D8	13	16	VEL03
1997 04 03.77		I	-1.5	S	5	R	6	20	120	S5	25	340	SZA05

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 03.77		O	-0.2	S	0.0	E		1	&23	7	2.0		SK004
1997 04 03.78		I	0.0	AA	0.0	E		1	&10	D	6	285	SZA07
1997 04 03.78		O	-1.4	S	0.0	E		1	115	D5	29	280	SZA05
1997 04 03.78	Ga		-0.7:	YF	0.0	E		1	&15	8	&3	5	SCI
1997 04 03.79		B	0.4	S	5.0	B		7	10	D5/	2.3		CZE01
1997 04 03.79		B	-0.5	AA	9	L	10	70	&12	D3/		285	SZA07
1997 04 03.79		I	0.3	S	0.0	E		1	&24	S9	&4.8		WAL03
1997 04 03.79		O	-0.2:	S	0.0	E		1	&15	6			TRY
1997 04 03.79		O	-1.0	AA	4.0	B		8	16	D9	3.0	360	MAR13
1997 04 03.79		S	-0.3	Y	5.0	B		10	25	S7	10	15	SAN07
1997 04 03.79		S	-0.5	S	3.5	B		7	&15	D5	&1.3	355	GRZ02
1997 04 03.79	!	O	-1.2	S	0.0	E		1	&18	D9	11	353	PIO
1997 04 03.79	!	S	-0.7	AA	0.0	E		1	12	8/	9	22	HAV
1997 04 03.80		B	-0.4	AA	5.0	B		7		D7	5.9		CHV
1997 04 03.80		M	-1.4	S	7.0	R	8	60	19	6	12		KOS01
1997 04 03.80	!	B	-1.0	S	3.6	B		4	18	D9	14	353	PIO
1997 04 03.80	a	B	-1.6	S	5.0	B		7	24	7/	22	348	PLE01
1997 04 03.80	a	O	-1.2	S	0.0	E		1	22	S7	20	344	KWI
1997 04 03.81		B	0.9:	S	5	R	6	20	33	D7	10	5	JAR01
1997 04 03.81		B	-0.5	S	7.0	B		25	&30	D9	12	345	SOC
1997 04 03.81	a	M	-0.9	S	8	R	7	35	19	S6	3.5	344	KWI
1997 04 03.81	s	B	0.0	Y	0.0	E		1	&12	S8			SIW01
1997 04 03.81	s	I	0.4	Y	0.0	E		1	&12	S8			SIW01
1997 04 03.82		M	-1.2	S	3.0	B		8	20	D7/			KON07
1997 04 03.82		S	-0.2	S	5	R	4	20	&24	7	2.9		SK004
1997 04 03.84		M	-1.1	Y	3.0	B		8	30	D8	30	10	DOB
1997 04 03.85		M	-1.0	AA	0.7	E		1	15	8	20	347	ABB
1997 04 03.92		I	-0.2	S	0.0	E		1		S8/	8		ZYW
1997 04 03.95	P				5.0	A	4		45	6	17	16	BAR06
1997 04 04.06		B	-0.8	HD	5.0	B		7	20	S8			MOR04
1997 04 04.75		A	-1.8	S	0.0	E		1	50	6	5.5	350	JON05
1997 04 04.77		M	-0.5	Y	5.0	B		16	6	D6	12	5	SZA06
1997 04 04.77		S	-0.9	AA	3.0	R	5	6	42	6			IVA03
1997 04 04.78		B	-0.5	AA	9	L	10	70	&12		6		SZA07
1997 04 04.78		M	-1.4	S	3.0	B		8	30	D6/			KON07
1997 04 04.78	Ga		-0.7	YF	0.0	E		1	&18	8	&8	29	SCI
1997 04 04.79		I	-2.6	S	5.2	B		10	21	8	24		MUS01
1997 04 04.79		O	-0.9	AA	4.0	B		8	16	D9	6.0	360	MAR13
1997 04 04.79		O	-1.0	Y	0.0	E		1					BAN
1997 04 04.79		S	-0.5	S	3.5	B		7	&16	D5	&2.1	0	GRZ02
1997 04 04.80		B	-0.5	Y	0.0	E		1	&18	7			KID01
1997 04 04.80		B	-2.5:	S	0.0	E		1	&38	6/			WLO
1997 04 04.81		M	-1.5	S	7.0	R	8	60	19	S6	13	335	KOS01
1997 04 04.81		S	-0.4	S	0.0	E		1	&20	6/	16	140	RES
1997 04 04.81	&	S	0.0	Y	3.0	B		8	&66	S7/	18.5	23	DYG
1997 04 04.82		B	-0.6	AA	5.0	B		7		D7	5.9		CHV
1997 04 04.82	a	M	-0.4	Y	0.0	E		1	15	9	18		KYS
1997 04 04.83		B	-0.5:	S	7.0	B		25	&40	D9	&8	335	SOC
1997 04 04.84	!	B	-0.6	S	6.0	B		20	&20	S9	&8.5		CHR
1997 04 04.85	&	O	-1.5	S	0.0	E		1	115	D4/	25	260	SZA05
1997 04 04.87	!	M	-1.0	S	0.0	E		1	&20	D8	15	350	PAR03
1997 04 04.88	&	S	0.4:	S	3.0	B		8	30	D5	&6	300	REM
1997 04 04.89		I	-0.1	S	0.0	E		1		S8/	6		ZYW
1997 04 04.97					5.0	B		7	14	D8	14	16	VEL03
1997 04 05.08		B	-0.7	AA	0.0	E		1		7	15	355	GAR03
1997 04 05.75		B	-1.0	HD	5.0	B		7	30	S8	19	18	MOR04
1997 04 05.75		I	-0.2:	Y	0.0	E		1		S9			MOS03
1997 04 05.78	G	B	-0.9	AA	0.0	E		1		D7	12	22	VEL03
1997 04 05.78		S	-0.8	AA	0.0	E		1	20				NAU
1997 04 05.79					5.0	B		7	14	D8	13	22	VEL03
1997 04 05.79		S	-0.5	S	3.5	B		7	&13	D5	&1.3	0	GRZ02
1997 04 05.80		O	-0.8	AA	4.0	B		8		D9	2.6	3	MAR13
1997 04 05.80	!	S	-0.6	AA	0.0	E		1	12	8/	12	28	HAV
1997 04 05.81		B	-0.6	AA	5.0	B		7		7	5.7		CHV
1997 04 05.81	!	M	-0.8	S	3.5	B		7	&20	D8	12	350	PAR03

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 05.85		0	-0.5	S	0.0	E		1	95	D4/	45	280	SZA05
1997 04 05.90		S	-0.5	AA	0.0	E		1		7			KRU01
1997 04 06.06		B	-0.7	HD	5.0	B		7	18	S8			MOR04
1997 04 06.20	a	S	-0.7	AA	0.0	E		1	20	9	11	345	SPR
1997 04 06.77		M	-0.5	Y	5.0	B		16	6	S6	15	0	SZA06
1997 04 06.79		B	-0.4	S	7.0	B		25	&30	D9	&9	330	SOC
1997 04 06.79		S	-0.1	Y	5.0	B		10	30	S8	20	350	SAN07
1997 04 06.79		S	-0.7	S	3.5	B		7	&12	D5	&1.2	355	GRZ02
1997 04 06.79	Ga		-0.6	YF	0.0	E		1	&21	8	20	350	SCI
1997 04 06.80		B	-0.3	S	0.0	E		1	15	8	5.0	345	GAN
1997 04 06.80		B	-2.5:	S	0.0	E		1	&35	6/	10		WLO
1997 04 06.80	&	S	0.0	Y	3.0	B		8	&65	S7/	17.8	24	DYG
1997 04 06.80	a	I	0.2:	S	0.0	E		1	&17	S9	15		KOL03
1997 04 06.81		B	-0.4	S	5.0	B		10	&20	8	2.8	3	OLE
1997 04 06.81		0	-0.6	Y	0.0	E		1	&15	9	15		BIN
1997 04 06.81		S	-0.4	S	0.0	E		1	&20	6/	18	140	RES
1997 04 06.81	\$	B	-0.4	Y	0.0	E		1	20	S7	18.5	330	MAC03
1997 04 06.81	a	B	-1.5	S	5.0	B		7	22	8	26	350	PLE01
1997 04 06.81	w	0	-1.2	S	0.0	E		1	20	S6/	20	351	KWI
1997 04 06.82	&	S	0.4:	S	0.0	E		1	30	D5	&6	310	REM
1997 04 06.82	w	M	-1.0	S	8	R	7	35	19	S6	3.5	351	KWI
1997 04 06.83		B	0.3	S	5.0	B		7	12	D6	5.3		CZE01
1997 04 06.83		I	-0.1	S	3.5	B		7		S8/	6		ZYW
1997 04 06.84	w	B	0.1	S	0.0	E		1	&23	S7/	11.3	348	DRA02
1997 04 06.88		I	-0.1	S	8	L	8	20		S8/	19.7		ZYW
1997 04 06.90		0	-0.3	S	0.0	E		1	&18	6/	6.0		GNI
1997 04 06.93		I	-0.1	S	3.5	B		7		S8/	16		ZYW
1997 04 06.93		I	-0.8	S	5.0	R	10	20	10	S7	15	315	SMY
1997 04 07.17		B	-0.6	AA	0.0	E		1		7	15	20	SID
1997 04 07.57		S	-0.7	AA	5	R	4	10	18	8	12	24	GUR
1997 04 07.76		M	0.3	Y	3.0	B		3	10	6	5	320	BAR05
1997 04 07.77		0	0.3	S	0.0	E		1	&17	7	1.8		SK004
1997 04 07.77		0	-0.1:	S	0.0	E		1	&15	S7	12.8	330	TRY
1997 04 07.78		A	-1.8	S	0.0	E		1	50	6	6	280	JON05
1997 04 07.78		B	0.1	AA	5.0	B		10	12	6	8	50	DER
1997 04 07.79		B	0.2	S	0.0	E		1	&23	S7/	11.6	347	DRA02
1997 04 07.79		0	-0.5	S	5.0	R	7	20	10	6	6	0	ZOL
1997 04 07.79		S	-0.8	S	3.5	B		7	&13	D6	&1.3	0	GRZ02
1997 04 07.80		B	-0.2	S	0.0	E		1	15	8			GAN
1997 04 07.80		B	-0.5	S	7.0	B		25	&40	D9	21	335	SOC
1997 04 07.80		B	-2.3:	S	0.0	E		1	&30	7	10		WLO
1997 04 07.80		M	-1.4	S	3.0	B		8	30	D6			KON07
1997 04 07.80		0	-0.5	Y	0.0	E		1	&15	9		15	BIN
1997 04 07.80	!	S	-0.5	AA	0.0	E		1	12	8/	17	32	HAV
1997 04 07.80	Ga		-0.6	YF	0.0	E		1	&22	8	17	358	SCI
1997 04 07.80	a	M	-0.7	Y	0.0	E		1	15	9	>3		KYS
1997 04 07.80	w	B	-0.3:	Y	0.0	E		1	&14	S8	16.1		SIW01
1997 04 07.80	w	I	0.5	Y	0.0	E		1	&14	S8	16.1		SIW01
1997 04 07.81		B	-0.3	Y	0.0	E		1	20	8	9.4	355	FILO4
1997 04 07.81		M	0.3	S	10.4	L	10	70	&22	S8/	&4.5		WAL03
1997 04 07.81		0	0.2:	S	0.0	E		1	&15	S8	&6.5		SAD
1997 04 07.81		0	-0.6:	AA	4.0	B		8	16	D9	3.0	5	MAR13
1997 04 07.81		S	0.3	S	5	R	4	20	&20	7	3.4		SK004
1997 04 07.81		S	-0.1	Y	5.0	B		7	5	d6	3.5	320	PAT02
1997 04 07.81	\$	B	-0.4	Y	5.0	B		10	25	S6	15	320	MAC03
1997 04 07.81	a	M	-0.3	Y	5.0	B		7	15	9	>5		KYS
1997 04 07.81	w	0	-1.1	S	0.0	E		1	20	S6	20	352	KWI
1997 04 07.82		B	-0.5	S	5.0	B		7	&9	S7/	9.5	342	SPE01
1997 04 07.82		0	-1.1	S	0.0	E		1	57	7	&7		SZU01
1997 04 07.82	&	S	0.0	Y	3.0	B		8	&64	S7/	17.8	25	DYG
1997 04 07.82	a	B	-1.5	S	5.0	B		7	28	7/	23	31	PLE01
1997 04 07.82	w	M	-0.9	S	8	R	7	35	19	S5/	4.5	352	KWI
1997 04 07.85	&	0	-0.4	S	0.0	E		1	&18	6/	5.5		GNI
1997 04 07.86		M	-0.6	Y	5.0	B		10	25	S6	10	10	DOB
1997 04 07.86		M	-1.1	Y	4.0	B		8	8.5	6	16	27	PINO1

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 07.87		B	0.7:	S	6.0	B		20		7/			KAM05
1997 04 07.88		B	-1.5	S	6.0	B		20	10	S9	&7		MIG01
1997 04 07.88	!	B	-0.3	OH	0.0	E		1	14	6	13	345	GR003
1997 04 07.88	&	B	0.5:	S	5.0	B		7	12	D6	2.3		CZE01
1997 04 07.93		I	-0.1	S	0.0	E		1		S8	22		ZYW
1997 04 08.57		S	-0.6	AA	5	R	4	10	18	8	14	26	GUR
1997 04 08.77		A	-1.8	S	0.0	E		1	50	6	7	300	JON05
1997 04 08.77		O	0.4	S	0.0	E		1	&17	6	2.9		SK004
1997 04 08.77		S	-0.2	Y	5.0	B		10	30	S8	17	350	SAN07
1997 04 08.79		B	0.1	AA	5.0	B		10	15	6	7	50	DER
1997 04 08.79		B	0.2:	SC	5.0	B		7		7	5.8		CHV
1997 04 08.79		O	-0.5:	Y	0.0	E		1	&15	9			BIN
1997 04 08.79		S	0.0	Y	5.0	B		10	25	S6/	22	350	SAN07
1997 04 08.79		S	-0.5	S	3.5	B		7	&12	D6	&1.2	355	GRZ02
1997 04 08.79	Ga		-0.5	YF	0.0	E		1	&20	8	10	6	SCI
1997 04 08.80		B	-0.2	S	5	R	11	20		4/	18.6	343	SZC01
1997 04 08.80		B	-0.3	S	7.0	B		25	&40	D9	16	335	SOC
1997 04 08.80	G	B	-0.9	AA	0.0	E		1		D7	15	25	VEL03
1997 04 08.80		M	-1.5	S	3.0	B		8	35	D6			KON07
1997 04 08.80	w	O	-1.1	S	0.0	E		1	20	S6	20	353	KWI
1997 04 08.81		B	-2.0:	S	0.0	E		1	&30	7	&9.5		WLO
1997 04 08.81		I	-2.3	S	5.2	B		10	21	8	24		MUS01
1997 04 08.81		S	0.4	S	5	R	4	20	&19	6	3.0		SK004
1997 04 08.81	w	B	-0.3:	Y	0.0	E		1	&14	S8	16.1		SIW01
1997 04 08.81	w	I	0.4	Y	0.0	E		1	&14	S8	16.1		SIW01
1997 04 08.81	w	M	-0.8	S	8	R	7	35	18	S5/	4	353	KWI
1997 04 08.82		B	0.0	AA	5.0	B		12	&12				SZA07
1997 04 08.82		I	0.0	AA	0.0	E		1	&12			290	SZA07
1997 04 08.82		O	-0.4:	AA	4.0	B		8		D9	3.0		MAR13
1997 04 08.82	a	B	-1.4	S	5.0	B		7	26	7/	25	351	PLE01
1997 04 08.83		B	0.1	Y	0.0	E		1	20	8	7.4	355	FIL04
1997 04 08.83		B	0.6:	S	5.0	B		7	12	D6	2.3		CZE01
1997 04 08.83		O	-1.0	S	0.0	E		1	55		6.5		SZU01
1997 04 08.83	a	O	-0.7:	Y	0.0	E		1	15	9	>5		KYS
1997 04 08.84		O	0.1:	S	0.0	E		1	&20	S8/	10		SAD
1997 04 08.84		O	-1.1	S	0.0	E		1	95	D4/	30	295	SZA05
1997 04 08.85		B	-0.5	AA	9	L	10	70	&13				SZA07
1997 04 08.86		M	-0.9	Y	5.0	B		10	25	S6	19	0	DOB
1997 04 08.92		I	0.0	S	0.0	E		1		S8	19.4		ZYW
1997 04 08.93		I	-0.8	S	5.0	R	10	20	10	S7	10.5	315	SMY
1997 04 08.96		B	-0.4	AA	3.0	B		8		7	15	5	GAR03
1997 04 08.96		I	0.0	S	3.5	B		7		S8	8.7		ZYW
1997 04 09.73		B	0.1:	SC	5.0	B		7		7	5.8		CHV
1997 04 09.77		M	0.5	AA	5.0	B		10	11	D8	30	20	SAJ
1997 04 09.78	G	B	-0.6	AA	0.0	E		1		D7			VEL03
1997 04 09.79					5.0	B		7	15	D7	12	23	VEL03
1997 04 09.79		S	-0.5	S	3.5	B		7	&12	D6	&1.2	0	GRZ02
1997 04 09.79	Gs	B	-0.3	SC	0.0	E		1	10	6	5		FIL05
1997 04 09.80	!	S	-0.5	AA	0.0	E		1	12	8/	13	36	HAV
1997 04 09.93		I	-0.6	S	5.0	R	10	20	&7	S7	10.5	315	SMY
1997 04 10.09		S	-0.5	AA	3.0	R	5	6	40	6			IYA03
1997 04 10.57		S	-0.5	AA	5	R	4	10	15	8	10	29	GUR
1997 04 10.75		B	-1.2	HD	5.0	B		7	15	S8	15	26	MOR04
1997 04 10.76		B	-0.1:	S	7.0	B		25	&15	S9	&3	330	SOC
1997 04 10.79		S	-0.7	S	3.5	B		7	&12	D6	&1.3	5	GRZ02
1997 04 10.80		S	-0.1	S	0.0	E		1	&15	6/	6	100	RES
1997 04 11.78		O	-0.5	S	0.0	E		1	68	S5/	15	310	SZA05
1997 04 11.78	Ga		-0.5	YF	0.0	E		1	&20	8	&5	25	SCI
1997 04 11.79		S	-0.3	S	3.5	B		7	&13	D6	&1.3	10	GRZ02
1997 04 11.79	a	O	-0.4	Y	0.0	E		1	15	9	12		KYS
1997 04 11.80	a	B	-1.2	S	5.0	B		7	25	7/	19	353	PLE01
1997 04 11.81		M	-1.4	S	3.0	B		8	30	D7			KON07
1997 04 11.87		B	-1.4	S	6.0	B		20	10	S9	&5		MIG01
1997 04 12.75		B	-1.3	HD	5.0	B		7	15	S8			MOR04
1997 04 12.76		A	-1.4	S	0.0	E		1	50	6	5	305	JON05

