

AUTHORS GUIDE

Version 3.0 2024 Feb 2

The *Minor Planet Bulletin (MPB)* is open to papers on all aspects of minor planet study. Theoretical, observational, historical, review, and other topics from amateur and professional astronomers are welcome. The level of presentation should be such as to be readily understood by most amateur astronomers. The preferred language is English. All observational and theoretical papers will be reviewed by another researcher prior to publication to insure that results are presented clearly and concisely. Typically, papers will be published within three months of receipt. However, material submitted on or before the posted deadline may or may not appear in that issue, depending on available space and editorial processing.

There is no formal word or page count limit. Manuscripts should be as concise as possible but not to the point of sacrificing clarity or accuracy.

For lightcurve articles, authors are encouraged to combine as many objects together in a single article as possible. When presenting data on more than one asteroid, the asteroids should be listed in numerical order throughout, i.e., in the title, abstract, text body, and tables. Unnumbered asteroids should be listed after any numbered asteroids and by designation, which is – generally – the order of discovery. See recent *MPB* issues for examples.

The *MPB* will not generally publish articles on instrumentation. Persons interested in details of CCD instrumentation should consult web sites that provide both general information and specifics for given programs, such as:

American Association of Variable Star Observers (AAVSO). An excellent CCD photometry handbook can be found on this site.
<http://www.aavso.org>

International Occultation Timing Association (IOTA).
<http://www.lunar-occultations.com/iota/iotandx.htm>

Astrometry measurements should be submitted to the IAU Minor Planet Center <http://minorplanetcenter.org/iau/mpc.html> and are no longer being published or reproduced in the *MPB*.

Checking Previous Research

When reporting lightcurve results, authors should consult the Astrophysics Data System (ADS, http://adsabs.harvard.edu/abstract_service.html) and the Asteroid Lightcurve Database (LCDB; <http://www.minorplanet.net/info/lightcurvedatabase.html>) to look for previous results on each object. If using the LCDB, your reference to previous results should not be to the LCDB. Instead, your reference should be to the original author and publication where the currently accepted “best result” is reported, e.g. Lagerkvist (1978).

Claims of priority: “These are the first lightcurves reported for asteroid x.” is not an appropriate style for the *Minor Planet Bulletin*. Instead, something like: “A search of the Asteroid Lightcurve Database (or other resources) did not find any previously reported results for asteroid x.” is considered more acceptable.

If previous results have been reported and they are different from yours (beyond the error margins), try fitting your data to those other periods and report your “compare and contrast” results as part of the paper. This can be a brief statement, e.g., “The data were

checked against the period of 10.45 h found by Smith (2010) but this produced an unconvincing fit.”

Manuscript Submission

All material should be submitted electronically to the *Minor Planet Bulletin* editor, Professor Richard Binzel:

Dr. Richard Binzel
MIT 54-410
77 Massachusetts Ave.
Cambridge, MA 02139 USA
email: rpb@mit.edu

Manuscript Preparation

We strongly encourage that all submissions be made electronically using MS Word or OpenOffice files (saved in MS Word format). If using Word 2007 or later, please save in DOCX instead of DOC format.

The Editors and Production Staff are all volunteers. The large size of each *MPB* issue requires considerable time and effort from this Staff. You are strongly encouraged to use the available templates in preparing your manuscripts to be as “ready-to-print” as possible. Careful proof reading and attention to errors are also essential prior to submission.

The MS Word template can be found at:

<http://www.minorplanet.info/MPB/mpb.php>

All authors receive the opportunity to review proof pages of their final manuscripts to review editorial and production changes, as well as providing a final check on accuracy.

Preferred Order

Most papers should follow this outline:

1. Title
2. Author list
3. Abstract
4. Body Text

Figures, e.g., lightcurves, can be embedded within the body so that they are close to the text that discusses them. See more under “Figures.”

The body text can contain a number of sections, as does this guide. Sections should be given a title using the Header 2 paragraph style.

Generally, keep the number of sections to a minimum. For example, it is not necessary, and even discouraged, to create an “Introduction” section that leads into an “Equipment” section followed by “Observations.” All of these, unless there is a very specific reason otherwise, should go into the body text without section headers.

5. Standard Table (see below).
6. Acknowledgements
7. References
8. Figures, if not embedded in the body text.

The abstract and body text should be written as if the other does not exist. Specifically, the first paragraph after the abstract should not be a continuation of the abstract. It may, and often does, sound

redundant for the first paragraph to be a rephrasing of the abstract. Regardless, the two should be independent of one another.