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 12.78		0	1.0	S	0.0	E		1	&13	6	1.2		SK004
1997 04 12.79		M	0.5	S	10.4	L	10	70	&19	S8/	&4.1		WAL03
1997 04 12.79		M	-1.4	S	3.0	B		8	&28	D7/			KON07
1997 04 12.79		S	-0.5	S	3.5	B		7	&13	D6	&1.3	10	GRZ02
1997 04 12.80		B	0.4:	S	7.0	B		25	&20	S9	&6	340	SOC
1997 04 12.80		B	-0.2	S	0.0	E		1	12	7/	3.5	5	GAN
1997 04 12.81		B	0.6	S	5.0	B		10	& 8	D7	&5		OSS
1997 04 12.81		B	-2.0:	S	0.0	E		1	&25	7/			WLO
1997 04 12.81		0	-0.3:	Y	0.0	E		1	&10	8		40	BIN
1997 04 12.81		S	1.1	S	5	R	4	20	&14	6	1.7		SK004
1997 04 12.82		0	-0.8	S	0.0	E		1	50	s6/	4		SZU01
1997 04 12.82	Ga		-0.5	YF	0.0	E		1	&15	7	&9	30	SCI
1997 04 12.83		S	0.1	S	0.0	E		1	&20	6/	10	100	RES
1997 04 12.83	!	B	-0.3	OH	0.0	E		1	12	6	8	355	GR003
1997 04 12.83	&	B	1.0:	S	5.0	B		7	10	D6	1.8		CZE01
1997 04 12.84		B	0.0:	SC	5.0	B		7		6	6.8		CHV
1997 04 12.84		B	-0.1	S	5	R	11	20	&15	5			SZC01
1997 04 12.84		B	-1.0:	S	5	R	6	20					PER05
1997 04 12.84	w	B	0.6	S	0.0	E		1	&23	S7/	5.8	6	DRA02
1997 04 12.88	!	S	-0.3	SC	6.3	B		9	4	8	8		DIN01
1997 04 12.96		I	0.0	S	0.0	E		1		S8	5		ZYW
1997 04 13.77		A	-1.4	S	0.0	E		1	50	6	5	280	JON05
1997 04 13.77		0	0.3	S	5.0	R	7	20	8	6	4	30	ZOL
1997 04 13.77		0	1.2	S	0.0	E		1	&10	5	1.4		SK004
1997 04 13.77		0	-0.3:	S	0.0	E		1	&10	S6	&7.2	340	TRY
1997 04 13.79		S	-0.4	AA	3.0	R	5	6	20	6			IVA03
1997 04 13.79		S	-0.5	S	3.5	B		7	&13	D6	&1.2	10	GRZ02
1997 04 13.79	!	M	-0.5	S	5.0	B		7	&20	D8	12	350	PAR03
1997 04 13.80		B	0.0	S	5.0	B		10	&20	7	2.8	6	OLE
1997 04 13.80		B	0.3:	SC	5.0	B		7		7	6.5		CHV
1997 04 13.80		B	-0.1	AA	4.0	B		8		D8/	2.8		MAR13
1997 04 13.80		B	-0.1	S	5	R	11	20	&15	5			SZC01
1997 04 13.80		S	1.3	S	5	R	4	20	&12	5	1.8		SK004
1997 04 13.80	Ga		-0.3	YF	0.0	E		1	&15	7	&7	35	SCI
1997 04 13.80	s	B	0.1	Y	0.0	E		1	&12	S8			SIW01
1997 04 13.80	s	I	0.7	Y	0.0	E		1	&12	S8			SIW01
1997 04 13.81		B	0.9	S	5	R	6	20	19	d7/	7.5	25	JAR01
1997 04 13.81	G	B	-0.4	AA	0.0	E		1					VEL03
1997 04 13.81		B	-1.8:	S	0.0	E		1	&25	7/			WLO
1997 04 13.81	a	0	-0.7	Y	0.0	E		1	15	9	>6		KYS
1997 04 13.82					5.0	B		7	15	D8	8	32	VEL03
1997 04 13.82		B	0.1	S	7.0	B		25	&30	D9	10	345	SOC
1997 04 13.82		B	-0.2:	S	5.0	B		7	& 8	S7/	5.7	0	SPE01
1997 04 13.82		0	0.2:	S	0.0	E		1	&15	7	&5		SAD
1997 04 13.84		0	-0.7	S	0.0	E		1	&47		&3.5		SZU01
1997 04 13.84	!	B	-0.4	OH	0.0	E		1	14	6	10	0	GR003
1997 04 13.84	&	0	0.0	S	0.0	E		1	&18	7			GNI
1997 04 13.85		B	-0.5	S	5	R	6	20	&18	S6	1.5		PER05
1997 04 13.86	&	B	1.0	S	5.0	B		7	10	D5/	1.4		CZE01
1997 04 13.87		I	0.0	S	0.0	E		1		S8	11		ZYW
1997 04 14.01		S	-0.5	AA	3.0	R	5	6	20	7/			IVA03
1997 04 14.79		0	-0.3	S	0.0	E		1	59	S5/	13	315	SZA05
1997 04 14.80		B	-0.2	S	0.0	E		1	15	7/			GAN
1997 04 14.81		B	0.6	S	5.0	B		10	10	D7	10		OSS
1997 04 14.82		S	0.2	S	0.0	E		1	&12	6/	12	100	RES
1997 04 14.82	Gs	B	-0.2	SC	0.0	E		1		6			FIL05
1997 04 14.89		M	0.0	AA	0.7	E		1	10	8	10	4	ABB
1997 04 15.74		B	-1.4	HD	5.0	B		7	15	S8			MOR04
1997 04 15.77		M	0.5	Y	3.0	B		3	9	8	6	320	BAR05
1997 04 15.79		B	1.1	S	5.0	B		7	10	D6	3.0		CZE01
1997 04 15.79	&	B	-0.4	S	5.0	B		10	12	7			SWI
1997 04 15.80		A	-1.4	S	0.0	E		1	50	6	5	270	JON05
1997 04 15.80		0	-0.4:	S	0.0	E		1	&11	S6	13.5	300	TRY
1997 04 15.80		S	1.4	S	5	R	4	20	&11	5	1.7		SK004
1997 04 15.80	a	0	-0.6	S	0.0	E		1	15	S7	15	357	KWI

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 15.80	w	B	-0.1	Y	0.0	E		1	&12	S8			SIW01
1997 04 15.80	w	I	0.5	Y	0.0	E		1	&12	S8			SIW01
1997 04 15.81	a	B	-0.5	S	5.0	B		7	24	7/	21	355	PLE01
1997 04 15.81	a	M	-0.3	S	8	R	7	35	13	S6/	2.5	357	KWI
1997 04 15.82		O	-0.5	S	0.0	E		1	45	6	3		SZU01
1997 04 15.82		S	0.3	S	0.0	E		1	&15	6/	7	100	RES
1997 04 15.83		I	0.1	S	4.8	R		37		S7	13.8		ZYW
1997 04 15.83	Ga		-0.2	YF	0.0	E		1	&12	7	&8	38	SCI
1997 04 15.84		B	0.0	S	7.0	B		25	&25	D9	&7	355	SOC
1997 04 15.84		B	0.5:	S	6.0	B		20	&15	6/	&7		SAD
1997 04 15.84		I	0.4:	S	0.0	E		1	&12	6/	&6.5		SAD
1997 04 15.85	\$	B	-0.6	Y	5.0	B		10	15	S4	12.3	340	MAC03
1997 04 15.86	!	M	-0.7	Y	5.0	B		10	8	S6	6	30	DOB
1997 04 16.02		B	0.3	AA	0.0	E		1		7	3	25	SID
1997 04 16.03		B	0.3	AA	6.0	B		20		7	3	5	GAR03
1997 04 16.75		M	-1.4	HD	5.0	B		7	15	S8	5	33	MOR08
1997 04 16.77		S	-0.4	AA	3.0	R	5	6	20	7/			IVA03
1997 04 16.81		B	0.2:	S	7.0	B		25	&20	D9	&4	350	SOC
1997 04 16.83	&	B	1.2:	S	5.0	B		7	10	D5	1.5		CZE01
1997 04 17.75		M	-1.3	HD	5.0	B		7	15	S8	7	40	MOR08
1997 04 17.81		B	-0.2	S	0.0	E		1	13	7			GAN
1997 04 17.82		S	0.4	S	0.0	E		1	&15	6	4	100	RES
1997 04 17.92		B	-1.0	S	6.0	B		20	10	S9	&4		MIG01
1997 04 18.74	Gs	B	-0.1	SC	0.0	E		1		5			FIL05
1997 04 18.77		S	0.0	Y	5.0	B		10	20	S6	10	0	SAN07
1997 04 18.81	a	B	-0.2	AT	0.0	E		1			2		MILO2
1997 04 18.81	a	M	0.1	Y	5.0	B		7	12	8	8		KYS
1997 04 18.81	a	M	-0.4	Y	0.0	E		1	12	8	8		KYS
1997 04 19.75		M	-1.3	HD	5.0	B		7	15	S8			MOR08
1997 04 19.77		B	0.0	S	3.6	B		4	12	D8/	5	48	PIO
1997 04 19.77		O	-0.2	S	0.0	E		1		8/			PIO
1997 04 19.78		B	1.1	S	5.0	B		7	10	D6	1.5		CZE01
1997 04 19.79		B	0.4:	AA	4.0	B		8		D8	2.9	28	MAR13
1997 04 19.79	G	B	-0.3	AA	0.0	E		1		D6	7	2	VELO3
1997 04 19.79	a	I	1.1:	S	0.0	E		1					KOLO3
1997 04 19.80					5.0	B		7	18	D7	7	2	VELO3
1997 04 19.80		B	0.3	S	5.0	B		10	&12	7	2.0	33	OLE
1997 04 19.80		B	2.0:	AA	9	L	10	70	& 7			310	SZA07
1997 04 19.80		B	-0.1:	S	5.0	B		15	&40	5	3	270	JON05
1997 04 19.81		B	0.1:	S	5	R	11	20		5			SZC01
1997 04 19.81		B	-1.0:	S	4.0	B		12	&25	7			WLO
1997 04 19.81		O	0.2:	Y	0.0	E		1	& 6	7			BIN
1997 04 19.81		S	1.7	S	5	R	4	20	&10	5	1.6		SK004
1997 04 19.81	!	M	-0.2	S	0.0	E		1	&15	D8	10		PAR03
1997 04 19.81	a	B	-0.1	AT	0.0	E		1			1		MILO2
1997 04 19.82		B	0.6:	S	7.0	B		25	&15	S9	&3	0	SOC
1997 04 19.82		I	-0.4	S	6.0	B		20	55	D5/	4.5	320	SZA05
1997 04 19.82		O	-0.2	S	0.0	E		1	35	S5/	15	350	SZA05
1997 04 19.82		S	0.3	S	0.0	E		1	&15	6/	5	100	RES
1997 04 19.82	&	M	-1.3	S	7.0	R	8	60	14	S6/	7	18	KOS01
1997 04 19.82	Ga		-0.2:	YF	0.0	E		1	&12	7	&7	35	SCI
1997 04 19.84	&	B	1.3	S	5	R	6	20	17	d7/	5		JAR01
1997 04 19.85		I	-1.8	S	0.0	E		1	&20	8	12		MUS01
1997 04 19.88		B	-0.1	AA	0.0	E		7	10	7	8	25	STE12
1997 04 19.90		B	1.5:	AA	9	L	10	70	& 7			310	SZA07
1997 04 20.78		B	-0.3	S	5.0	B		15	30	5/	2	270	JON05
1997 04 20.79		B	1.1	S	5.0	B		7	8	D6	1.5		CZE01
1997 04 20.79	G	B	-0.2:	AA	0.0	E		1		D6	5	2	VELO3
1997 04 20.80		B	0.4	S	5.0	B		10	&11	7	1.7	41	OLE
1997 04 20.80		B	0.6	AA	4.0	B		8		D8	2.7	33	MAR13
1997 04 20.81		B	0.4	AA	5.0	B		10	15	7	9	30	DER
1997 04 20.81		B	0.6:	S	7.0	B		25	&15	S9	&3	0	SOC
1997 04 20.81		O	-0.3	S	0.0	E		1	40	D	&2.5		SZU01
1997 04 20.81		S	1.9	S	5	R	4	20	& 9	5	1.5		SK004
1997 04 20.81	&	B	0.3:	S	5	R	11	20		4/			SZC01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 20.81	Ga		0.0	YF	0.0	E		1	&10	7	&7	35	SCI
1997 04 20.82		B	0.0	S	5.0	B		10	10	7			GAN
1997 04 20.82		B	-0.8:	S	4.0	B		12	&23	7/			WLO
1997 04 20.83		S	0.3	S	0.0	E		1	&15	6/	4	100	RES
1997 04 20.83	\$	B	0.0	Y	5.0	B		10	10	S6	7	0	MAC03
1997 04 20.83	a	0	-0.5	Y	0.0	E		1	15	8	6		KYS
1997 04 20.84		I	-1.8	S	0.0	E		1	&20	7	11.7		MUS01
1997 04 20.84	!	B	-0.1	OH	0.0	E		1	11	6	5	15	GR003
1997 04 20.90		I	1.5:	AA	0.0	E		1	& 7			310	SZA07
1997 04 20.96		B	0.4	AA	3.0	B		8		7	2	10	GAR03
1997 04 21.77		B	-0.3	S	5.0	B		15	20	5/	1.5	270	JON05
1997 04 21.79		B	1.2:	S	5.0	B		7	8	D5	1.7		CZE01
1997 04 21.80		B	0.4	S	5.0	B		10	&10	7/	1.7	40	OLE
1997 04 21.80		B	0.5	S	7.0	B		25	&20	S9	&4	0	SOC
1997 04 21.80		0	-0.3	S	0.0	E		1	&40				SZU01
1997 04 21.81		S	0.3	S	0.0	E		1	&15	6/	5.5	100	RES
1997 04 21.81	&	B	0.4	S	0.0	E		1		4			SZC01
1997 04 21.81	&	M	-1.3	S	5.0	B		20	14	7			KOS01
1997 04 21.81	a	B	-0.2	S	5.0	B		7	20	7/	20	0	PLE01
1997 04 21.81	a	0	0.1	S	0.0	E		1	15	S7	19	1	KWI
1997 04 21.82	Ga		0.0	YF	0.0	E		1	&10	7	&6	34	SCI
1997 04 21.82	a	M	0.5	S	8	R	7	35	13	S6/	2	1	KWI
1997 04 21.82	a	M	-0.3:	Y	5.0	B		7	13	8	3		KYS
1997 04 21.83		0	0.1	S	0.0	E		1	45	D5/	3.5	345	SZA05
1997 04 21.83		0	0.1	S	0.0	E		1	50	D5/	3.5	340	SZA05
1997 04 21.85		B	1.0:	AA	9	L	10	70	& 7	D		310	SZA07
1997 04 21.93		I	0.5	S	8	L	8	20		S7/	5.5		ZYW
1997 04 21.96		B	0.5	AA	3.0	B		8		7		45	GAR03
1997 04 21.97		B	0.8	AA	3.0	B		8	20	6	2	45	SID
1997 04 22.82		S	0.4	S	0.0	E		1	&15	6	5	100	RES
1997 04 22.82	&	M	-1.2	S	5.0	B		20	14	7			KOS01
1997 04 23.75		M	-1.2:	HD	5.0	B		7	12	S8			MOR08
1997 04 23.77		M	0.1	Y	5.0	B		10	15	S5	5	32	DOB
1997 04 23.77		S	0.5:	Y	5.0	B		10	17	S6/	8	10	SAN07
1997 04 23.79		B	0.2	S	5.0	B		15	10	5/	2	270	JON05
1997 04 23.79		B	1.3	S	5.0	B		7	8	D5/	1.4		CZE01
1997 04 23.79		M	-0.4	S	3.0	B		8		D7/			KON07
1997 04 23.79		0	0.5	S	5.0	R	7	20	8	6	2.5	55	ZOL
1997 04 23.79	!	0	-0.1	S	0.0	E		1	&12	d	&5	48	PIO
1997 04 23.79	&	B	1.7	S	5.0	B		10	9	7			SWI
1997 04 23.80		B	1.3:	AA	4.0	B		8		D8	&3.0	38	MAR13
1997 04 23.80		B	-0.1	S	3.6	B		4	12	d8	5	48	PIO
1997 04 23.80		M	1.2	S	10.4	L	10	70	&15	S8/	&3.4		WAL03
1997 04 23.80	a	B	0.8	Y	0.0	E		1	&10	S8			SIW01
1997 04 23.81		B	0.5	S	5.0	B		10	&12	7	1.4	40	OLE
1997 04 23.81		I	-1.4	S	0.0	E		1	19	D8	7.3		MUS01
1997 04 23.81	&	M	-1.2	S	5.0	B		20	15	7			KOS01
1997 04 23.81	Ga		0.0	YF	0.0	E		1	&10	7	&6.5	40	SCI
1997 04 23.81	a	0	0.2	S	0.0	E		1	15	S7	18	4	KWI
1997 04 23.82		B	0.6	S	7.0	B		25	&20	S9	&4	5	SOC
1997 04 23.82		B	1.0	S	0.0	E		1	& 8	7	&4		OSS
1997 04 23.82		B	-0.5:	S	0.0	E		1	&20	8	&6		WLO
1997 04 23.82		S	0.3	S	0.0	E		1	&15	6/	7	100	RES
1997 04 23.82	&	B	0.7	S	0.0	E		1		4			SZC01
1997 04 23.82	a	B	-0.1	S	5.0	B		7	18	7/	22	2	PLE01
1997 04 23.82	a	M	0.5	S	8	R	7	35	14	S6/	2	4	KWI
1997 04 23.83	!	M	-0.1	S	0.0	E		1	&15	D8	5		PAR03
1997 04 23.83	a	M	0.2	Y	5.0	B		7	12	8	4		KYS
1997 04 23.83	a	M	-0.2	Y	0.0	E		1	12	8	3		KYS
1997 04 23.84	!	B	-0.1	OH	0.0	E		1	13	6		20	GR003
1997 04 23.86		B	-0.5	S	5	R	6	20	15	S6	&1.5		PER05
1997 04 23.87		I	0.5	S	8	L	8	20		S7	4.5		ZYW
1997 04 23.88		B	0.0	S	6.0	B		20	8	S9			MIG01
1997 04 23.88		S	0.5	SC	0.7	E		1	15		7		BIN01
1997 04 23.88	!	B	1.2	S	0.0	E		1		S9	&2.5		CHR