Tables

The font size of a table's contents should be large enough to allow for clear reproduction, usually no less than 6.5 points, preferably 8 points. Keep the number of columns to a minimum and try to avoid multi-line cells, except for headers.

Tables should be numbered consecutively in Roman numerals, i.e. I, II, III, etc. The caption goes below the table.

Place tables at the end of the text, after any figures. The layout editor will place them how and where appropriate. Generally, use only white backgrounds for tables.

Please do not embed tables as objects, e.g., as an Excel spreadsheet table. It is permissible to use a Word table created in the document (Insert | Table), but not one that is an embedded object from another document.

Wide Tables

Do not use section breaks in order to span a table across the page. In fact, do not use section breaks of any kind anywhere in the document.

If the table can fit into a single column, then you can place it in-line with the text. If the table needs to span both columns, create a text box and insert a Word table within the text box.

The text box should be 7" wide and use top/bottom word wrapping. The internal margins of the box should be at 0.01-0.02" so that it's possible to click on the text box rather than the contents.

It is important to turn off the "Anchor to Text" (or "Move Object with Text") property of the text box in order to make it easier to change the layout of the paper as needed. Also, turn off "Allow overlap" and "Layout in table cell."

Standard Table for Observation Circumstances and Results

Any paper that reports on observations and results for lightcurve analysis needs to include a standardized table that contains a specific set of columns in specific order. This is to facilitate semi-automated data entry into large databases such as the asteroid lightcurve database (LCDB; Warner et al., 2009) but, more important, so that the reader can have quick access to the critical values for each lightcurve analysis.

Other tables in the paper should not duplicate the data in the standard table, or as little as required.

The standard table is not actually a MS Word table but text in a text box that follows the guidelines mentioned above, i.e., for a 7" wide text box. Usually the text box will be at the top of a page, so it should be positioned at 0" from the top and left margins. In this case, the top wrapping would be 0" and the bottom wrapping would be 0.05-0.1". If the table is at the bottom of a page, reverse the top/bottom wrapping numbers.

The required standard columns and order are

1. Number, blank entry if not numbered.
2. Name or designation if not named.
3. First and last dates in yyyy mm/dd (or 20yy mm/dd) format.
4. Solar phase angle for the first and last date. If the phase angle reached an extrema during the period, enter an asterisk immediately before the first data value. Values are given to 0.1° precision and assumed to be for 0h UT on the give date. Do not use $\pm$ to indicate after/before opposition.
5. Phase angle bisector (PAB) longitude and latitude for the approximate mid-date of the observations at 0h UT. Use integer values.
6. Rotation period, in hours
7. Error in rotation period, in hours. The precision should be the same as for the period.
8. Amplitude (peak-to-peak) of the lightcurve, in magnitudes to 0.01 mag precision, if appropriate.
9. Error in amplitude, in magnitudes to 0.01 mag precision, if appropriate. The precision should be the same as for the amplitude.
10. One or more "flex" columns. The default is a single flex column that indicates the group/family to which the asteroid belongs. If all the objects are the same group and this is mentioned in the text, the entry can be blank (but still put a tab after the amplitude error value). The column can also be used to show the exposure, filter, or other data.

If additional columns are added, they *must* go after column 9 (amplitude error) and never at the beginning or between the nine standard columns.

Four examples of the standard table are shown above. These include the standard caption ("Caption" style) that goes below the table.

Example 1 Styles: LCHeader (header line) and LCData

Example 2 Styles: LCHeader (header line) and LCData.
(Special case for a binary asteroid).

Example 2 Styles: LCHeader2 (header line) and LCData2

Example 3 Styles: LCHeader3 (header line) and LCData3

These styles contain pre-set tabs that account for the standard columns. For this reason, *use tabs only between the columns*. If, as in Example 2, there are empty columns, use tabs, starting at the beginning of the line, to get to the first column with a value.

N.B. The default styles are starting points. If necessary, and with caution, adjust the tab stops so that data lines do not wrap but, again, the order of the columns must be correct and the type of tab (left, right, decimal, centered) must be maintained.

If changing the data line(s), select all data lines before making the changes. This assures the revised tab stops will be applied to every data line.

If necessary, you can reduce the font size from the default of 8 points, but do not go below 7 points.

Keep in mind that your paper may not start at the top of an *MPB* page, so the layout may change during final production. This is why it is suggested that tables with more than 2 or 3 lines be placed towards the end of a paper. If the table is only 1-2 lines, it can be fit at the bottom of the first page or top of the second page, if there is one. *This is a guideline*; see previous issues of the *MPB* for examples and guidance.