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.	
1997 04 23.90		I	0.5	S	8	L	8	20		s7	11		ZYW	
1997 04 23.92		M	1.0	AA	6.0	R	5	1	20	6	3	45	SID	
1997 04 23.94		B	0.7	AA	3.0	B		8		7	2	45	GAR03	
1997 04 24.78					5	R	8	20	12	S6/	5	5	BOR04	
1997 04 24.78		S	0.3:	Y	5.0	B		10	15		14	10	SAN07	
1997 04 24.79	G	B	0.1	AA	0.0	E		1		D7	6	20	VEL03	
1997 04 24.79		B	0.7	S	7.0	B		25	&25	S9	&3	5	SOC	
1997 04 24.80					5.0	B		7	13	D7	6	20	VEL03	
1997 04 24.80		B	1.3	S	5.0	B		7	10	D5/	2.0		CZE01	
1997 04 24.80		I	0.7:	S	0.0	E		1	&15	7	&6		SAD	
1997 04 24.80		M	0.6	Y	3.0	B		3	9	8		315	BAR05	
1997 04 24.80		M	-0.2	S	3.0	B		8	20	D7			KON07	
1997 04 24.80	a	B	-0.3	AT	0.0	E		1			1		MIL02	
1997 04 24.81		M	1.7	S	10.4	L	10	70	&15	S8	&3.3		WAL03	
1997 04 24.81	&	0	-0.3:	S	0.0	E		1	&9	S6	10.5	295	TRY	
1997 04 24.81	Ga		0.2	YF	0.0	E		1	&15	7	30	34	SCI	
1997 04 24.81	a	0	0.3	S	0.0	E		1	18	S6/	21	5	KWI	
1997 04 24.81	w	B	0.1	S	0.0	E		1	&23	S7/		351	DRA02	
1997 04 24.81	w	B	0.6	Y	0.0	E		1	&12	S8	16.7		SIW01	
1997 04 24.81	w	I	0.9	Y	0.0	E		1	&12	S8	16.7		SIW01	
1997 04 24.82		B	0.5	AA	5.0	B		10	15	6/	3	350	DER	
1997 04 24.82		B	-0.3:	S	0.0	E		1	&18	7/	&5		WLO	
1997 04 24.82		0	0.2	S	0.0	E		1	45	D5/	4	360	SZA05	
1997 04 24.82		0	-0.2	S	0.0	E		1	35	5/	&2		SZU01	
1997 04 24.82		S	0.4	S	0.0	E		1	&15	6/	3	100	RES	
1997 04 24.82	a	B	0.0	S	5.0	B		7	16	7/	24	4	PLE01	
1997 04 24.82	a	M	0.6	S	8	R	7	35	16	S6	2.5	5	KWI	
1997 04 24.84	&	B	1.8	S	5	R	6	20	13	d8	5	45	JAR01	
1997 04 24.91		I	0.5	S	0.0	E		1		s7	15		ZYW	
1997 04 24.92		M	1.0	AA	6.0	R	5	1	20	6	3	45	SID	
1997 04 25.4					15	T		26	&20	6	&70	m	75	FAR01
1997 04 25.4		B	1.5	YG	5.0	B		7					FAR01	
1997 04 25.45	w	B	0.1	YG	0.0	E		1	&10	S7	20	10	MIY01	
1997 04 25.75		M	-1.2:	HD	5.0	B		7	15	S8			MOR08	
1997 04 25.75	&	I	0.7:	Y	0.0	E		1		S9			MOS03	
1997 04 25.78		S	-0.3	AA	3.0	R	5	6	20	8			IYA03	
1997 04 25.78	Gs	B	-0.2	SC	0.0	E		1	20	5	6		FILO5	
1997 04 25.79		M	1.0	AA	5.0	B		10	27	D8	16		SAJ	
1997 04 25.81	&	M	-1.0	S	7.0	R	8	60	15	7			KOS01	
1997 04 25.82		S	0.5	S	0.0	E		1	&12	6/	7	100	RES	
1997 04 25.83	!	S	0.0	AA	0.0	E		1	10	8/	3	60	HAV	
1997 04 25.89		S	0.0	YG	5.0	B		7	10	7	1.5		SOU01	
1997 04 25.93		M	1.0	AA	6.0	R	5	1	15	7	3	45	SID	
1997 04 26.80		B	0.9	S	7.0	B		25	&25	S9	&3	5	SOC	
1997 04 26.80	!	0	0.2	S	0.0	E		1		d	6.5	50	PIO	
1997 04 26.81					5	R	8	20	12	S6/	6	0	BOR04	
1997 04 26.81					5	R	8	20	12	S6/	6	0	BOR04	
1997 04 26.81	G	B	0.2	AA	0.0	E		1		D6	21	6	VEL03	
1997 04 26.81		B	0.6	S	5.0	B		10	&15	7/	1.7	45	OLE	
1997 04 26.81		B	1.2	S	0.0	E		1	&7	7	&3		OSS	
1997 04 26.81		B	1.4	AA	4.0	B		8		D8	&1.8	40	MAR13	
1997 04 26.81	!	M	-0.1	S	0.0	E		1	&10	D8	10	40	PAR03	
1997 04 26.81	&	B	1.4	S	5.0	B		7	8	D5/	1.8		CZE01	
1997 04 26.81	&	M	-0.8	S	7.0	R	8	60	15	7			KOS01	
1997 04 26.82					5.0	B		7	13	D7	21	6	VEL03	
1997 04 26.82		B	1.3	S	5.0	B		15	10	4	1.5	270	JON05	
1997 04 26.82		B	-0.2:	S	0.0	E		1	&20	8			WLO	
1997 04 26.82		S	0.4	S	0.0	E		1	&15	6/	6	100	RES	
1997 04 26.82	!	B	0.1	S	3.6	B		4	11	d7	&4.5	50	PIO	
1997 04 26.83		B	1.0	AA	5.0	B		10	12	5	3	20	DER	
1997 04 26.83	&	B	1.5	S	5	R	11	20	&15	3/	14.4	12	SZC01	
1997 04 26.84		B	0.8	S	5.0	B		7	&8	S7/	4.5	0	SPE01	
1997 04 26.84		0	0.1	S	0.0	E		1	55	D5/	8	340	SZA05	
1997 04 26.95		B	0.8	AA	3.0	B		8		7	8	45	GAR03	
1997 04 27.75		M	-1.2:	HD	5.0	B		7	15	S8			MOR08	

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 27.77	\$	B	0.0	S	0.0	E		1	&15	S6	&8.0	5	CH001
1997 04 27.79		M	1.0	AA	5.0	B		10	17	D7			SAJ
1997 04 27.79	Gs	B	0.0	SC	0.0	E		1	20	6	6		FIL05
1997 04 27.80	&	M	-0.8	S	7.0	R	8	60	15	7			KOS01
1997 04 27.81	G	B	0.2	AA	0.0	E		1		D6	17	6	VEL03
1997 04 27.81	a	0	0.5	S	0.0	E		1	15	S7/	14	5	KWI
1997 04 27.82		B	1.4:	AA	4.0	B		8		D8	1.55	40	MAR13
1997 04 27.82		0	0.1	S	0.0	E		1	&18	d6			KON07
1997 04 27.82	G!		0.6:	YF	0.0	E		1	&10	7	&4	34	SCI
1997 04 27.82	a	B	0.5	S	5.0	B		7	18	7/	16	5	PLE01
1997 04 27.82	a	M	0.7	S	8	R	7	35	13	S7	2	5	KWI
1997 04 27.83		0	0.2	S	0.0	E		1	50	D5/	7	345	SZA05
1997 04 27.84	!	S	0.2	SC	6.3	B		9	10	8	13	10	DIN01
1997 04 27.88		I	0.5	S	0.0	E		1		s7	4.2		ZYW
1997 04 27.94		M	1.1	AA	6.0	R	5	1	15	7	5	45	SID
1997 04 28.76		M	-1.1:	HD	5.0	B		7	20	S8			MOR08
1997 04 28.79		I	0.6:	AA	0.0	E		1		6			RYZ
1997 04 28.80		B	1.6:	S	7.0	B		25	&15	s7	&2	10	SOC
1997 04 28.81	s	B	0.9	Y	0.0	E		1	&10	S8			SIW01
1997 04 28.81	s	I	1.1	Y	0.0	E		1	&10	S8			SIW01
1997 04 28.82		B	-0.2:	S	0.0	E		1	&18	8			WLO
1997 04 28.83		M	0.5:	S	3.0	B		8	&14	d6			KON07
1997 04 28.83		0	0.3	S	0.0	E		1	50	D5/	5	350	SZA05
1997 04 28.83		S	1.3:	AA	0.0	E		1	18	s6/	7		NAU
1997 04 28.88		I	0.6	S	0.0	E		1		s7	7		ZYW
1997 04 28.88	!	B	1.4	S	0.0	E		1	&15	S9	&2.3		CHR
1997 04 28.89		S	0.0	YG	5.0	B		7	10	7	1.5		SOU01
1997 04 29.76		M	-1.1:	HD	5.0	B		7	20	S8			MOR08
1997 04 29.80		B	1.6:	S	7.0	B		25	&15	S9	&1.5	15	SOC
1997 04 29.80		S	0.9:	AA	0.0	E		1	10	s8	10		NAU
1997 04 29.81		0	0.9	S	0.0	E		1	50	D6	4	0	SZA05
1997 04 29.81	G!		0.8:	YF	0.0	E		1	&10	7	&3	48	SCI
1997 04 29.83	a	0	0.2:	Y	0.0	E		1	10	7	>3		KYS
1997 04 29.88		I	0.6	S	8	L	8	20		s6/	4.5		ZYW
1997 04 29.90		S	0.0	YG	5.0	B		7	15	6	1.5		SOU01
1997 04 29.91		M	1.2	AA	6.0	R	5	1	15	7	5	45	SID
1997 04 30.80	&	M	-0.4:	S	5.0	B		20	&15	7			KOS01
1997 04 30.82		I	0.9	S	0.0	E		1	&18	6	0.6		MUS01
1997 04 30.89		S	0.8	YG	5.0	B		7	15	6/	1		SOU01
1997 05 01.80		0	1.4	S	6.0	B		20	55	D6/	3	10	SZA05
1997 05 01.80		0	1.6	S	0.0	E		1	45	D6	1	0	SZA05
1997 05 01.81		S	0.9:	S	0.0	E		1	& 8	5/	3	100	RES
1997 05 01.83	!	S	0.3	AA	0.0	E		1	10	8	3	30	HAV
1997 05 01.85		B	0.5	S	6.0	B		20	8	S9			MIG01
1997 05 01.87		S	0.5	YG	5.0	B		7	15	7	1		SOU01
1997 05 01.91		M	1.2	AA	6.0	R	5	1	15	7	3	45	SID
1997 05 02.77		B	0.6	AA	8.0	B		12	15	9	1	65	MEN03
1997 05 02.81	!	M	0.7	Y	5.0	B		10	9	s6	4	35	SAN07
1997 05 02.81	!	M	0.7	Y	30	L	9	80	20	s4	2	70	DOB
1997 05 02.81	a	0	0.6	S	0.0	E		1	14	S7/	19	6	KWI
1997 05 02.82	\$	B	0.7	S	5.0	B		7	12	7	20	7	PLE01
1997 05 02.82	a	M	0.9	S	8	R	7	35	13	S7	2	6	KWI
1997 05 02.83		B	0.0:	S	4.0	B		12	&16	8			WLO
1997 05 03.79	a	B	0.8:	AA	0.0	E		1	27	6			BAR06
1997 05 03.79	a	B	1.0:	AA	5.0	B		20	21	S8	4		BAR06
1997 05 03.80		0	1.9	S	6.0	B		20	43	D6/	1.5	10	SZA05
1997 05 03.80		0	2.1	S	0.0	E		1	35	D6	1	0	SZA05
1997 05 03.80	&	M	0.0:	S	3.0	B		8	&15	7			KOS01
1997 05 03.81		B	1.6:	S	4.0	B		8		D8/			MAR13
1997 05 03.81	G!		1.1:	YF	0.0	E		1	& 7	7	&2	60	SCI
1997 05 03.81	a	B	1.3	Y	0.0	E		1	&10	S8			SIW01
1997 05 03.82	!	M	0.7	Y	5.0	B		10	12	s4	6	45	DOB
1997 05 03.83		0	0.0	S	0.0	E		1	30	5	1.5		SZU01
1997 05 03.87		M	1.3	AA	0.7	E		1	9	7/	5.5	80	ABB
1997 05 03.92		M	1.4	AA	6.0	R	5	1	15	7	1.5	50	SID

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 05 03.93		B	1.3	AA	3.0	B		8		7	1	55	GAR03
1997 05 04.76		M	-0.9:	HD	5.0	B		7	13	S8			MOR08
1997 05 04.80		B	2.4	S	7.0	B		25	&15	d6	&1	50	SOC
1997 05 04.80		O	1.0:	S	5.0	R	7	20	& 8	6	&1.5	65	ZOL
1997 05 04.80		O	2.0	S	6.0	B		20	40	D6/	1	10	SZA05
1997 05 04.80		O	2.3	S	0.0	E		1	35	D6	0.5	0	SZA05
1997 05 04.80	&	M	0.5:	S	5.0	B		20	&15	7			KOS01
1997 05 04.81	G	B	0.5:	AA	0.0	E		1		D7	12	7	VEL03
1997 05 04.81	G	B	0.5:	AA	5.0	B		7	17	D8	12	7	VEL03
1997 05 04.81		B	1.7	S	4.0	B		8		D8/	&0.6	58	MAR13
1997 05 04.81	a	B	0.8	AA	5.0	B		20	15	6	4		BAR06
1997 05 04.82	!	M	0.2	S	0.0	E		1	&10	D8	10	40	PAR03
1997 05 04.83	&	B	3.0	S	5	R	11	20		2/			SZC01
1997 05 04.91		M	1.5	AA	6.0	R	5	1	15	7	1.2	55	SID
1997 05 04.93		B	1.5	AA	3.0	B		8		7	1	55	GAR03
1997 05 05.76		M	-0.8:	HD	5.0	B		7	12	S8			MOR08
1997 05 05.80		B	0.9	AA	8.0	B		12	15	9	1.5	70	MEN03
1997 05 05.80		B	1.9	S	3.0	B		8	8	D7			KON07
1997 05 05.80		I	1.4	S	6.0	B		20	&15	7			ADA02
1997 05 05.80		O	2.3	S	6.0	B		20	40	D6/	0.8	15	SZA05
1997 05 05.80		O	2.4	S	0.0	E		1	30	D6	0.5	0	SZA05
1997 05 05.80	&	M	1.2:	S	7.0	R	8	60	&15	S5			KOS01
1997 05 05.81		B	1.7:	S	4.0	B		8		D8/	&0.6	60	MAR13
1997 05 05.81	!	B	1.1:	YF	5.0	B		10	& 5	7	&1.5	78	SCI
1997 05 05.81	!	M	0.3	Y	5.0	B		10	15	5	3	80	DOB
1997 05 05.81	!	M	1.2	Y	5.0	B		10	10	S7	7	30	SAN07
1997 05 05.81	&	B	1.7	S	5.0	B		10	7	7			SWI
1997 05 05.81	&	B	2.8:	S	5.0	B		7	& 6	D3			CZE01
1997 05 05.81	a	B	1.7	Y	0.0	E		1	& 9	S7			SIW01
1997 05 05.81	a	S	1.0	AA	0.0	E		1	20	5			BAR06
1997 05 05.81	a	S	1.1	AA	4.0	R		6	17	6	3		BAR06
1997 05 05.81	a	S	1.2	AA	5.0	B		20	17	7	3		BAR06
1997 05 05.82	\$	B	1.0	S	5.0	B		7	10	7	8	12	PLE01
1997 05 05.87		N	2.5	AA	0.0	E		1		7			KRU01
1997 05 05.88	!	B	1.8	S	3.0	B		8		S9	&8		CHR
1997 05 05.92		M	2.0:	AA	6.0	R	5	1	15	7	1	55	SID
1997 05 06.77		M	-0.8:	HD	5.0	B		7	13	S8			MOR08
1997 05 06.79		O	2.4	S	0.0	E		1	30	S6/		0	SZA05
1997 05 06.79		O	2.4	S	6.0	B		20	35	S7	0.8	25	SZA05
1997 05 06.80		B	2.5	S	7.0	B		25	&15	d7	&1	55	SOC
1997 05 06.80	&	M	2.0:	S	7.0	R	8	60	&15	S5	&1		KOS01
1997 05 06.81	&	B	3.0:	S	5.0	B		7	& 6	D3	0.5		CZE01
1997 05 06.82		B	1.8	S	4.0	B		8		D8		60	MAR13
1997 05 06.83		B	2.1:	S	6.0	B		20	10	D7			KON07
1997 05 06.83	\$	B	0.5	S	0.0	E		1	&15	S6	&6.0	60	CH001
1997 05 06.85	!	S	0.4	SC	6.3	B		9	10	8	5		DIN01
1997 05 07.77		M	-0.7:	HD	5.0	B		7	12	S8			MOR08
1997 05 07.82	\$	B	1.1	S	5.0	B		7	8	6/	6	45	PLE01
1997 05 07.85		S	1.6:	S	0.0	E		1	& 5	6			RES
1997 05 08.77		M	-0.6:	HD	5.0	B		7	12	S8			MOR08
1997 05 09.27		S	0.6	SC	4.9	B		3			0.25		JON
1997 05 09.80		B	2.5	S	7.0	B		25	&10	d7	&0.5	70	SOC
1997 05 09.81		O	0.1	S	0.0	E		1	&25	d			SZU01
1997 05 09.81	&	B	2.0	S	5.0	B		10	6	7			SWI
1997 05 09.81	a	B	1.2	Y	0.0	E		1	& 8	S7			SIW01
1997 05 09.81	a	B	1.7	Y	5.0	B		10	& 9	S6			SIW01
1997 05 09.81	a	I	1.3:	Y	0.0	E		1	& 8	S7			SIW01
1997 05 09.82		B	2.4	S	6.0	B		20	5	D7			KON07
1997 05 09.82	!	S	0.6	AA	0.0	E		1	10	8	2	35	HAV
1997 05 09.82	!	S	0.8	AA	5.0	B		10	12	8	2	65	HAV
1997 05 09.82	\$	B	1.2	S	5.0	B		7	6	6	4	46	PLE01
1997 05 09.82	\$	O	1.0	S	0.0	E		1	5	5			KWI
1997 05 09.82	&	B	3.5:	S	5.0	B		7	& 6	d3			CZE01
1997 05 09.82	s	B	1.1	YF	5.0	B		10	& 8	7	&3	68	SCI
1997 05 09.83	\$	M	1.4	S	8	R	7	35	5	4			KWI