Number	Name	yyyy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
1187	Afra	2006 10/15-10/22	*8.5, 8.5	26	13	14.645	0.006	0.37	0.05	MB-M
2384	Schulhof	2012 11/20-11/20	16.3	10	3	3.388	0.001	0.44	0.02	EUN

Table I. Observing circumstances and results. The phase angle is given for the first and last date. If preceded by an asterisk, the phase angle reached an extrema during the period. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude/latitude at mid-date range (see Harris et al., 1984). Grp is the asteroid family/group (Warner et al., 2009).

Number	Name	yyyy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
152931	2000 EA107	2019 03/14-04/03	54.6, 66.2	211	44	4.1367	0.0002	0.29	0.02	NEA
						16.079	0.006	0.16	0.01	

Table I. Observing circumstances and results. The first line gives the results for the primary of a binary system. The second line gives the orbital period of the satellite and the maximum attenuation. The phase angle is given for the first and last date. If preceded by an asterisk, the phase angle reached an extrema during the period. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude/latitude at mid-date range (see Harris et al., 1984). Grp is the asteroid family/group (Warner et al., 2009).

Number	Name	20yy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	D	a/b
10306	Pagnol	19 07/16-08/01	5.9, 7.7	298	11	4.790456	0.00007	0.27	0.05	29.1*	1.23

Table I. Observing circumstances and results. The phase angle is given for the first and last date. If preceded by an asterisk, the phase angle reached an extrema during the period. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude/latitude at mid-date range (see Harris et al., 1984). D is the diameter (km, *diameter is from JPL SBN). Other diameters were derived from *H* and *p_v* values. The last column gives the a/b ratio, based on the amplitude, for an assumed triaxial ellipsoid viewed equatorially.

Number	Name	20yy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Exp	Grp
50149	2000 AU136	18 06/05-06/11	8.7, 9.4	252	17	9.3677	0.0025	0.62	0.10	120	EUN

Table I. Observing circumstances and results. The phase angle is given for the first and last date. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris et al., 1984). Exp is the exposure (sec) or average if a range of exposures was used. Grp is the asteroid family/group (Warner et al., 2009).

To help with using the standard tables the first few times, copy/paste into your paper whichever of the four example tables above that most closely fits your needs and then substitute your data for those in the table.

Captions of the standard tables cite Harris et al. (1984) and Warner et al. (2009). Remember to include the corresponding references in your paper. For your convenience, the two references are reproduced immediately below and can be copied into your paper:

Harris, A.W.; Young, J.W.; Scaltriti, F.; Zappala, V. (1984). "Lightcurves and phase relations of the asteroids 82 Alkmene and 444 Gytis." *Icarus* **57**, 251-258.

Warner, B.D.; Harris, A.W.; Pravec, P. (2009). "The Asteroid Lightcurve Database." *Icarus* **202**, 134-146. Updated YYYY MM. <http://www.minorplanet.info/lightcurvedatabase.html>

N.B. The "Updated" date for the LCDB changes periodically. Be sure to indicate the year/month for the version that you referenced.

Suggested Table for General Asteroid Information

This *optional* table seen below, which is similar to the Observations and Results table, is suggested when you want to include basic information about objects instead of putting the information in the narration for each object. This can save space overall, improve the presentation, and, more important, consolidate the information into one place for the reader for easier reference.

It's recommended that you use the table only if you have more than three objects. With one to three in the list, the benefits of using the table may not be worth the time to put it together.

The table is not a Word table, but a text box using formatted text. This makes it more manageable during the production process. It is 7.0 inches wide with internal left/right margins of 0.05 inches and top/bottom margins of 0.02 inches.

The AsteroidDataHead paragraph style is used for the header line while the AsteroidData style is used.

For $D \geq 1.00$ km, round to 0.1 km. For $D \leq 1.0$ km, round to 0.01 km. For $D \leq 0.005$ km, use 0.01 km. The semi-major axis should be rounded to two decimal places, the eccentricity to three decimal places and the inclination to two decimal places.

For the discover, use only the first person in a group. Do not put spaces between initials. Only the four-digit year and two-digit month number (use leading 0 if necessary) should be used for the discovery date.

Do not check "Move object with text" in the wrapping properties for the box. Use "Top and Bottom" wrapping. Depending on the placement on the page, the wrapping distances can be for both, or just one or the other, e.g., if at the bottom, the bottom value might be 0.0 while the top value might 0.05-0.10 inches.

The default layout tries to allow for large values for the diameter (*D*), semi-major axis (*a*), and inclination (*i*). If necessary, you can change the tab positions to make room for entries as needed. All paragraphs of the same style should have the same tab settings.

When changing tab positions, be sure to select all the affected lines and then change the values. This assures that every paragraph using the style has the same formatting. *Use tabs, not spaces, to separate values in each line.*

The column values, except Fam, should not need explanation. The Fam column is the family/group number using the method used in the LCDB, which first tries to use the family number from Nesvorný et al. (2015). For objects not in Nesvorný et al. and/or not part of a family, the orbital space defined by *a*, *e*, *i* values are used for a generic group name, e.g., 9104 is "inner main-belt" (MB-I) and 9109 is for KBOs and TNOs. The caption includes the two better sources. Use the LCDB diameter if JPL does not have one.

Number	Name	Fam	H	Dkm	<i>a</i> (au)	<i>e</i>	<i>i</i> (deg)	P(yrs)	Discovered by	yyyy/mm
914	Palisana	9104*	7.74	205.0	2.46	0.214	25.21	3.85	J.C. Watson	1867/09
2286	Fesenkov	9104*	13.12	6.7	2.19	0.094	1.35	3.25	N.S. Chernykh	1977/07
23552	1994NB	701	13.68	4.7	2.36	0.278	23.77	3.67	E.F. Helin	1994/07
134340	Pluto	9109*	-0.45	2733.7	139.59	0.252	17.15	249.09	C. Tombaugh	1930/01

Table I. Orbital and discovery information. Fam is the group or family using the LCDB values. An asterisk indicates a generic group, otherwise, the numbers are from Nesvorny et al. (2015).
Web Sources: JPL: https://ssd.jpl.nasa.gov/tools/sbdb_lookup.html#/ MPlInfo: <https://minorplanet.info/php/oneasteroidinfo.php>

Figures

Figures, if captioned, should be numbered consecutively in Arabic numerals. You can insert figures within the body of the text or at the end.

If your paper reports on one or more asteroids, each with an extended discussion and figure(s), we recommend embedding the figure(s) in line with the text. Such figures may or may not be captioned (see comments below about figure captions).

If your paper reports on many asteroids with only one short paragraph and one or more figures for each, we recommend the first paragraph of each asteroid begin with the number and name/designation underlined and running on to the paragraph text. You might insert the asteroid's figure(s) after its text, or alternately place all figures at the paper's end.

It is preferred that you insert the graphics yourself, even if only at the end of the article, instead of supplying them as a set of files that must be inserted by the editors.

Please do not embed figures as objects, e.g., Excel charts. If necessary, make a screen shot of the chart and edit it in a graphics editor. For example, in Windows, it is possible to highlight an Excel chart in Excel, copy it, and paste it into the Paint program.

If at all possible, use GIF or PNG format for all plots or charts to avoid “ringing” around small features that occurs when saving in JPG formation. BMP format files are much larger and can cause problems when several megabytes in size. The JPG format should be used if the figure is a gray-scale or color photo.

Use Insert | Picture | File on the Word main menu to insert graphics. If there are several consecutive figures, all but the last one should use the “Graphics” paragraph style. The last figure before any text, other than a caption, should use the “Normal” paragraph style. The picture wrapping style should be “In Line with Text.”

If inserting a figure that will span both columns, use a text box with appropriate wrapping to hold the figure. Do not use section breaks to change to a single column. It is very rare that a figure needs to be more than one column wide.

Figure captions should be used sparingly and offer new or expanded information. If, for example, a caption says only “Lightcurve for 1 Ceres phased to 9.078 h”, it is not needed since the standard table with circumstances and results (see above) will give the period and amplitude. You can also use text within the graphics to distinguish among them and reference the text in the body text instead of using a caption.

Use 300 dpi or higher resolution. Generally, use only white backgrounds for figures and solid colors for symbols. If the figure is in color, make it such that the grayscale rendering of the figure is *easily* legible. For example, yellow symbols on a white background are *not* suitable. Labeling should be large enough to be easily readable when reproduced.

Avoid using color as the sole feature distinguishing data series in a figure. The black-and-white rendering of the archival printed copy of *MPB* might not show any differences.

Lightcurve plot symbols should be easily differentiated from one another. Each lightcurve should contain a legend that identifies each symbol with a date or other reference, the name of the object, the period (and error). If there is room, include the JD for zero phase or the first data point of a raw data plot, the period (and error) and amplitude (the error is not needed for the plot).

When adding a number of lightcurves at the end of a paper and to avoid a minimum of wasted white space, the original lightcurve figures should have an aspect ratio of about 1.45: 1 (width:height) and use the Graphics paragraph style. This allows putting 8 plots on a single page (4 per column).