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 05 10.76		B	1.5	AA	3.0	B		8	15	8	0.8	75	MEN03
1997 05 10.77		M	-0.6:	HD	5.0	B		7	15	S8			MOR08
1997 05 10.80		M	2.7	S	6.0	B		20	5	D7/			KON07
1997 05 10.80	!	M	1.5:	Y	5.0	B		10	8	s4/	1	50	SAN07
1997 05 10.80	a	M	1.4	AA	5.0	B		20	16	6			BAR06
1997 05 10.80	a	S	1.3	AA	5.0	B		20	16	6			BAR06
1997 05 10.81		O	0.2	S	0.0	E		1	23		&0.5		SZU01
1997 05 10.81	&	B	2.5	S	7.0	B		25	&10	d6	&0.3	70	SOC
1997 05 10.81	&	B	3.6:	S	5.0	B		7	& 5	d3			CZE01
1997 05 10.82	&	B	2.2:	S	5.0	B		10	&11	8			OLE
1997 05 10.82	&	O	1.1	S	0.0	E		1	5	5			KWI
1997 05 10.83	\$	B	1.3	S	5.0	B		7	7	6	2	45	PLE01
1997 05 10.83	\$	M	1.5	S	8	R	7	35	5	4			KWI
1997 05 10.84	\$	B	1.2:	OH	5.0	B		7	&15	4/	2.5	60	GR003
1997 05 11.77		B	1.2	AA	8.0	B		12	15	8	1	80	MEN03
1997 05 11.77		M	-0.5:	HD	5.0	B		7	10	7/			MOR08
1997 05 11.80	&	B	0.2:	S	5.0	B		7	22	4/			SZU01
1997 05 11.80	&	B	3.0:	S	7.0	B		25	& 7	s5			SOC
1997 05 11.80	a	B	1.5	AA	5.0	B		20	14	7			BAR06
1997 05 11.80	w	B	2.0	Y	5.0	B		10	& 8	S5			SIW01
1997 05 11.81		M	3.0	S	6.0	B		20	4	7/			KON07
1997 05 11.81	!	B	1.5:	YF	5.0	B		10	& 5	7	&0.4	95	SCI
1997 05 11.82	\$	B	1.0	S	11	L	7	32		s6			CH001
1997 05 11.83		S	1.8:	S	0.0	E		1	& 5	4			RES
1997 05 12.77		M	-0.4:	HD	5.0	B		7	10	7			MOR08
1997 05 12.80		B	0.3:	S	5.0	B		7	&20	d4			SZU01
1997 05 12.83		S	1.8:	S	5.0	B		10	& 5	7			RES
1997 05 12.88		S	1.9	YG	3.0	B		8	20	7	1		SOU01
1997 05 13.89		S	1.5	YG	3.0	B		8	10	8	0.5		SOU01
1997 05 13.97		B	1.7:	S	5.0	B		10	&19	7/	&1.3		OLE
1997 05 14.97		B	1.8	S	5.0	B		10	&19	7	&1.5		OLE
1997 05 15.4					15	T		26	&20	6	&3	80	FAR01
1997 05 15.4		B	1.5	YG	5.0	B		7					FAR01
1997 05 15.83	\$	B	1.5:	S	5.0	B		7	& 6	5	&1	48	PLE01
1997 05 16.83	\$	B	1.7:	S	5.0	B		7	& 5	5/	&0.5	50	PLE01
1997 05 16.96		B	1.7:	S	5.0	B		10	&18	7	&1.3	40	OLE
1997 05 17.4		B	1.7	YG	5.0	B		7					FAR01
1997 05 18.89		S	1.5	YG	5.0	B		7	6	9			SOU01
1997 05 18.96		B	1.9	S	5.0	B		10	&13	6/	&1.3	45	OLE
1997 05 19.89		S	1.5	YG	5.0	B		7	10	8	0.5		SOU01
1997 05 19.98		B	2.1	S	5.0	B		10	&14	6/			OLE
1997 05 20.85	!	S	2.5	SC	6.3	B		9	5	7	0.5		DIN01
1997 05 20.89		S	1.5	YG	5.0	B		7	10	8	0.5		SOU01
1997 05 20.97		B	1.9	S	5.0	B		10	&14	6/	&0.9		OLE
1997 05 21.81	!	B	2.0:	YF	6.0	B		20	& 7	6			SCI
1997 05 21.96		B	1.8	S	5.0	B		10	&13	6/	&1.0		OLE
1997 05 23.4		B	1.8	YG	0.0	E		1			&1	85	FAR01
1997 05 23.96		B	2.0	S	5.0	B		10	&16	6/	&1.2		OLE
1997 06 01.89		S	2.0	YG	5.0	B		7	20	6/	0.5		SOU01
1997 06 05.95		B	2.2	S	5.0	B		10	&14	6			OLE
1997 06 06.96		B	2.0	S	5.0	B		10	&15	6			OLE
1997 06 07.96		B	2.0	S	5.0	B		10	&15	6			OLE
1997 06 08.4		B	1.9	YG	5.0	B		7	&10	5	&50	m 315	FAR01
1997 06 08.88		S	2.0	YG	5.0	B		7	5	8			SOU01
1997 06 08.95		B	2.0	S	5.0	B		10	&14	6			OLE
1997 06 10.32	a	M	2.1	AA	0.0	E		1					SEA01
1997 06 10.88		S	3.0	YG	5.0	B		7	10	5			SOU01
1997 06 12.33	a	M	2.0	AA	0.0	E		1					SEA01
1997 06 12.88		S	2.8	YG	5.0	B		7	5	8			SOU01
1997 06 13.88		S	3.0	YG	5.0	B		7	10	5			SOU01
1997 06 14.33	a	I	2.0	AA	0.0	E		1					SEA01
1997 06 19.4		B	2.6	YG	5.0	B		7					FAR01
1997 06 21.33	a	S	2.7	AA	5.0	B		10	10	5	20	m	SEA01
1997 07 14.77		S	4.1	SC	4.9	B		3					JON
1997 07 15.77		S	4.0	SC	4.9	B		3					JON

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 07 18.77		S	4.0	SC	4.9	B		3			3		JON
1997 07 25.80		a I	2.7	SC	0.0	E		1					SEA01
1997 07 25.80		a S	3.4	SC	5.0	B		10	7	6	0.5		SEA01
1997 07 26.79		a I	3.6	SC	0.0	E		1					SEA01
1997 07 26.79		a M	3.6	SC	5.0	B		10	6	5	20	m 250	SEA01
1997 07 27.79		a I	3.6	SC	0.0	E		1			1.3	10	SEA01
1997 07 27.79		a M	3.8	SC	8.0	B		15	10	5	3.5	10	SEA01
1997 07 27.89		\$a S	4.0	AA	8.0	B		20	5	7	0.5		PEA
1997 07 28.35		S	4.0	YG	5.0	B		7	15	5			SOU01
1997 07 29.35		S	4.0	YG	5.0	B		7	10	4			SOU01
1997 07 29.8					15	T		26	&20	D6	&30	m 210	FAR01
1997 07 29.8		B	4.1	YG	5.0	B		7					FAR01
1997 07 30.35		S	4.0	YG	5.0	B		7	10	5			SOU01
1997 07 30.36		S	4.0	AA	5.0	B		7	15	6	3	225	LOU
1997 07 30.76		S	3.8	SC	4.9	B		3	10				JON
1997 07 30.81		B	3.1	AA	0.0	E		1	&30		4	10	SEA
1997 07 31.35		S	4.0	AA	8.0	B		11	15	5	>2.5	220	DES01
1997 07 31.77		a M	3.7	SC	5.0	B		10	12	5	5.0	350	SEA01
1997 07 31.82		S	3.0	AA	0.0	E		1			7	345	SEA
1997 08 01.35		S	4.1	AA	8.0	B		11	15	5	>2.5	220	DES01
1997 08 01.35		S	4.1	AA	8.0	B		20	15	5/	3	225	LOU
1997 08 01.35		S	4.1	YG	5.0	B		7	10	4/	0.5	235	SOU01
1997 08 01.78		a M	4.1	SC	5.0	B		10	25	5	5.0	350	SEA01
1997 08 02.35		S	4.1	AA	8.0	B		11	15	5/	>2.5	225	DES01
1997 08 02.35		S	4.1	YG	5.0	B		7	15	4			SOU01
1997 08 02.36		S	4.1	AA	8.0	B		20	15	5/	3	225	LOU
1997 08 02.76		S	3.9	SC	4.9	B		3	10				JON
1997 08 02.78		a I	4.1	SC	0.0	E		1			3.0	350	SEA01
1997 08 02.78		a M	4.1	SC	5.0	B		10	20	5	4.0	350	SEA01
1997 08 03.79		I	4.3	SC	0.0	E		1					SEA01
1997 08 04.76		S	4.1	SC	4.9	B		3				230	JON
1997 08 05.76		S	4.2	SC	4.9	B		3					JON
1997 08 05.81		I	4.1	SC	0.0	E		1					SEA01
1997 08 06.76		S	4.3	SC	4.9	B		3					JON
1997 08 07.35		S	4.1	AA	8.0	B		11	15	5/	>2.5	230	DES01
1997 08 07.75		S	4.4	SC	2.3	B		2	10				JON
1997 08 07.81		I	4.1	SC	0.0	E		1	20	4	3.5	0	SEA01
1997 08 07.81		M	4.1	SC	5.0	B		10	15	5	5.5	0	SEA01
1997 08 08.75		S	4.3	SC	2.3	B		2	10				JON
1997 08 08.81		B	3.4	AA	0.0	E		1			3		SEA
1997 08 09.35		S	4.1	AA	8.0	B		11	15	5	2.3	230	DES01
1997 08 10.33		S	4.1	YG	8.0	B		11	15	5	0.5	235	SOU01
1997 08 10.34		S	4.1	AA	8.0	B		11	15	5	2.5	230	DES01
1997 08 10.77		I	4.1	SC	0.0	E		1			4.0	330	SEA01
1997 08 10.77		M	4.2	SC	5.0	B		10	17	4	6.5	330	SEA01
1997 08 10.79		w S	3.4	AA	1.0	E		1			&3	350	SEA
1997 08 11.35			4.0	AT	0.0	E		1	10	7			DES01
1997 08 11.35		S	4.1	AT	8.0	B		11	15	6	2.5	235	DES01
1997 08 11.79		I	4.1	SC	0.0	E		1			2.0	330	SEA01
1997 08 12.35			4.0	AT	0.0	E		1	10	6/			DES01
1997 08 12.35		S	4.1	AT	8.0	B		11	15	6	2.5	235	DES01
1997 08 12.35		S	4.1	YG	5.0	B		7	15	4			SOU01
1997 08 12.79		I	4.1	SC	0.0	E		1			2.5	330	SEA01
1997 08 12.79		M	4.2	SC	5.0	B		10	18		4.0	330	SEA01
1997 08 13.34			4.1	AT	0.0	E		1	10	6			DES01
1997 08 13.34		S	4.1	AT	8.0	B		11	15	6	2.7	235	DES01
1997 08 13.77		I	4.1	SC	0.0	E		1			0.5	340	SEA01
1997 08 13.79		M	4.3	SC	5.0	B		10	17	4	4.5	340	SEA01
1997 08 13.79		S	4.0	AA	0.0	E		1					SEA
1997 08 14.35			4.1	AT	0.0	E		1	10	5/			DES01
1997 08 14.35		S	4.2	AT	8.0	B		11	15	6	2.8	235	DES01
1997 08 14.75		S	4.4	SC	2.3	B		2					JON
1997 08 14.77		I	4.3	SC	0.0	E		1					SEA01
1997 08 14.79		M	4.3	SC	5.0	B		10	17	4	3.5	5	SEA01
1997 08 15.35			4.1	AT	0.0	E		1	10	6			DES01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 15.35		S	4.2	AT	8.0	B		11	15	6/	2.8	235	DES01
1997 08 15.79		I	4.4	SC	0.0	E		1					SEA01
1997 08 16.34			4.1	AT	0.0	E		1	10	5/			DES01
1997 08 16.35		S	4.1	AT	5.0	B		7	15	5	0.5	235	SOU01
1997 08 16.35		S	4.2	AT	8.0	B		11	15	6	3.0	240	DES01
1997 08 16.79		M	5.0	SC	5.0	B		10	6	3			SEA01
1997 08 17.34			4.1	AT	0.0	E		1	10	5/			DES01
1997 08 17.34		S	4.1	AT	5.0	B		7	15	5	0.5	235	SOU01
1997 08 17.34		S	4.2	AT	8.0	B		11	15	6/	3.0	240	DES01
1997 08 17.79		S	5.2	SC	5.0	B		10	5	3			SEA01
1997 08 18.35			4.2	AT	0.0	E		1	10	6/			DES01
1997 08 18.35		S	4.2	AT	5.0	B		7	15	4			SOU01
1997 08 18.79		M	5.0	SC	5.0	B		10	5	4			SEA01
1997 08 19.35		S	4.2	AT	5.0	B		7	10	5/			SOU01
1997 08 19.35		S	4.2	AT	8.0	B		11	>12	5/			DES01
1997 08 20.34		S	4.2	AT	5.0	B		7	5	8			SOU01
1997 08 20.34		S	4.2	AT	8.0	B		11					DES01
1997 08 20.34		S	4.2	AT	8.0	B		11	15	6			SOU01
1997 08 20.79		M	5.2	SC	5.0	B		10	6	4	0.5	215	SEA01
1997 08 22.79		M	5.5	SC	5.0	B		10	6	4			SEA01
1997 08 23.79		M	5.4	SC	5.0	B		10	5	5			SEA01
1997 08 24.79		M	5.4	SC	5.0	B		10	8	4	40 m	265	SEA01
1997 08 25.34		S	4.2	AT	8.0	B		11	10	5/	>1.5	240	DES01
1997 08 25.79		I	4.6	SC	0.0	E		1			10 m	260	SEA01
1997 08 25.79		M	5.3	AA	5.0	B		10	16	4	3.5	5	SEA01
1997 08 26.34		S	4.2	AT	8.0	B		11	12	5/	2	240	DES01
1997 08 26.78		I	4.3	AA	0.0	E		1					SEA01
1997 08 26.78		M	4.9	AA	5.0	B		10	17	5	4.0	10	SEA01
1997 08 27.33		S	4.3	AT	8.0	B		11	12	6	2	240	DES01
1997 08 27.77		I	4.5	AA	0.0	E		1					SEA01
1997 08 27.77		M	4.8	AA	5.0	B		10	20	4	4.0	10	SEA01
1997 08 28.33		S	4.3	AT	5.0	B		7	10	4			SOU01
1997 08 28.33		S	4.3	AT	8.0	B		11	15	6	2	245	DES01
1997 08 28.74		I	4.6	AA	0.0	E		1		1	0.5	270	SEA01
1997 08 28.74		M	4.8	AA	5.0	B		10	19	4	4.0	10	SEA01
1997 08 29.33		S	4.3	AT	8.0	B		11	15	5			SOU01
1997 08 29.33		S	4.3	AT	8.0	B		11	15	6	2	245	DES01
1997 08 29.76		I	4.7	AA	0.0	E		1			40 m	290	SEA01
1997 08 29.76		M	4.9	AA	5.0	B		10	17	4	3.5	10	SEA01
1997 08 30.33		S	4.3	AT	8.0	B		11	10	4/			SOU01
1997 08 30.33		S	4.3	AT	8.0	B		11	15	5/	2	245	DES01
1997 08 30.74		M	4.9	AA	5.0	B		10	18	4	4.0	10	SEA01
1997 08 30.77		I	4.6	AA	0.0	E		1			3.5	10	SEA01
1997 08 31.33		S	4.3	AT	8.0	B		11	15	6	2	245	DES01
1997 08 31.34		S	4.6	AT	5.0	B		7	15	6/	2.5	235	LOU
1997 08 31.78		I	4.8	AA	0.0	E		1			3.5	335	SEA01
1997 08 31.78		S	4.9	AA	5.0	B		10	18	3	6.0	335	SEA01
1997 09 01.33		S	4.3	AT	8.0	B		11	15	6	2	245	DES01
1997 09 01.33		S	4.3	AT	8.0	B		11	15	6	2	245	DES01
1997 09 01.33		S	4.4	AT	8.0	B		11	15	6			SOU01
1997 09 02.33		S	4.4	AT	8.0	B		11	15	5			SOU01
1997 09 02.33		S	4.4	AT	8.0	B		11	15	6	2	245	DES01
1997 09 02.77		I	4.8	AA	0.0	E		1			3.0	330	SEA01
1997 09 02.77		M	5.2	AA	5.0	B		10	15	3	4.0	330	SEA01
1997 09 03.33		S	4.4	AT	8.0	B		11	15	4			SOU01
1997 09 03.33		S	4.4	AT	8.0	B		11	15	5/	>2	245	DES01
1997 09 03.75		I	4.8	AA	0.0	E		1			2.3	330	SEA01
1997 09 03.75		M	4.8	AA	5.0	B		10	17	3	4.3	330	SEA01
1997 09 04.78		I	5.0	AA	0.0	E		1					SEA01
1997 09 04.78		M	5.0	AA	5.0	B		10	12	3	1.5	330	SEA01
1997 09 05.76		S	4.4	AA	0.0	E		1					SEA
1997 09 05.78		I	4.9	AA	0.0	E		1					SEA01
1997 09 05.78		M	5.2	AA	5.0	B		10	14	3	1.5	330	SEA01
1997 09 06.33		S	4.6	AT	8.0	B		11	15	4			SOU01
1997 09 07.33		S	4.5	AT	8.0	B		11	15	5/	2.5	248	DES01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 09 07.74		M	4.9	AA	5.0	B		10	15	3	4.0	335	SEA01
1997 09 07.76		I	4.8	AA	0.0	E		1			4.6	335	SEA01
1997 09 08.32		S	4.5	AT	8.0	B		11	15	6	2	248	DES01
1997 09 08.33		S	4.6	AT	8.0	B		11	15	6			SOU01
1997 09 08.74		I	4.5	AA	0.0	E		1	45	2	4.0	335	SEA01
1997 09 08.74		M	4.7	AA	5.0	B		10	15	3	4.7	335	SEA01
1997 09 09.32		S	4.5	AT	8.0	B		11	15	6	2	248	DES01
1997 09 09.33		S	4.6	AT	8.0	B		11	15	5			SOU01
1997 09 09.74		I	4.7	AA	0.0	E		1			4.2	327	SEA01
1997 09 09.74		M	4.9	AA	5.0	B		10	14	3	4.5	327	SEA01
1997 09 10.33		S	4.8	AA	5.0	B		7	15	6/	2.5	240	LOU
1997 09 10.7		B	5.0	YG	5.0	B		7	&15	D5			FAR01
1997 09 11.32		S	4.6	AT	8.0	B		11	15	5/	2	250	DES01
1997 09 12.32		S	4.6	AT	8.0	B		11	15	6	2	250	DES01
1997 09 12.77		I	4.8	AA	0.0	E		1			3.2	330	SEA01
1997 09 12.77		M	5.0	AA	5.0	B		10	12	3	3.4	330	SEA01
1997 09 13.32		S	4.6	AT	8.0	B		11	15	6	2	250	DES01
1997 09 13.33		S	4.6	AT	8.0	B		11	10	3/			SOU01
1997 09 13.76		I	4.7	AA	0.0	E		1			4.7	325	SEA01
1997 09 13.76		M	4.9	AA	5.0	B		10	12	3	4.2	325	SEA01
1997 09 14.76		I	4.7	AA	0.0	E		1					SEA01
1997 09 14.76		M	5.0	AA	5.0	B		10	9	3	1.1	288	SEA01
1997 09 15.76		M	5.2	AA	5.0	B		10	8	5	1.1	280	SEA01
1997 09 16.76		S	4.6	AA	0.1	E		1					SEA
1997 09 16.81		B	5.6	S	3.0	B		8		6/			OHM
1997 09 16.81	a	M	5.3	YG	10.0	B		20	9	6			YOS02
1997 09 17.32		S	4.7	AT	8.0	B		11	15	5/	>1.5	250	DES01
1997 09 18.23		S	4.8	YG	8.0	B		11	10	4			SOU01
1997 09 18.32		S	4.7	AT	8.0	B		11	15	5/	>1.5	250	DES01
1997 09 20.65		S	5.1	AA	5.0	B		10	6	3			SEA01
1997 09 21.68		M	5.0	AA	5.0	B		10	6	4			SEA01
1997 09 22.77		M	5.3	AA	5.0	B		10	5	4	1.0	295	SEA01
1997 09 23.32		S	4.8	AT	8.0	B		11	15	5/	>1.5	255	DES01
1997 09 23.76		I	4.9	AA	0.0	E		1					SEA01
1997 09 23.76		M	5.1	AA	5.0	B		10	5	3			SEA01
1997 09 23.79		S	5.0	AA	0.0	E		1					PEA
1997 09 23.79		S	5.1	AA	8.0	B		20	6	6/			PEA
1997 09 24.32		S	4.8	AT	8.0	B		11	15	6	1.5	255	DES01
1997 09 24.75		M	5.3	AA	5.0	B		10	8	2			SEA01
1997 09 24.80		S	5.0	AA	0.0	E		1					PEA
1997 09 24.80		S	5.1	AA	8.0	B		20	6	6	0.6	290	PEA
1997 09 25.71		I	4.9	AA	0.0	E		1			40 m	325	SEA01
1997 09 25.71		M	5.4	AA	5.0	B		10	6	5	3.5	325	SEA01
1997 09 25.72		S	4.7	AA	0.1	E		1					SEA
1997 09 26.62		M	5.2	AA	5.0	B		10	5	2	1.9	295	SEA01
1997 09 26.64		I	4.8	AA	0.0	E		1					SEA01
1997 09 26.70		S	4.7	AA	0.1	E		1					SEA
1997 09 27.72		I	5.2	AA	0.0	E		1			40 m	275	SEA01
1997 09 27.72		M	5.5	AA	5.0	B		10	14	3	4.0	290	SEA01
1997 09 28.31		S	4.9	AT	8.0	B		11	15	6	1.5	260	DES01
1997 09 28.80	\$	S	5.7:	TI	3.5	B		7	&12	5			NAG08
1997 09 28.80	\$	S	5.9:	TI	8.0	B		11	&10	6			NAG08
1997 09 28.82		M	5.6	AA	3.5	B		7					TSU02
1997 09 29.31		S	4.9	AT	8.0	B		11	15	6	1.0	260	DES01
1997 09 29.32		S	5.0	AA	8.0	B		11	10	4			SOU01
1997 09 29.71		S	4.8	AA	0.1	E		1					SEA
1997 09 29.73		M	5.5	AA	5.0	B		10	7	4	3.2	310	SEA01
1997 09 29.76		I	5.5	AA	0.0	E		1			3.5	310	SEA01
1997 09 29.80	\$	S	5.6:	TI	8.0	B		11	&10	6			NAG08
1997 09 29.83		S	5.8	S	15.0	R	5	25	5	4			NAG02
1997 09 30.70		I	5.2	AA	0.0	E		1			3.0	295	SEA01
1997 09 30.70		M	5.6	AA	5.0	B		10	7	3	2.1	320	SEA01
1997 09 30.82		M	5.3	AA	3.5	B		7					TSU02
1997 10 01.70		I	5.5	AA	0.0	E		1			1.8	285	SEA01
1997 10 01.70		M	5.7	AA	5.0	B		10	7	3	2.0	295	SEA01