To make the lightcurves as readable as possible, the legend and other information should be moved to inside the plot area. A tutorial on how this might be done is available at

<http://www.minorplanetobserver.com/MPOSoftware/MPBPlots.htm>

See recent *MPB* issues for examples of how the above guidelines were applied.

Equations and Special Symbols

If including equations with Greek characters or special symbols for any reason, please use only Times New Roman, Arial, or Symbol (Windows TrueType) fonts. Use the extended characters of these fonts to insert special characters such as eastern European diacritical characters. This is done on a Windows machine by ALT+XXXX, where XXXX is a four-digit code *entered on the numeric keypad*. The Character Map system utility can also be used to locate and copy the necessary character.

If special characters are used, then – in addition to your manuscript – please submit a PDF that *clearly* shows how those characters should appear.

Accepted Abbreviations and Other Conventions

The following abbreviations for units are preferred in the *MPB*:

arc minutes	arcmin
arc seconds	arcsec
days	d
degrees	° (Alt+0176, see notes under “Equations and Special Symbols”), or deg
hours	h
magnitudes	mag
meters	m
minutes	min
pixel	pix
plus/minus	± (Alt+0177, see notes under “Equations and Special Symbols”)
seconds	s

A space should separate a value and unit, e.g., 7.1334 h. An exception to this is when the unit is used as part of a description, e.g., 0.4-m telescope, 14-inch SCT, or 30-s exposures.

If the unit falls onto the next line by itself, you can add a new line (Shift+Enter in Word) just before the first character of the value. This will keep the value and unit together.

If including a value and error, include the units only once, after the error, e.g., 7.144 ± 0.005 h.

“lightcurve” is a single word.

Use a leading zero for a number whose absolute value is less than 1, e.g. 0.35 or -0.15.

When referring to a numbered asteroid that is named, do not put the number in parentheses, e.g., 1 Ceres instead of (1) Ceres.

When the asteroid is numbered but has only its MPC designation, put the number in parentheses, e.g., (178956) 2001 QN185. Note that the number in the designation is not subscripted. Do not use parentheses around the number if the number is a separate column in a table. See “Standard Table for Observation Circumstances and Results” and the sample tables above.

Dates

In order to standardize dates and avoid confusion due to different formats, we prefer that ANSI date format be used, i.e., year-month-day, e.g., 2010 Nov 12 or 2010 November 12.

It is strongly recommended that all numeric dates not be used, e.g., 2012-09-07, since it is not clear if the writer used the ANSI date format or not (see exception for tables below).

When using a month name and date, do not include a leading zero for a date from 1 to 9. For example, write Nov 7 instead of Nov 07.

If using only the three-letter abbreviation for the month, it is not necessary to include the period after, i.e., instead of “Nov.” use “Nov”.

If using only the month and year, put the year before the month, i.e., 2008 Nov or 2008 November.

In a table, such as giving a range of dates for observations, numbers can be used to save space. The column head (or table caption)

should clearly indicate the format, e.g., “mm/dd”. Unless the year changes, include only the month and day in the table entries but indicate the year in the column header (or table caption).

References

Authors should try to follow the standard reference styles for the *Minor Planet Bulletin*. It can be tedious for an editor to fix out-of-standard references.

References should be cited in the text such as Harris and Young (1980) for one or two authors or *Bowell et al.* (1979) for more than two authors. If the author and year are within the parentheses, separate the author and year with a comma. If multiple references are given within parentheses, separate the references with a semicolon. For example: “The results are in good agreement with earlier works (Smith, 1999; Jones, 2010).”

This applies even if there is only one author but several references. For example, “This asteroid was observed at three previous apparitions (Jones, 2016; 2017b; 2018), all with similar results.”

URLs (web addresses) should be italics, whether in the article body or in a reference. If a URL is too long for one line, separate after a slash or hyphen, or before a period.

Please remove active hyperlinks from the document (usually indicated by the text being in blue or the default hyperlink text color). These do not always convert to valid hyperlinks when producing the final PDF document.

The reference section should list papers in alphabetical order of the first author’s last name, then by year. Include the full list of authors in the citation in the References section, unless it exceeds 15. In that case, use “and xxx colleagues” (without the quotes) as the “last author” where xxx is the number of unlisted authors. Use surname, initials for each author, separating author names with semicolons (e.g., Astronomer, J.Q.; Assistant, H.I.S.).

There are no blanks between initials.

For references by multiple authors, omit the word “and” before the final author, unless it is the “and xxx colleagues” case described above.

Include the full title of the work in addition to the publication, volume, and page numbers. Include *both* beginning and ending page number for articles spanning more than one page. Many journals now give an article number instead of page range. In this case, use AXX where XX is the article number. It is not necessary to include the number of pages after the article number.

If several references are to the same web site and differ only in year, use a single reference with the several years instead of a separate reference for each year. For example,

Behred, R. (2002, 2005, 2006). Observatoire de Geneve web site. http://obswww.unige.ch/~behrend/page_cou.html

It is acceptable to start a URL on a line by itself, e.g.

JPL (2016). Small Body Database Search Engine. http://ssd.jpl.nasa.gov/sbdb_query.cgi

The line preceding a URL can be left-justified by ending it with a tab, if needed, and newline (Shift+Enter in Word).

Here are example entries for a journal article with page numbers, a journal article with article number, a chapter in a book, and a book.

Bus, S.J.; Binzel, R.P. (2002a). "Phase II of the Small Main-Belt Asteroid Spectroscopic Survey. The Observations." *Icarus* **158**, 106-145.

Jacobson, S.A.; Scheeres, D.J.; McMahon, J. (2014). "Formation of the Wide Asynchronous Binary Asteroid Population." *Ap. J.* **780**, A60.

Pravec, P.; Harris, A.W.; Michalowski, T. (2002). "Asteroid Rotations." In *Asteroids III* (W.F. Bottke, A. Cellino, P. Paolicchi, R.P. Binzel, eds.) pp 113-122. Univ. Arizona Press, Tucson.

Warner, B.D. (2006). *A Practical Guide to Lightcurve Photometry and Analysis* (2nd edition). pp 268. Springer, New York.

Intentionally Blank

Editing Canopus Plots for the *Minor Planet Bulletin*

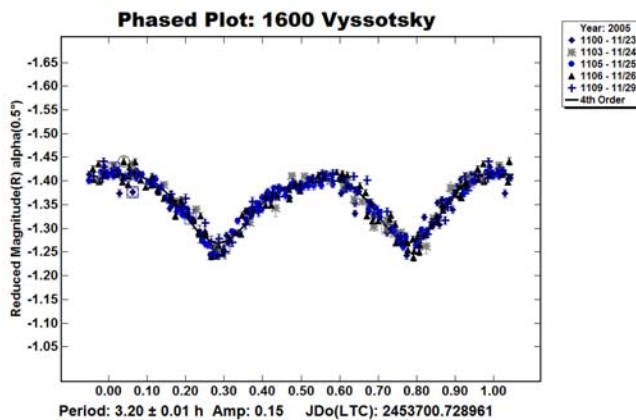
Many authors use *MPO Canopus* to do period analysis and generate lightcurves. Below are some *recommended* steps for editing those lightcurves to help reduce white space, both within a graphic and on *MPB* pages.

While these instructions are specific to a system running Windows, native or in a virtual machine, and *MPO Canopus*, they can serve as a guide to improving the appearance of some of your plots.

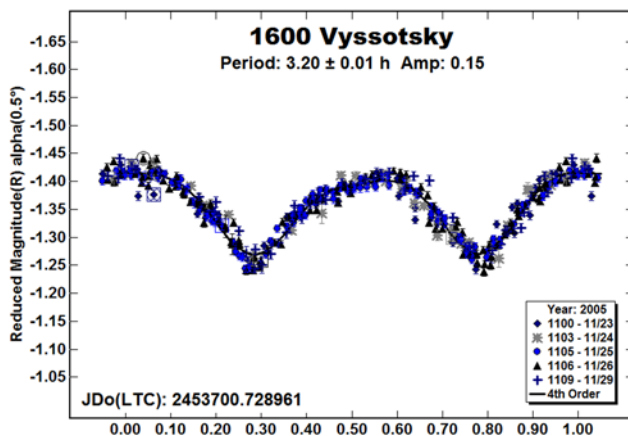
Making a Big Difference

Here is an example of the difference in the presentation of the lightcurve before and after editing and cropping and then pasting into an *MPB* column that is 3.35" wide. As you can see, there is a significant increase in the size of the plot area (the area within the rectangular outline). This makes the lightcurve easier to see and greatly reduces white space.