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 10 03.71		I	5.5	AA	0.0	E		1					SEA01
1997 10 03.71		M	5.8	AA	5.0	B		10	9	3	1.8	300	SEA01
1997 10 03.86		S	5.2	AA	8.0	B		20	7	7	0.3		PEA
1997 10 04.32		S	5.3	AA	8.0	B		20	10	4/	1		LOU
1997 10 04.84		S	5.3	AA	8.0	B		20	7.5	7	0.4	275	PEA
1997 10 05.33		S	5.3	AA	8.0	B		20	10	4/	1		LOU
1997 10 05.84		S	5.3	AA	8.0	B		20		6			PEA
1997 10 06.84		S	5.3	AA	8.0	B		20	7.5	6/	0.6	270	PEA
1997 10 07.70		I	5.7	AA	0.0	E		1					SEA01
1997 10 07.70		M	5.7	AA	5.0	B		10	10	3	1.0	285	SEA01
1997 10 08.31		S	5.1	YG	8.0	B		11	10	5/	1		DES01
1997 10 08.31		S	5.3	AA	8.0	B		20	10	4/	1		LOU
1997 10 08.66		I	5.7	AA	0.0	E		1					SEA01
1997 10 08.66		M	5.8	AA	5.0	B		10	9	4	1.0	290	SEA01
1997 10 08.7		B	6.7	S	5.0	B		7					FAR01
1997 10 09.30		S	5.2	YG	8.0	B		11	10	6	1		DES01
1997 10 09.31		S	5.4	AA	8.0	B		20	10	4/	1		LOU
1997 10 09.75		I	5.9	AA	0.0	E		1			15	m 290	SEA01
1997 10 09.75		M	5.8	AA	5.0	B		10	9	4	1.1	290	SEA01
1997 10 10.30		S	5.2	YG	8.0	B		11	10	6	1		DES01
1997 10 10.68		I	5.8	AA	0.0	E		1					SEA01
1997 10 10.68		M	5.9	AA	5.0	B		10	8	4	2.4	300	SEA01
1997 10 10.84		S	5.4	AA	8.0	B		20		7			PEA
1997 10 11.30		S	5.2	YG	8.0	B		11	10	6	1		DES01
1997 10 11.69		I	5.8	AA	0.0	E		1					SEA01
1997 10 11.69		M	6.0	AA	5.0	B		10	7	4	1.1	290	SEA01
1997 10 11.84		S	5.5	AA	8.0	B		20		7			PEA
1997 10 12.29		S	5.5	AA	8.0	B		20	8	4/	0.5		LOU
1997 10 12.30		S	5.2	YG	8.0	B		11	10	6	1		DES01
1997 10 12.70		I	5.9	AA	0.0	E		1			0.5	320	SEA01
1997 10 12.70		M	5.9	AA	5.0	B		10	8	3	1.8	320	SEA01
1997 10 12.84		S	5.6	AA	8.0	B		20	8	6/			PEA
1997 10 13.31		S	5.2	YG	8.0	B		11	12	5/	1		DES01
1997 10 13.84		S	5.6	AA	8.0	B		20	8	7			PEA
1997 10 14.30		S	5.3	YG	8.0	B		11	10	5/	1		DES01
1997 10 14.65		S	6.4	AA	5.0	B		10	4	2			SEA01
1997 10 15.30		S	5.3	YG	8.0	B		11	10	5/	1		DES01
1997 10 15.58		S	6.6	AA	8.0	B		15	3	1			SEA01
1997 10 16.58		S	6.8	AA	8.0	B		15	2	1			SEA01
1997 10 17.58		S	6.8	AA	5.0	B		10	2	1			SEA01
1997 10 18.30		S	5.3	YG	8.0	B		11	10	6	1		DES01
1997 10 20.60		S	6.6	AA	5.0	B		10	8	4			SEA01
1997 10 21.59		M	6.4	AA	5.0	B		10	5	4			SEA01
1997 10 21.7		B	6.9	VN	15	T		26	&10	D5			FAR01
1997 10 22.59		I	6.0	AA	0.0	E		1					SEA01
1997 10 22.59		M	6.3	AA	5.0	B		10	8	3	1.8	280	SEA01
1997 10 22.60		S	6.1	AA	2.5	B		2					SEA
1997 10 22.7		B	6.9	VN	15	T		26	&10	D5			FAR01
1997 10 23.6		B	7.4	VN	15	T		52	& 5	D4			FAR01
1997 10 23.60		M	6.2	AA	5.0	B		10	8	3			SEA01
1997 10 24.29		S	5.5	YG	8.0	B		11	10	6			DES01
1997 10 24.60		S	6.8	AA	8.0	B		15	3	4	2.4	300	SEA01
1997 10 24.80		S	6.4	AA	8.0	B		20	5.5	5			PEA
1997 10 25.80		S	6.2	AA	8.0	B		20	7	5			PEA
1997 10 26.28		S	5.7	YG	8.0	B		11	10	6/			DES01
1997 10 26.80		S	6.2	AA	8.0	B		20	7	5/			PEA
1997 10 27.28		S	5.9	YG	8.0	B		11	8	6/			DES01
1997 10 27.30		S	6.2	AA	8.0	B		20	8	5/			LOU
1997 10 27.80		S	6.2	AA	8.0	B		20	7.5	5			PEA
1997 10 28.28		S	5.9	YG	8.0	B		11	8	6/			DES01
1997 10 28.29		S	6.2	AA	8.0	B		20	8	5/			LOU
1997 10 28.80		S	6.4	VN	8.0	B		20	6	5			PEA
1997 10 29.28		S	6.0	YG	8.0	B		11	8	7			DES01
1997 10 29.56		S	6.3	AA	2.5	B		2					SEA
1997 10 29.80		S	6.3	VN	8.0	B		20	6.5	6			PEA

Comet C/1995 01 (Hale-Bopp) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 10 30.80		S	6.3	VN	8.0	B		20		6			PEA
1997 10 31.80		S	6.4	VN	8.0	B		20	7.5	6	0.2	285	PEA

Comet C/1995 Q1 (Bradfield)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1995 10 01.13		B	7.6	S	6.0	B		20	2	3			LUE
1995 10 01.13		S	7.5	S	6.0	B		20	2	3			LUE

Comet C/1996 J1 (Evans-Drinkwater)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 05.98		S	13.7	AC	25.4	J	6	150	0.6	1			BOU
1997 08 06.99		S	13.6	AC	25.4	J	6	150	0.6	1/			BOU
1997 09 01.07		S	13.7	AC	25.4	J	6	150	0.7	1/			BOU
1997 09 06.10		S	[13.2	NP	20	T	10	205					SHA02
1997 09 24.85		0	[13.6	HS	35	L	5	237	! 0.8				HOR02

Comet C/1996 J1 (Evans-Drinkwater) [nucleus A]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 07 05.78		C	15.9:	GA	60.0	Y	6	a120	1.4				NAK01
1997 08 08.76		H	18.0:	HS	50.0	C	12	a300	0.23	2			FUK02
1997 08 28.77		C	17.7	GA	60.0	Y	6	a240	0.5				NAK01
1997 09 10.75		C	17.8:	GA	60.0	Y	6	a240	0.55				NAK01
1997 09 29.78		C	17.3:	GA	60.0	Y	6	a240	0.75				NAK01

Comet C/1996 J1 (Evans-Drinkwater) [nucleus B]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 07 05.78		C	14.7	GA	60.0	Y	6	a120	1.6		> 9.7m	264	NAK01
1997 07 28.08		C	15.9	HS	60	L	6	a240				267	PRA02
1997 08 08.75		H	15.5:	HS	50.0	C	12	a300	0.15	5			FUK02
1997 08 28.10		C	15.3	HS	60	L	6	a270			3 m	264	GAL03
1997 08 28.77		C	14.9	GA	60.0	Y	6	a240	1.2		> 7.3m	265	NAK01
1997 09 10.75		C	15.1	GA	60.0	Y	6	a240	1.1		> 7.1m	266	NAK01
1997 09 29.78		C	15.1	GA	60.0	Y	6	a240	1.2		> 6.8m	267	NAK01
1997 10 23.90		S	14.4	HS	44.5	L	4	230	1	2			SAR02
1997 10 24.92		S	14.2	HS	44.5	L	4	230	1.2	3			SAR02

Comet C/1996 Q1 (Tabur)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 08 21.11		! V	11.1	YF	20.0	T	2		4.5	5			MIK

Comet C/1997 D1 (Mueller)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 09 06.15		S	[13.0	NP	20	T	10	60					SHA02
1997 09 09.16		S	12.4:	NP	20	T	10	100	0.8	2			SHA02
1997 09 11.13	a	S	12.6	AC	25.4	J	6	115	0.8	2/			BOU
1997 09 29.12		S	12.7	HS	35	L	5	158	1.2	2			HOR02
1997 10 06.11		S	12.3	TI	35	L	5	158	1	2			HOR02
1997 10 09.43	!	J	13.0	SC	25.4	T	5		0.72	d1	?		ROQ
1997 10 10.51		C	15.8	FA	91.4	L	5		1.75		19.6m	49	SC001
1997 10 10.51	c	S	18.0	FA	91.4	L	5						SC001
1997 10 11.17		S	13.1	AC	25.4	J	6	150	0.9	1/			BOU
1997 10 13.49		J	12.8	SC	25.4	T	5		0.6	d1/			ROQ
1997 10 28.03		S	11.9	TI	35	L	5	104	2.3	2			HOR02
1997 10 28.97		M	11.8	TI	35	L	5	104	1.8	2			HOR02
1997 10 29.16	a	S	12.5	AC	25.4	J	6	100	1.6	1			BOU
1997 10 29.17		S	12.9	HS	20.3	T	10	156	0.3	4			HAS02
1997 10 30.13		J	12.6	SC	25.4	T	5		1.03	d1/			ROQ
1997 10 31.14	a	S	12.7	AC	25.4	J	6	100	1.8	0/			BOU