BEFORE



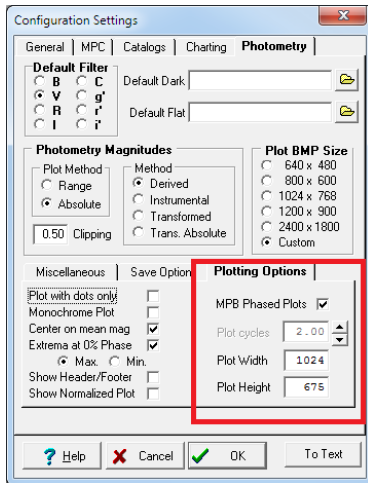
AFTER



MPO Canopus Lightcurves

The steps below presume that you are working on a PC that is running the Windows operating system. This can be the machine itself or a virtual machine, such as might occur if running Windows on an Mac.

1. Before generating a plot, set the plotting options within the red box on the configuration form as shown.

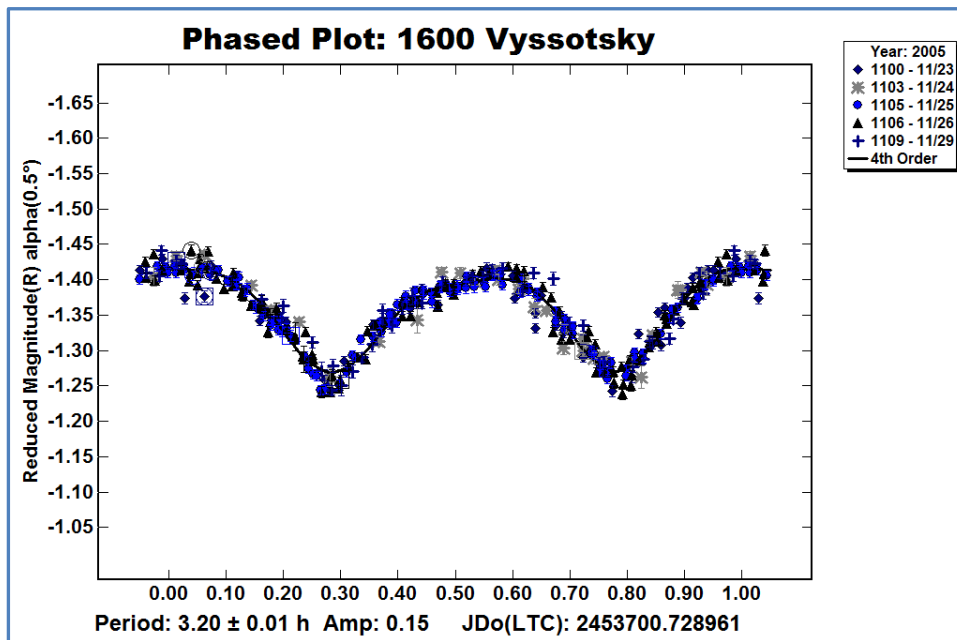


These options, assuming the editing below, can allow putting four lightcurves per column, or eight lightcurves per page.

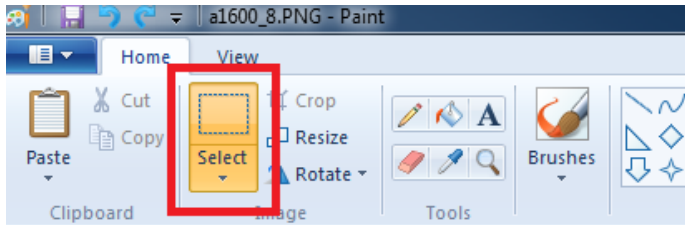
In the following, there is no border around the actual graphic; it has been added to show the full extent of the graphic being edited.

This is not a tutorial on using Windows Paint. It is up to you to learn this very basic image editor included with Windows. It's presumed that you understand the Windows terms "click", "drag", and "select."

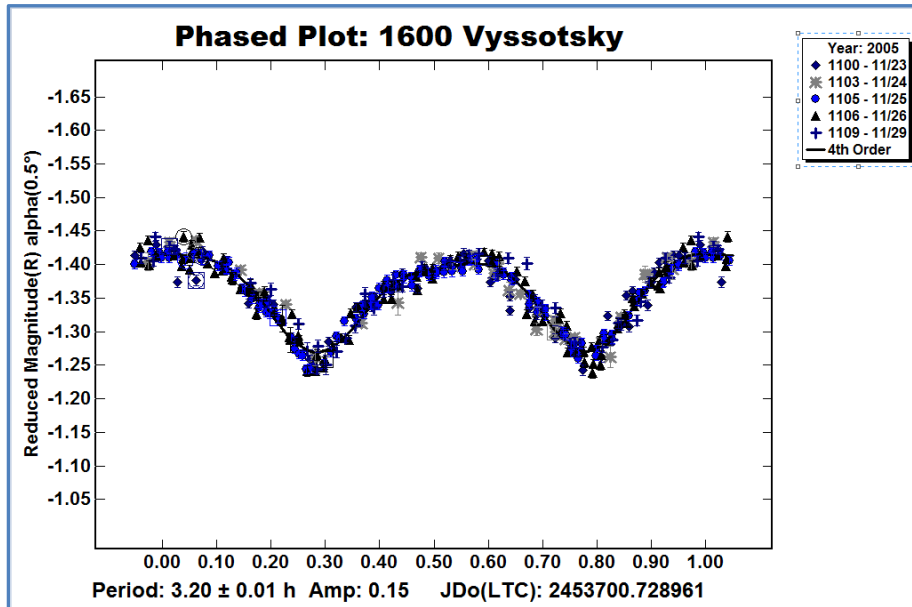
2. Generate the plot as needed and save.