Comet C/1997 G2 (Montani)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 29.69		C	17.8	GA	60.0	Y	6	a240	0.35				NAK01
1997 05 09.63		C	17.5	GA	60.0	Y	6	a240	0.45				NAK01
1997 05 27.61		C	17.1	GA	60.0	Y	6	a240	0.5				NAK01
1997 05 31.61		C	17.1	GA	60.0	Y	6	a240	0.5				NAK01
1997 06 12.58		C	17.1	GA	60.0	Y	6	a240	0.5				NAK01
1997 06 29.58		C	16.8	GA	60.0	Y	6	a240	0.55				NAK01
1997 07 23.51	a	C	16.9	GA	60.0	Y	6	a240	0.6			40	NAK01

Comet C/1997 J1 (Mueller)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 06 09.91		M	11.9	HS	35	L	5	92	1.3	2/			PLS
1997 07 14.48		H	14.7	HS	50.0	C	12	a240	0.24	6	1.3m	57	FUK02
1997 07 22.46		H	15.1	HS	50.0	C	12	a240	0.17	7	0.3m	20	FUK02
1997 08 04.83		C	15.2	HS	60	L	6	a 60	0.25				GAL03
1997 09 04.10		C	14.6	HS	60	L	6	a300			35 s	33	GAL03
1997 09 29.10		O	[13.4	HS	35	L	5	237	! 0.9				HOR02

Comet C/1997 J2 (Meunier-Dupouy)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 07 06.95		S	12.4	NP	33	L	5	100	1.2	2			SHAO2
1997 07 09.89		S	12.3	HS	44.0	L	5	156	0.7	4			HAS02
1997 07 09.96		S	12.3	NP	33	L	5	150	1.3	2			SHAO2
1997 07 10.95		S	12.1	NP	20	R	14	140	0.8	2			SHAO2
1997 07 23.49		C	12.7	GA	60.0	Y	6	a120	1.7		> 5.2m	205	NAK01
1997 07 25.93		S	12.3	VB	20	R	14	110	1.1	3			SHAO2
1997 07 26.87	!	V	13.1	GA	36.0	T	7	a120	+ 1.1	7	& 6 m	208	MIK
1997 07 26.89		S	12.4	AS	30.0	L	5	100	1.2	1/			NEV
1997 07 27.87		M	12.0	TI	35	L	5	92	1.8	4			HOR02
1997 07 27.88	!	V	13.0	GA	36.0	T	7	a300	+ 1.1	7	& 4 m	208	MIK
1997 07 27.92		S	12.4	NP	33	L	5	100	1.4	2			SHAO2
1997 07 27.95		S	11.8	NP	25.3	L	6	58	& 0.9	4			PER01
1997 07 27.95		S	12.1	NP	25.3	L	6	58	& 0.6	5			VIT01
1997 07 28.89		M	11.9	TI	35	L	5	92	1.8	4			HOR02
1997 07 28.92		C	13.7	HS	60	L	6	a150			5 m	215	PRA02
1997 07 29.91		S	12.4	AS	30.0	L	5	100	1.5	2			NEV
1997 07 29.96		S	12.3	AC	25.4	J	6	88	1.1	3/			BOU
1997 07 30.91		S	12.4	HS	20.3	L	10	93	0.8	4			HAS02
1997 08 02.91		S	12.3	AS	30	L	5	100	1.5	3			NEV
1997 08 02.95		S	12.2	NP	33	L	5	100	1.6	3			SHAO2
1997 08 03.24		S	12.3	AA	20.0	T	10	185	1.0	4/			SPR
1997 08 04.85		M	12.0	TI	15	R	13	50	1.8	3			ZNO
1997 08 05.86		S	12.4	HS	44.5	L	5	134	1.5	6			SAR02
1997 08 05.86		S	12.6	HS	44.5	L	5	134	1.5	6			BAK01
1997 08 05.91		S	12.4	NP	33	L	5	100	1.4	2			SHAO2
1997 08 05.95		S	12.1	AC	25.4	J	6	72	1.3	3/			BOU
1997 08 06.97		S	12.2	AC	25.4	J	6	88	1.2	4			BOU
1997 08 07.92		S	12.0	AC	25.4	J	6	72	1.4	3/			BOU
1997 08 07.96		M	12.3	NP	44.5	L	5	74	< 1	D6			MAR02
1997 08 08.94		S	12.1	AC	25.4	J	6	88	1.3	3/			BOU
1997 08 09.24		S	12.2	AA	20.0	T	10	226	1.0	4/			SPR
1997 08 09.91		S	12.2	HS	20.3	L	10	93	0.7	4			HAS02
1997 08 10.85		M	11.7	TI	35	L	5	92	1.9	3/			HOR02
1997 08 10.93		S	12.1	AC	25.4	J	6	72	1.4	4			BOU
1997 08 23.87		S	12.2	NP	33	L	5	100	1.2	2			SHAO2
1997 08 24.46		C	12.6	GA	60.0	Y	6	a120	1.8		5.5m	235	NAK01
1997 08 24.87		S	11.9	HS	20.3	L	10	93	0.7	4			HAS02
1997 08 25.81		E	11.4	AS	30	L	5	100	2	4			NEV
1997 08 25.88		S	12.5	NP	20	R	14	110	1.0	2			SHAO2
1997 08 26.81		E	11.6	AS	30	L	5	100	1.7	3			NEV
1997 08 27.87		S	12.3	NP	33	L	5	100	1.4	3			SHAO2
1997 08 29.98		M	11.6	NP	32.0	L	5	57	1	D5			MAR02
1997 08 30.81		E	11.4	AS	30	L	5	100	1.7	3/			NEV
1997 08 30.86		S	12.3	NP	33	L	5	100	0.7	3			SHAO2

Comet C/1997 J2 (Meunier-Dupouy) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 30.87		S	11.9	AC	25.4	L	5	65	1.3	3/			MEY
1997 08 30.91		M	11.7	NP	32.0	L	5	57	1	D6			MAR02
1997 08 30.91		S	11.6	AS	25.5	L	6	94	& 0.4	2/			VIT01
1997 08 30.91		S	11.8	NP	32.0	L	5	57	> 1	5			SAN04
1997 08 30.93		S	12.2	AS	25.5	L	6	94	& 0.6	4			PER01
1997 08 31.80		E	11.4	AS	30	L	5	100	1.8	4			NEV
1997 08 31.82		M	11.7	TI	35	L	5	92	1.9	3/			HOR02
1997 08 31.82		M	12.0	TI	35	L	5	92	1.8	3/			PLS
1997 08 31.83		S	11.9	HS	20.3	L	10	93	0.4	4			HAS02
1997 08 31.88		S	11.7	AC	25.4	J	6	72	1.9	3/			BOU
1997 09 01.86		M	11.6	HS	35	L	5	92	1.8	3/			HOR02
1997 09 02.80		E	11.3	AS	30	L	5	100	2	4			NEV
1997 09 02.82		M	11.8	HS	35	L	5	92	1.8	3			HOR02
1997 09 04.80		E	11.4	AS	30	L	5	150	1.8	3			NEV
1997 09 05.08		S	11.8	AC	25.4	J	6	72	1.5	4			BOU
1997 09 05.81		S	12.0	HS	30	L	6	150	1	3			SAR02
1997 09 05.81		S	12.5	HS	30	L	6	150	1				BAK01
1997 09 06.16		S	12.5:	NP	20	T	10	60	0.7	3			SHA02
1997 09 07.10		S	12.0:	FG	20	L	6	58	1	1			CRE01
1997 09 07.82		M	12.0	TI	35	L	5	92	1.6	3/			PLS
1997 09 07.85		S	12.1	NP	33	L	5	75	2.0	3			SHA02
1997 09 07.88		S	11.8	AC	25.4	J	6	72	1.5	4/			BOU
1997 09 08.84		S	11.7	HS	44.0	L	5	63	1.3	4			HAS02
1997 09 08.86		S	12.0	NP	20	R	14	90	1.3	2			SHA02
1997 09 10.45		S	12.5:	HS	40.0	L	6	200	1.0	3/			NAG08
1997 09 11.09		S	11.8	AC	25.4	J	6	72	1.7	4			BOU
1997 09 12.04		S	11.9	AC	25.4	L	5	65	2.0	4			MEY
1997 09 13.03		S	12.3	NP	20	R	14	140	1.0	3			SHA02
1997 09 16.79		M	11.7	TI	20	L	5	48	2.3	3			PLS
1997 09 16.80		S	11.3:	HS	8	R	11	67	2.1	3			OKS
1997 09 16.80	!	V	12.5	YF	36.0	T	7	a300	+ 1.6	6	& 6 m 255		MIK
1997 09 19.43		C	12.7	GA	60.0	Y	6	a120	2.0		> 7.0m 257		NAK01
1997 09 20.78		M	11.5	HS	35	L	5	92	1.7	3/			PLS
1997 09 20.78		M	11.6	TI	35	L	5	92	1.7	3/			HOR02
1997 09 20.85		S	11.2	GA	25.3	L	6	58	& 1.1	4/			VIT01
1997 09 20.85		S	11.6	GA	25.3	L	6	58	& 2.2	3/			PER01
1997 09 21.07		S	11.7	FG	20	L	6	47	1.5	3			CRE01
1997 09 21.79		M	11.5	TI	35	L	5	92	2.1	3/			HOR02
1997 09 21.85		S	11.6	AC	25.4	J	6	72	2.0	4			BOU
1997 09 22.06		M	11.5	FG	20	L	6	58	1.8	3/			CRE01
1997 09 22.83		S	11.7	AC	25.4	J	6	88	1.8	4/			BOU
1997 09 22.85		M	11.6	TI	35	L	5	92	1.9	3/			HOR02
1997 09 22.87		S	12.1	NP	33	L	5	100	0.9	2			SHA02
1997 09 24.82		M	11.5	TI	35	L	5	92	2.2	3/			HOR02
1997 09 24.82		M	12.1	TI	35	L	5	92	2.1	3/			PLS
1997 09 24.86		S	11.7	GA	25.4	J	6	72	1.8	3/			BOU
1997 09 25.82		S	11.8	HS	20.3	T	10	93	1.0	3			HAS02
1997 09 25.84		M	11.3	TI	35	L	5	92	2.3	3/			HOR02
1997 09 25.84		S	11.7	GA	25.4	J	6	72	1.7	4			BOU
1997 09 26.79	!	V	12.6	GA	36.0	T	7	a180	+ 1.6	6	& 8 m 264		MIK
1997 09 27.11	a	M	11.6	FG	55.8	L	4	70	2.0	4			CRE01
1997 09 27.54		S	12.0:	HS	40.0	L	6	120	1.0	4			NAG08
1997 09 28.77		M	11.4	TI	35	L	5	92	1.9	3/			HOR02
1997 09 28.81		S	11.7:	AA	25	L	6	93	1.7	3			AND01
1997 09 28.83		M	11.6	GA	25.4	J	6	72	2.2	4/			BOU
1997 09 29.88		S	11.4	GA	25.3	L	6	58	& 1.9	4			PER01
1997 09 29.88		S	11.5	GA	25.3	L	6	58	& 2.2	3/			VIT01
1997 10 02.84		S	11.2	GA	25.3	L	6	58	& 1.8	s4/			PER01
1997 10 03.78		S	11.6	HS	20.3	T	10	77	1.1	2			KAM01
1997 10 03.82		S	11.8	HS	25.4	L	6	104	3	5			SAR02
1997 10 04.79		S	11.7	HS	25.4	L	6	104	1.7	4			SAR02
1997 10 05.81		M	11.3	GA	41.0	L	6	123	& 1.5	3			GLI
1997 10 05.96		S	11.9	HS	38	L	4	183	1.5	3			WAR01
1997 10 06.76		S	11.3:	VF	11	L	7	50	2	2			BAR06
1997 10 06.78		M	11.9	HS	35	L	5	92	1.5	2/			PLS

Comet C/1997 J2 (Meunier-Dupouy) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 10 06.79		M	11.3	TI	10	B		25	2.0	2/			ZNO
1997 10 06.87		M	11.7	TI	35	L	5	92	2	2/			HOR02
1997 10 07.86		S	11.7	GA	25.4	J	6	72	2.0	3			BOU
1997 10 09.81		M	11.2	TI	35	L	5	92	2.1	3			HOR02
1997 10 11.13	a	S	11.7	AC	25.4	J	6	88	1.8	3/			BOU
1997 10 17.74		M	11.2	TI	13	L	8	69	2.2	2/			HOR02
1997 10 18.79		S	11.2	TI	13	L	8	69	2	2/			HOR02
1997 10 19.73		M	10.8	TI	35	L	5	92	2.6	3			HOR02
1997 10 19.74		M	11.4	HS	35	L	5	92	1.4	4			PLS
1997 10 20.16		S	11.4	AC	20.0	T	10	185	2.0	4/			SPR
1997 10 21.04	a	S	11.8	FG	20	L	6	47	1.5	3			CRE01
1997 10 21.80		S	11.5	GA	25.4	J	6	72	1.7	4			BOU
1997 10 21.84		M	10.7	TI	13	L	8	69	3.0	3			HOR02
1997 10 23.74		M	10.7	TI	35	L	5	92	2.3	3			HOR02
1997 10 23.77		S	11.5	HS	44.5	L	4	134	1.1	s6			SAR02
1997 10 23.77		S	11.6	HS	44.5	L	4	146	2	s4			LAN02
1997 10 24.88		S	11.4	HS	44.5	L	4	82	1.7	5			SAR02
1997 10 26.00		S	10.9	VF	20	L	5	33	2	4			BAR06
1997 10 26.69	a	S	10.9	PA	25	L	4	64	1	3			SHU
1997 10 26.72		S	10.8	VF	20	L	5	33	2	4			BAR06
1997 10 26.74		S	11.2	AC	15.2	L	5	42	3.0	2			MOE
1997 10 27.19		S	11.0	AC	20.0	T	10	125	2.5	4/			SPR
1997 10 27.69	a	S	10.9	PA	25	L	4	64	1.3	3			SHU
1997 10 27.75		S	11.2	TI	10	B		25	3	3/			ZNO
1997 10 27.75		S	11.4	AC	15.2	L	5	42	2.5	2			MOE
1997 10 27.76		S	11.1	HS	20.3	T	10	77	1.6	2/			KAM01
1997 10 27.77		M	11.2:	TI	20	L	5	48	1.9	3			PLS
1997 10 27.77		S	11.5	GA	25.4	J	6	72	2.0	4			BOU
1997 10 28.78		S	11.2	HS	20.3	T	10	93	0.8	4			HAS02
1997 10 28.86		S	11.6	NP	25.3	L	6	58	& 1.4	6			PER01
1997 10 28.87		M	10.9	TI	20	L	5	48	2.5	2/			HOR02
1997 10 30.75		S	11.5	AC	15.2	L	5	42	2.5	2			MOE
1997 10 30.76		M	10.8	TI	20	L	5	48	3.0	3/			HOR02
1997 11 01.73		M	11.1	TI	10	B		25	2.7	3			ZNO

Comet C/1997 L1 (Xinglong)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 06 12.60		C	17.1	GA	60.0	Y	6	a240	0.35		1.2m	200	NAK01
1997 06 29.59		C	17.3	GA	60.0	Y	6	a240	0.35		0.7m	193	NAK01
1997 07 05.59		C	17.6	GA	60.0	Y	6	a240	0.35		0.7m	185	NAK01
1997 07 23.52		C	17.4	GA	60.0	Y	6	a240	0.4		0.7m	157	NAK01
1997 08 24.48		C	18.0	GA	60.0	Y	6	a240	0.3			150	NAK01
1997 09 19.45	a	C	18.3	GA	60.0	Y	6	a240	0.35			130	NAK01

Comet C/1997 N1 (Tabur)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 09 15.79		I	9.4	HS	8.0	B		20					OKS
1997 09 16.78		S	10.5	HS	8	R	11	67					OKS
1997 09 21.78		O	11.5	TI	35	L	5	92	! 2.0				HOR02
1997 09 25.79		S	11.0	HS	20.3	T	10	51					HAS02
1997 09 28.80		I	14.0:	AA	25	L	6	93					AND01
1997 10 05.92		I	14.5:	HS	38	L	4	92					WAR01

Comet C/1997 O1 (Tilbrook)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 07 25.48		S	10.5:	VN	20.0	L	4	45	1.5	3			PEA
1997 07 26.40		S	9.8	VN	25.4	L	6	37	6	2			SEA01
1997 07 26.46		S	10.3	AA	20.0	L	4	45	2.6	3/			PEA
1997 07 27.33		S	10.9	VN	31.7	L	5	64	1	1			JON
1997 07 27.47		S	10.3	AA	20.0	L	4	45	2.4	3/			PEA
1997 07 28.35		S	9.5	VN	25.4	L	6	37	3	4			SEA01
1997 07 28.42		S	9.5	AA	10.0	B		25					SEA

Comet C/1997 01 (Tilbrook) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 07 29.35		S	9.5	VN	25.4	L	6	37	3.5	2			SEA01
1997 07 29.40		S	9.5	AA	10.0	B		25	5	4			SEA
1997 07 30.40		S	9.7	AA	10.0	B		25					SEA
1997 07 31.36		S	9.7	VN	25.4	L	6	37	3	2			SEA01
1997 07 31.36		S	9.9	AA	10.0	B		25					SEA
1997 08 01.35		S	10.1	VN	25.4	L	6	37	3	2			SEA01
1997 08 01.39		S	10.0	AA	10.0	B		25					SEA
1997 08 02.38		S	10.1	VN	25.4	L	6	37	3	3			SEA01
1997 08 03.36		S	10.3	VN	25.4	L	6	37	2.7	3			SEA01
1997 08 05.36		S	10.2	VN	25.4	L	6	37	2.5	2			SEA01
1997 08 06.36		S	10.4	VN	25.4	L	6	37	2.5	3			SEA01
1997 08 07.38		S	10.3	VN	25.4	L	6	37	2	3			SEA01
1997 08 07.88	a	S	11.1:	NP	44.5	L	5	74	1	2/			MAR02
1997 08 21.41		S	11.0	GA	10.0	B		25					SEA
1997 08 24.36		S	10.8	VN	25.4	L	6	37	2	1			SEA01
1997 08 27.38		S	11.3	VN	25.4	L	6	37	1.2	1			SEA01
1997 08 27.45	a	C	12.2:	GA	60.0	Y	6	a 60	1.9				NAK01
1997 08 28.37		S	[11.3	VN	25.4	L	6	37					SEA01
1997 08 30.85	a	S	12.4:	NP	32.0	L	5	57	2	2			MAR02

Comet C/1997 P2 (Spacewatch)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 26.63		C	18.9:	GA	60.0	Y	6	a240	0.25				NAK01
1997 08 27.61		C	18.7	GA	60.0	Y	6	a240	0.3				NAK01
1997 08 28.62		C	18.7	GA	60.0	Y	6	a240	0.3				NAK01
1997 09 04.62		C	18.7	GA	60.0	Y	6	a240	0.3				NAK01

Comet C/1997 T1 (Utsunomiya)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.	
1997 10 06.07		M	11.1	PA	41.0	L	6	123	1.0	s6/			GLI	
1997 10 06.07		S	9.9	NP	25.4	L	4	44	& 2	2/	3.0m	140	GRE	
1997 10 06.17		S	10.0	AC	20.0	T	10	113	2.0	4/			SPR	
1997 10 06.51		S	9.5	TI	10.0	B		20	6.0	4			NAG08	
1997 10 06.75		M	10.5	TI	35	L	5	92	2.8	5	0.17	110	PLS	
1997 10 06.76		M	10.3	TI	10	B		25	2.2	4	0.05	140	ZNO	
1997 10 06.78		M	10.6	AC	25.4	J	6	72	2.5	5			BOU	
1997 10 06.85		M	10.4	TI	35	L	5	92	1.8	5	0.10	130	HOR02	
1997 10 07.87		M	10.2	AC	25.4	J	6	58	2.8	6	0.10	131	BOU	
1997 10 08.56		S	10.4:	TI	10.0	B		20	2	4			NAG08	
1997 10 08.60		M	10.6	HS	25.0	L	6	63	2.5	4	2.5m	115	TSU02	
1997 10 08.76		S	9.3	TI	25.4	T	6	60	5	5			YOS04	
1997 10 08.82		S	10.2	NP	15.0	R	5	25	5	4			NAG02	
1997 10 09.00		M	10.6	TI	25.3	L	6	58	& 2	5			VIT01	
1997 10 09.01		M	10.1	TI	25.3	L	6	58	& 2.5	5			PER01	
1997 10 09.01		S	10.2	TI	25.3	L	6	58	& 2.5	5			PER01	
1997 10 09.80		M	10.0	TI	35	L	5	92	2.3	5	0.12	130	HOR02	
1997 10 09.90		M	10.6	TI	35	L	5	92	2.8	4/	0.09	120	PLS	
1997 10 10.62		C	10.9	GA	60.0	Y	6	a120	2.9		> 8.0m	105	NAK01	
1997 10 11.05		M	10.1	AA	20	L	6	47	1.5	4			CRE01	
1997 10 11.29		M	10.0	AA	8.0	B		16	1.8	3			CRE01	
1997 10 12.18		S	9.8	AC	20.0	T	10	64	2.4	5/			SPR	
1997 10 13.06		M	9.9	TI	13	L	8	69	3.3	4			HOR02	
1997 10 14.87	!	V	10.8	YF	36.0	T	7	a120	+ 3.5	5	&10	m	80	MIK
1997 10 16.07		S	10.2	TI	25.3	L	6	58	& 1.5	3/			PER01	
1997 10 16.08		S	10.2	TI	25.3	L	6	58	& 1.2	2/			VIT01	
1997 10 16.79		M	9.3	TI	13	L	8	69	2.6	4			HOR02	
1997 10 18.72		S	10.0	VF	11	L	7	50	4	3			BAR06	
1997 10 18.75		M	9.8	TI	13	L	8	69	3.2	4			HOR02	
1997 10 18.76		S	9.8	AA	15.0	R	8	30	4	7			DIE02	
1997 10 19.72		S	10.2:	VF	11	L	7	50	3.5	3			BAR06	
1997 10 19.75		M	9.5:	TI	13	L	8	69	3.3	4	0.10	90	PLS	
1997 10 19.75		M	9.8	TI	13	L	8	69	3.1	4/	0.10	85	HOR02	
1997 10 19.77		S	9.8	AA	15.0	R	8	30	3	7			DIE02	

Comet C/1997 T1 (Utsunomiya) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 10 19.79	!	V	10.5	YF	36.0	T	7	a120	+ 4.0	5	&12 m	75	MIK
1997 10 20.02		M	10.0	AA	20	L	6	47	2.0	4	0.05	90	CRE01
1997 10 20.15		S	9.4	AA	20.0	T	10	125	2.5	5/			SPR
1997 10 20.85		S	10.0	AA	15.0	R	8	30	3	7			DIE02
1997 10 21.03		M	9.9	FG	20	L	6	47	2.4	5	0.1	95	CRE01
1997 10 21.72		S	10.4	VF	11	L	7	32	3	3/			BAR06
1997 10 21.72		S	10.5	VF	11	L	7	50	2.7	4			BAR06
1997 10 21.85		M	9.7	TI	13	L	8	69	> 2.8	4/			HOR02
1997 10 21.85		S	9.8	AA	15.0	R	8	30	3	7			DIE02
1997 10 22.44		S	10.1	TI	40.0	L	6	96	1.6	6	& 3 m	110	NAG08
1997 10 22.85		S	9.9	AA	15.0	R	8	30	3	6			DIE02
1997 10 23.00		S	10.1	TI	25.3	L	6	58	& 1.6	4/			PER01
1997 10 23.77		S	10.0	HS	10.0	B		25	3.2	4			HAS02
1997 10 23.78		M	9.7:	TI	13	L	8	69	> 2.5	4/			HOR02
1997 10 23.78		M	10.6	HS	44.5	L	4	82	2.2		0.3	85	LAN02
1997 10 23.78		M	10.8	HS	44.5	L	4	82	2.3	6	0.2	70	SAR02
1997 10 24.18		S	9.7	AA	20.0	T	10	64	2.2	5			SPR
1997 10 24.76		M	10.0	HS	44.5	L	4	82	3	6	0.3	70	SAR02
1997 10 24.81		S	9.9	AA	15.0	R	8	30	2.5	6			DIE02
1997 10 25.85		S	9.7	VF	15	L	6	51	4	2	?0.15	208	BAR06
1997 10 26.41		C	10.5	GA	60.0	Y	6	a120	3.4		> 8.9m	66	NAK01
1997 10 26.45		S	9.7	NP	15.0	R	5	25	6	4			NAG02
1997 10 26.62	a	S	10.0	SE	25	L	4	64	4.5	4			SHU
1997 10 26.71	a	S	9.8	PA	25	L	4	64	5	4			SHU
1997 10 26.74		S	10.2	AC	15.2	L	5	42	3.5	3			MOE
1997 10 27.19		S	9.6	AA	20.0	T	10	64	2.8	4/			SPR
1997 10 27.48		S	10.3	TI	10.0	B		37	2	4			YOS02
1997 10 27.65	a	M	10.1	SE	25	L	4	64	5	4			SHU
1997 10 27.74		S	10.1	AC	15.2	L	5	42	3.0	3	0.07	60	MOE
1997 10 27.76		M	9.8	TI	10	B		25	2.4	5/	0.13	55	ZNO
1997 10 27.76		S	9.6:	VF	20	L	5	33	& 4.5	3			BAR06
1997 10 27.78		J	9.4	SC	25.4	T	5		3.26	s5	4.6m	78	ROQ
1997 10 27.79		M	9.8	TI	20	L	5	48	3.5	4/	0.05	65	PLS
1997 10 27.79		S	9.5	TJ	20.3	T	10	77	2.0	4/			KAM01
1997 10 27.86		S	10.0	AA	15.0	R	8	30	2.5	4			DIE02
1997 10 28.72		S	9.4	VF	20	L	5	33	5	3			BAR06
1997 10 28.73		S	9.8	VF	8.0	B		12		3/			BAR06
1997 10 28.74		M	10.2	TI	15	R	15	56	1.5	2			KUB
1997 10 28.81		S	10.0	AA	15.0	R	8	30	2.5	5			DIE02
1997 10 28.81		S	10.0	TI	10.0	B		14	& 3	2/			PER01
1997 10 28.84		S	10.4	TI	25.3	L	6	58	& 2.5	4			PER01
1997 10 29.48		S	10.5	TI	40.0	L	6	120	1.1	6/	& 2 m	80	NAG08
1997 10 29.72		M	9.5	VF	20	L	5	33	6.1	3			BAR06
1997 10 29.80		S	10.0	AA	15.0	R	8	30	2.5	5			DIE02
1997 10 29.82		S	9.7	TJ	20.3	T	10	50	3.0	4/			KAM01
1997 10 30.74		S	10.1	AC	15.2	L	5	42	3.5	2	0.08	65	MOE
1997 10 30.80		S	10.0	AA	15.0	R	8	30	2.5	5			DIE02
1997 10 30.81		S	10.0	TI	25.3	L	6	58	& 2.4	4			PER01
1997 10 30.81		S	10.0	TI	25.3	L	6	58	& 3	5			VIT01
1997 10 30.86		M	9.7	NP	21.0	L	6	44	4	5			MAR02
1997 11 01.75		M	9.7	TI	10	B		25	3	4/	0.17	65	ZNO

Comet 2P/Encke

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 06 29.34		S	6.8	SC	8.0	B		15	13	1			SEA01
1997 06 30.35		S	7.5	SC	8.0	B		15	10	1			SEA01
1997 07 01.34		S	7.2	SC	8.0	B		15	12	3			SEA01
1997 07 04.35		S	6.3	SC	8.0	B		15	15	1			SEA01
1997 07 04.38		S	6.5	SC	5.0	B		10	11	1			SEA01
1997 07 07.41		S	7.2	SC	8.0	B		15	10	1			SEA01
1997 07 14.47		S	8.3	AA	25.4	L	6	37	1.5	5			SEA01

Comet 43P/Wolf-Harrington

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 12.10	!	V	14.1	YF	36.0	T	7	a180	+ 0.8	7	& 1.5m	270	MIK
1997 08 26.11		C	13.6	HS	60	L	6	a120			1.5m	281	GAL03
1997 08 28.81		C	13.4	GA	60.0	Y	6	a120	1.2		7.1m	282	NAK01
1997 09 01.10		S	12.6	HS	35	L	5	237	0.8	1/			HOR02
1997 09 01.11		S	13.2	AC	25.4	J	6	115	0.6	3			BOU
1997 09 02.06		S	12.5	HS	35	L	5	237	0.6	2			PLS
1997 09 02.08		S	12.9:	HS	35	L	5	237	0.7	1/			HOR02
1997 09 05.11		S	13.1	AC	25.4	J	6	115	0.9	2			BOU
1997 09 09.14		S	13.4:	NP	20	T	10	205	0.9	2			SHA02
1997 09 10.80	a	C	13.5	GA	60.0	Y	6	a120	1.2		6.8m	284	NAK01
1997 09 11.11		S	13.0	AC	25.4	J	6	115	0.9	1			BOU
1997 09 12.09		S	12.6	AC	25.4	L	5	104	0.9	2/			MEY
1997 09 12.44	!	J	12.4	SC	25.4	T	5		0.65	s3	3.5m	285	ROQ
1997 09 29.11		S	12.3	TI	35	L	5	158	1.0	2			HOR02
1997 10 03.87		S	12.0	VN	20.0	L	4	190					PEA
1997 10 06.45		J	11.7	SC	25.4	T	5		2.09	s3	4.0m	287	ROQ
1997 10 11.14	a	S	12.7	AC	25.4	J	6	100	1.0	1			BOU
1997 10 13.45	!	J	12.6	SC	25.4	T	5		0.7	s6	4.8m	292	ROQ
1997 10 28.01		S	11.9	HS	35	L	5	158	1.2	2			HOR02
1997 10 28.11	a	S	12.8	AC	25.4	J	6	115	1.0	2			BOU
1997 10 29.17		S	12.7	AC	25.4	J	6	100	1.0	1/			BOU
1997 10 29.18		S	12.9	HS	20.3	T	10	156	0.9	4			HAS02
1997 10 31.16		S	12.6	AC	25.4	J	6	100	1.2	1/			BOU

Comet 46P/Wirtanen

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 28.67		S	10.0:	AC	11	L	7	32	8	0/			NAU
1997 05 19.86		O	11.3:	TI	20	L	4	57	1.5	2			KYS

Comet 48P/Johnson

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 05 31.71		C	16.9	GA	60.0	Y	6	a240	0.4		1.2m	278	NAK01
1997 06 12.69	a	C	16.3	GA	60.0	Y	6	a240	0.55			280	NAK01
1997 06 29.66		C	15.6	GA	60.0	Y	6	a240	0.65		2.2m	269	NAK01
1997 07 05.64		C	15.4	GA	60.0	Y	6	a120	0.8		2.8m	276	NAK01
1997 07 22.98		C	15.6	HS	60	L	6	a160	0.25				GAL03
1997 07 24.59		C	15.2	GA	60.0	Y	6	a120	0.6				NAK01
1997 08 05.92		S	13.6	HS	44.0	L	5	222	0.25	4			HAS02
1997 08 27.50		C	15.2	GA	60.0	Y	6	a120	0.75				NAK01
1997 08 31.87		S	13.5	HS	44.0	L	5	222	0.25	3			HAS02
1997 10 26.43		C	15.7	GA	60.0	Y	6	a120	0.65				NAK01

Comet 65P/Gunn

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 30.08		S	13.2	NP	32.0	L	5	57	1	1			MAR02
1997 08 31.08		S	13.4	NP	32.0	L	5	57	1	1			MAR02
1997 09 06.09		S	13.5:	NP	20	T	10	60	0.8	3			SHA02
1997 10 23.88		S	14.7	HS	44.5	L	4	230	0.7	2/			SAR02
1997 10 24.88		S	15.3	HS	44.5	L	4	230	0.7				SAR02

Comet 78P/Gehrels 2

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 11.05		M	12.3	HS	35	L	5	158	1.1	2/			HOR02
1997 08 12.04		S	12.0	TI	35	L	5	158	1	1/			PLS
1997 08 12.05		M	12.0	TI	35	L	5	158	1.0	2			HOR02
1997 08 12.08	!	V	13.1	YF	36.0	T	7	a300	+ 1.3	6	& 3 m	268	MIK
1997 08 28.80		C	12.5	GA	60.0	Y	6	a120	1.9		6.3m	266	NAK01
1997 08 30.09		S	12.8	NP	32.0	L	5	57	1	1			MAR02
1997 08 31.09		S	12.5	NP	32.0	L	5	57	> 1	1/			MAR02
1997 09 01.09		S	12.4	AC	25.4	J	6	115	0.8	3			BOU
1997 09 01.10		M	11.9	TI	35	L	5	158	1.3	2/			HOR02

Comet 78P/Gehrels 2 [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 09 02.04		M	11.9	TI	35	L	5	158	1.2	2/			HOR02
1997 09 02.08		C	13.2	HS	60	L	6	a120			3	m 265	GAL03
1997 09 02.09		M	12.5	HS	35	L	5	92	0.9	2/			PLS
1997 09 05.09		S	12.5	AC	25.4	J	6	115	0.8	4/			BOU
1997 09 06.11		S	13.3:	NP	20	T	10	205	0.4	4			SHA02
1997 09 09.12		S	13.2	NP	20	T	10	135	0.7	3			SHA02
1997 09 10.77		M	12.9	HS	25.0	L	6	120	0.6	3	1.5m	280	TSU02
1997 09 10.78		C	12.6:	GA	60.0	Y	6	a120	1.6		> 7.4m	272	NAK01
1997 09 11.10		S	12.4	AC	25.4	J	6	115	1.1	3/			BOU
1997 09 11.10	!	V	13.1	YF	36.0	T	7	a300	+ 1.3	7	& 3	m 270	MIK
1997 09 12.06		S	12.2	AC	25.4	L	5	104	0.8	4			MEY
1997 09 27.15		S	12.7	HS	20.3	T	10	156	0.4	4			HAS02
1997 09 29.09		M	11.3	TI	35	L	5	92	1.0	2			HOR02
1997 10 03.84		S	12.5:	VN	20.0	L	4	190	1	3			PEA
1997 10 05.08		S	11.7	HS	25.4	L	6	104	2.5	2			BAK01
1997 10 05.08		S	12.1	HS	25.4	L	6	104	1.4	3			SAR02
1997 10 06.10		S	12.1	HS	35	L	5	158	1.0	2			HOR02
1997 10 06.48		J	12.8	SC	25.4	T	5		0.51	4	2.3m	280	ROQ
1997 10 11.15		S	12.7	AC	25.4	J	6	115	1.2	3			BOU
1997 10 11.50		c	17.8	FA	91.4	L	5						SC002
1997 10 11.51		C	13.3	FA	91.4	L	5		1.73		12.3m	276	SC002
1997 10 13.42		J	12.1	SC	25.4	T	5		0.7	s5	3.1m	276	ROQ
1997 10 24.94		S	12.5	HS	44.5	L	4	230	1.5	1			SAR02
1997 10 26.33	!	J	11.8	SC	25.4	T	5		1.22	s5	3.5m	274	ROQ
1997 10 28.03		S	12.1	HS	35	L	5	158	1.2	2/			HOR02
1997 10 28.96		M	12.2	HS	35	L	5	104	1.2	2/			HOR02
1997 10 29.15		S	12.6	AC	25.4	J	6	115	1.1	4			BOU
1997 10 29.17		S	12.0	HS	20.3	T	10	156	0.6	3			HAS02
1997 10 31.13		S	12.7	AC	25.4	J	6	100	1.1	4			BOU

Comet 81P/Wild 2

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 02 01.95		B	10.7	GA	11.0	L	7	30	2.5	1			BAL02
1997 02 28.78		B	10.4	GA	11.0	L	7	30	3.0	2			BAL02
1997 03 02.92		S	9.1	AC	8.0	B		12	&12	3/			NAU
1997 03 05.73		S	8.9	AC	8.0	B		12	&14	3/			NAU
1997 03 05.85		B	10.2	GA	11.0	L	7	30	3.0	2			BAL02
1997 03 11.75		S	9.7	AC	11	L	7	32	4	2			NAU
1997 03 11.92		S	9.4	AC	11	L	7	32	6	3/			NAU
1997 03 28.16		S	9.8	AA	11	L	7	80	2	3			IVA03
1997 03 29.08		S	9.8	AA	11	L	7	80	2	3			IVA03
1997 03 31.85		S	9.4	AC	8.0	B		12	&18	d2			NAU
1997 03 31.86		S	9.6	AC	11	L	7	32	&15	0/			NAU
1997 04 01.89		S	9.6	AC	11	L	7	32		2/			NAU
1997 04 03.01		S	9.8	AA	11	L	7	80	2	3			IVA03
1997 04 06.20		S	9.9	AA	20.0	T	10	101	2.0	3/			SPR
1997 04 07.79		S	9.9	AA	11	L	7	80	2	3			IVA03
1997 04 10.78		S	9.9	AA	11	L	7	80	2	3			IVA03
1997 04 11.78		S	9.9	AA	11	L	7	80	2	3			IVA03
1997 04 29.82		S	10.8	AC	11	L	7	32					NAU
1997 05 03.83		S	9.6	VF	20	L	5	71	4	4			BAR06
1997 05 04.83		E	10.5:	AA	13.3	R	5	40	2.9	3			SC004
1997 05 05.17		S	9.9	VF	20	L	5	71	4	2/			BAR06
1997 05 19.88		O	11.1:	TI	20	L	4	57	1.5	2			KYS
1997 05 26.85		S	[10.2:	VF	11	L	7	32	! 2				BAR06
1997 05 28.83		S	[10.0:	VF	11	L	7	32	! 2				BAR06
1997 07 30.48	a	C	12.9	GA	60.0	Y	6	a120	2.1				NAK01
1997 08 07.89	a	S	12.3:	NP	44.5	L	5	74	1.5	1			MAR02

Comet 94P/Russell 4

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 07 23.48		a	C	18.5	GA	60.0	Y	6	a240	0.3			NAK01

Comet 103P/Hartley 2

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 05 31.72		C	18.7	GA	60.0	Y	6	a240	0.25			235	NAK01
1997 06 29.73		C	17.0	GA	60.0	Y	6	a240	0.5				NAK01
1997 07 22.95		C	17.5:	HS	60	L	6	a 90		9			GAL03
1997 07 24.58		C	16.4	GA	60.0	Y	6	a120	0.45				NAK01
1997 08 02.91	!	V	16.7	GA	36.0	T	7	a300	+ 0.4	7			MIK
1997 08 04.88	!	V	16.3	L	36.0	T	7	a300	+ 0.4	7			MIK
1997 08 09.89	!	V	16.2	L	36.0	T	7	a300	+ 0.5	7			MIK
1997 08 09.93		S	[14.0	HS	44.0	L	5	222					HAS02
1997 08 23.87		C	17 :	HS	60	L	6	a240			20	s 222	GAL03
1997 08 24.53		C	15.9	GA	60.0	Y	6	a120	0.55				NAK01
1997 08 30.02		S	13.9	NP	32.0	L	5	57	< 1	0			MAR02
1997 08 30.85		S	13.0:	AC	25.4	L	5	104	0.7	2			MEY
1997 08 30.90		S	13.5	NP	32.0	L	5	57	1	1			MAR02
1997 08 31.85		S	13.6	HS	35	L	5	237	0.6	2			HOR02
1997 08 31.85		S	13.6:	HS	35	L	5	237	0.6	2			PLS
1997 09 01.88		S	13.7	HS	35	L	5	237	0.8	2			HOR02
1997 09 03.83	!	V	15.9	L	36.0	T	7	a300	+ 0.5	7			MIK
1997 09 05.79		S	14.5:	HS	30	L	6	150	1				SAR02
1997 09 05.79		S	14.9	HS	30	L	6	150	1				BAK01
1997 09 05.82	!	V	15.6	L	36.0	T	7	a300	+ 0.5	7			MIK
1997 09 06.78		S	14.7:	HS	30	L	6	150	0.8				SAR02
1997 09 07.87		S	13.2	AC	25.4	J	6	115	0.9	1/			BOU
1997 09 08.80	!	V	15.4	L	36.0	T	7	a300	+ 0.5	7			MIK
1997 09 08.84		S	13.6	HS	44.0	L	5	156	0.4	2			HAS02
1997 09 08.89		S	13.9:	VB	30	R	18	170	0.6	2			SHA02
1997 09 16.78	!	V	15.3	YF	36.0	T	7	a300	+ 0.5	6			MIK
1997 09 19.46		C	15.1	GA	60.0	Y	6	a120	0.65		105		NAK01
1997 09 20.81		S	13.5	HS	35	L	5	237	0.7	2			HOR02
1997 09 21.81		S	13.4	HS	35	L	5	237	0.8	2			HOR02
1997 09 21.82		S	12.6	AC	25.4	J	6	88	1.3	1			BOU
1997 09 22.84		S	13.3	HS	35	L	5	237	0.9	1/			HOR02
1997 09 22.84		S	13.5	VB	30	R	18	170	0.4	3			SHA02
1997 09 24.83		S	12.9	HS	35	L	5	158	1.1	1/			HOR02
1997 09 24.84		S	12.7	HS	35	L	5	158	1.0	2			PLS
1997 09 26.78	!	V	14.3	YF	36.0	T	7	a300	+ 1.2	5			MIK
1997 09 28.81	M	12.8	HS	35	L	5	158	1.0	2				HOR02
1997 10 01.12	J	13.6	SC	25.4	T	5		0.31	d1/	?			ROQ
1997 10 02.83	S	11.4	GA	25.3	L	6	58	& 1.6	3				PER01
1997 10 03.50	S	[12.0	VN	20.0	L	4	190						PEA
1997 10 03.79	S	13.0	HS	25.4	L	6	104	1	2				SAR02
1997 10 04.19	J	13.4	SC	25.4	T	5		0.27	d2				ROQ
1997 10 05.79	S	12.5	HS	35	L	5	92	1.1	2				PLS
1997 10 05.80	S	12.4	HS	35	L	5	158	1.2	2				HOR02
1997 10 06.77	S	11.8	TI	10	B		25	1.2	5				ZNO
1997 10 19.75	S	11.8	TI	35	L	5	92	1.4	2/				HOR02
1997 10 20.44	S	11.2	GA	10.0	B		25						SEA
1997 10 21.43	C	13.3:	GA	60.0	Y	6	a120	1.3					NAK01
1997 10 23.76	S	12.4	HS	44.5	L	4	134	2	3				SAR02
1997 10 23.76	S	13.0:	HS	44.5	L	4	146		2				LAN02
1997 10 24.73	M	10.5	TI	35	L	5	92	2.0	2				HOR02
1997 10 26.42	C	12.5	GA	60.0	Y	6	a120	2.5			70		NAK01
1997 10 26.53	S	11.9	AC	20.0	L	4	190	1.3	3				PEA
1997 10 26.75	S	11.5:	AC	15.2	L	5	42	1.5	2				MOE
1997 10 27.74	M	9.8	TI	20	L	5	48	3	1/				PLS
1997 10 27.75	S	11.6:	AC	15.2	L	5	76	2.0	1				MOE
1997 10 27.75	S	11.7	TI	10	B		25	1.8	4				ZNO
1997 10 27.84	S	11.1	TI	35	L	5	104	2	2				HOR02
1997 10 28.51	S	11.9	AC	20.0	L	4	100	1.5	3/				PEA
1997 10 30.75	S	11.6:	AC	15.2	L	5	76	1.5	1				MOE
1997 10 30.85	S	10.4	NP	21.0	L	6	44	3	2				MAR02
1997 11 01.72	S	10.7	TI	10	B		25	3.5	3				ZNO

Comet 104P/Kowal 2

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 06 29.75		C	18.2	GA	60.0	Y	6	a240	0.3		0.5m	238	NAK01
1997 07 05.75		C	17.8	GA	60.0	Y	6	a240	0.4		0.7m	239	NAK01
1997 07 23.03		C	16.7	HS	60	L	6	a240			35 s	232	GAL03
1997 08 01.73		C	16.6	GA	60.0	Y	6	a240	0.55		0.9m	239	NAK01
1997 08 26.66		C	15.3	GA	60.0	Y	6	a120	0.7		1.1m	234	NAK01
1997 08 28.66		C	15.4	GA	60.0	Y	6	a120	0.85		1.0m	229	NAK01
1997 09 09.56		C	15.1	GA	60.0	Y	6	a120	1.0		1.3m	222	NAK01
1997 09 29.60		C	14.8	GA	60.0	Y	6	a120	1.2			230	NAK01
1997 10 22.53		C	14.1:	GA	60.0	Y	6	a120	1.6			230	NAK01
1997 10 24.79		S	14.1	HS	35	L	5	260	0.8	2			HOR02
1997 10 27.89		S	14.1	HS	35	L	5	207	1.0	2			HOR02
1997 10 28.86		S	14.1	HS	35	L	5	207	1.0	2			HOR02
1997 10 30.77		S	13.9	HS	35	L	5	207	1.0	2/			HOR02

Comet 128P/Shoemaker-Holt 1

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 28.78		C	17.4	GA	60.0	Y	6	a240	0.35		1.4m	255	NAK01
1997 09 10.76		C	17.0	GA	60.0	Y	6	a240	0.5		1.8m	263	NAK01
1997 09 11.09		!	V 17.1	YF	36.0	T	7	a300	+ 0.3	6			MIK
1997 10 12.77		C	16.4	GA	60.0	Y	6	a120	0.5		1.8m	279	NAK01
1997 10 27.73		C	16.1	GA	60.0	Y	6	a120	0.55		2.6m	259	NAK01

Comet 128P/Shoemaker-Holt 1 [nucleus B]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 10 10.47		c	18.3	FA	91.4	L	5						SC001
1997 10 10.48		C	16.1	FA	91.4	L	5		0.27		267.0s	266	SC001
1997 10 11.48		c	19.9	FA	91.4	L	5						SC002
1997 10 11.49		C	16.5	FA	91.4	L	5		0.32		236.4s	266	SC002

Comet 130P/McNaught-Hughes

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 04 29.67		C	20.3	GA	60.0	Y	6	a480		9			NAK01
1997 05 31.55		C	19.6	GA	60.0	Y	6	a480	0.25				NAK01

Comet 131P/Mueller 2

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 07 05.48		C	19.9	GA	60.0	Y	6	a240	0.25				NAK01
1997 08 26.77		C	18.7:	GA	60.0	Y	6	a240	0.25				NAK01
1997 08 28.69		C	18.6	GA	60.0	Y	6	a240	0.3				NAK01
1997 09 10.65		C	18.4	GA	60.0	Y	6	a240	0.3			235	NAK01
1997 09 23.47		C	18.1	FA	91.4	L	5						SC001
1997 09 29.70		C	17.9	GA	60.0	Y	6	a240	0.4			180	NAK01
1997 10 09.35		c	20.6	FA	91.4	L	5						SC001
1997 10 09.36		C	18.2	FA	91.4	L	5		0.22		30.6s	228	SC001
1997 10 27.66		C	17.6	GA	60.0	Y	6	a240	0.45			210	NAK01

Comet 132P/Helin-Roman-Alu 2

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 08 28.75		C	17.9	GA	60.0	Y	6	a240	0.3			250	NAK01
1997 09 10.70		C	17.6	GA	60.0	Y	6	a240	0.4		1.1m	253	NAK01
1997 09 29.72		C	16.8	GA	60.0	Y	6	a240	0.55		2.0m	255	NAK01
1997 10 12.39		C	16.1	FA	91.4	L	5		0.22		146.4s	258	SC001
1997 10 12.39		c	20.0	FA	91.4	L	5						SC001
1997 10 23.80		S	15.1	HS	44.5	L	4	230	0.9	2			SAR02
1997 10 24.89		S	14.8	HS	44.5	L	4	230	0.7	2/			SAR02
1997 10 27.67		C	15.8	GA	60.0	Y	6	a120	0.6		1.4m	261	NAK01

Comet 133P/Elst-Pizarro

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1997 10 10.49		C	20.3	FA	91.4	L	5			9			SC001

75th ANNIVERSARY: IAU Circulars

On October 22, the Central Bureau for Astronomical Telegrams issued *International Astronomical Union Circular* No. 6759 on the seventy-fifth anniversary of the issuance of *IAUC* 1 at the Copenhagen Observatory (1922 Oct. 22). For the past three-quarters of a century, the *IAUCs* have been the official source for announcing new comets, along with their official designations and names.

Φ Φ Φ

DESIGNATIONS OF RECENT COMETS

Listed below, for handy reference, are the last 35 comets to have been given designations in the new system. The name, preceded by a star (*) if the comet was a new discovery (compared to a recovery from predictions of a previously-known short-period comet). Also given are such values as the orbital period (in years) for periodic comets, date of perihelion, T (month/date/year), and the perihelion distance (q , in AU). Four-digit numbers in the last column indicate the *IAU Circular* (4-digit number) containing the discovery/recovery or permanent-number announcement.

Not included below are numerous recently-discovered comets observed only with the ESA/NASA Solar and Heliospheric Observatory (SOHO) spacecraft — and seen only close to the sun with the SOHO instruments — that are presumed to be Kreutz sungrazers that are no longer in existence (*IAUC* 6653, 6669, 6676, 6685, 6688, 6692, 6693, 6701, 6713, 6715, 6727, 6733, 6745, 6750, 6754, 6759, 6771): C/1996 B3, C/1996 D1, C/1996 F2, C/1996 H1, C/1996 M1, C/1996 M2, C/1996 O1, C/1996 O2, C/1996 O3, C/1996 O4, C/1996 Q2, C/1996 Q3, C/1996 S3, C/1996 X1, C/1996 X2, C/1996 Y1, C/1997 B2, C/1997 K1, C/1997 L3, C/1997 L4, C/1997 M1, C/1997 P1, C/1997 Q1, C/1997 Q2, C/1997 R1, C/1997 R2, C/1997 R3, C/1997 S1, C/1997 T2, C/1997 T4, C/1997 T5, and C/1997 V2. [This list updates that in the July 1997 issue, p. 155.]

<i>New-Style Designation</i>	<i>P</i>	<i>T</i>	<i>q</i>	<i>IAUC</i>
125P/1996 F1 (Spacewatch)	5.6	7/14/96	1.54	6349
* C/1996 J1 (Evans-Drinkwater)		12/30/96	1.30	6397
* C/1996 N1 (Brewington)		8/3/96	0.93	6428
* P/1996 N2 (Elst-Pizarro)	5.6	4/18/96	2.63	6456
126P/1996 P1 (IRAS)	13.3	10/29/96	1.70	6446
* C/1996 P2 (Russell-Watson)		3/1/96	2.01	6448
* C/1996 Q1 (Tabur)		11/3/96	0.84	6455
* C/1996 R1 (Hergenrother-Spahr)		8/29/96	1.90	6470
* P/1996 R2 (Lagerkvist)	7.3	1/18/97	2.62	6473
* C/1996 R3		5/30/96	1.8	6564
127P/1996 S1 (Holt-Olmstead)	6.3	2/6/97	2.15	6475
128P/1996 S2 (Shoemaker-Holt 1)	9.5	11/20/97	3.05	6477
129P/1996 U1 (Shoemaker-Levy 3)	7.2	3/4/98	2.82	6494
* C/1997 A1 (NEAT)		6/19/97	3.16	6532
* P/1997 B1 (Kobayashi)	25.2	3/2/97	2.05	6553
* C/1997 BA ₆ (Spacewatch)		11/26/99	3.4	6561
* P/1997 C1 (Gehrels)	17.4	1/29/96	3.6	6549
* C/1997 D1 (Mueller)		10/11/97	2.25	6562
55P/1997 E1 (Tempel-Tuttle)	33.2	2/27/98	0.98	6579
* P/1997 G1 (Montani)	21.8	4/26/97	4.2	6622
* C/1997 G2 (Montani)		4/16/98	3.1	6626
130P/1997 H1 (McNaught-Hughes)	6.7	2/23/98	2.1	6640
* C/1997 J1 (Mueller)		5/3/97	2.3	6642
* C/1997 J2 (Meunier-Dupouy)		3/10/98	3.0	6648
* C/1997 H2 (SOHO)		5/2/97	0.14	6650
* C/1997 L1 (Xinglong)		11/22/96	4.9	6677
* C/1997 L2 (SOHO)		6/10/97	0.04	6684
* C/1997 N1 (Tabur)		8/15/97	0.40	6692
131P/1997 M2 (Mueller 2)	7.0	11/22/97	2.4	6695
P/1997 N2 (Helin-Roman-Alu 2)	8.2	11/10/97	1.9	6704
* C/1997 O1 (Tilbrook)		7/13/97	1.37	6705
* C/1997 P2 (Spacewatch)		8/31/97	4.3	6717
* C/1997 T1 (Utsunomiya)		12/10/97	1.36	6751
* P/1997 T3	17.2	3/7/98	4.2	6754
* P/1997 V1 (Larsen)	10.8	8/16/97	3.3	6767