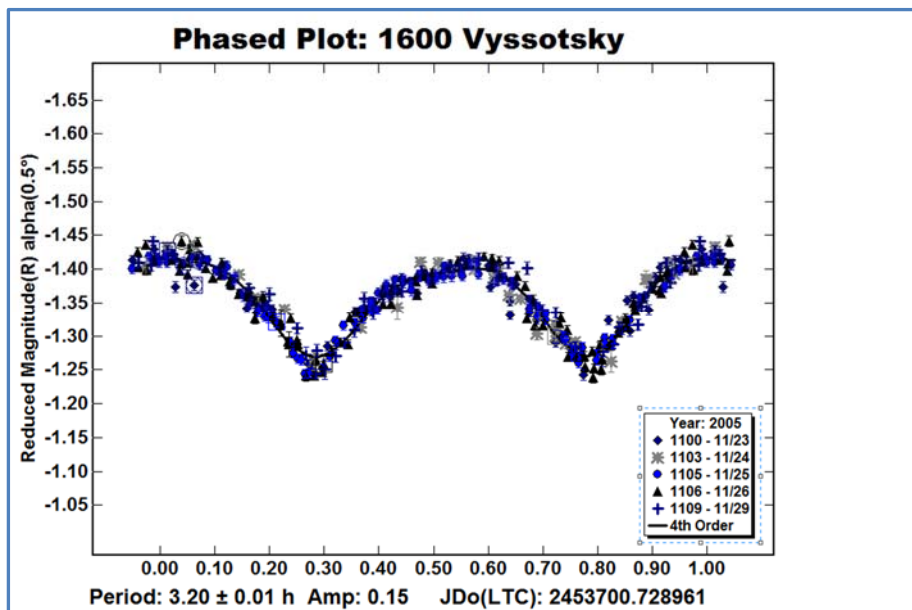
- Open the graphic in Windows Paint and click on the Select item in the menu



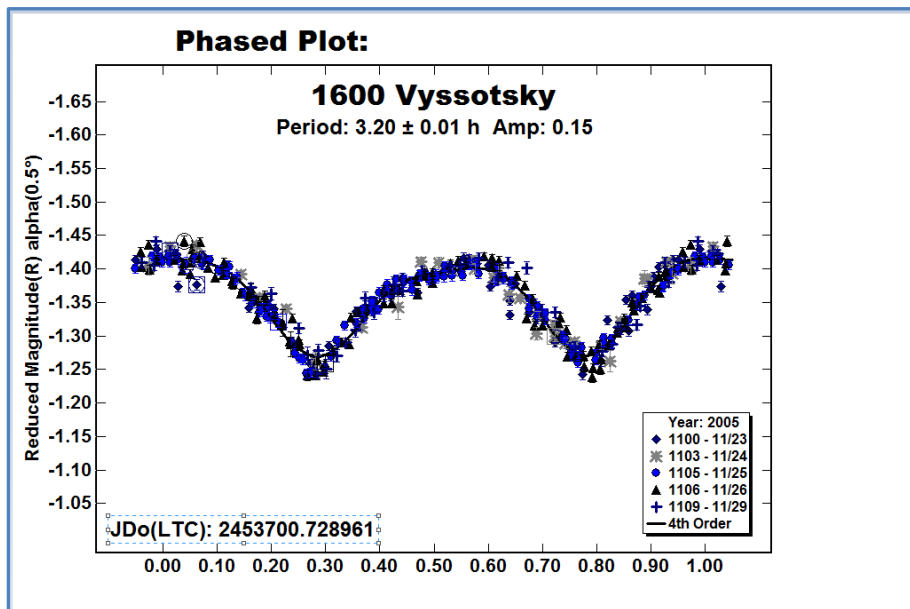
- Select the legend in the graphic (click just outside at the upper-left and drag to just outside the bottom-right).



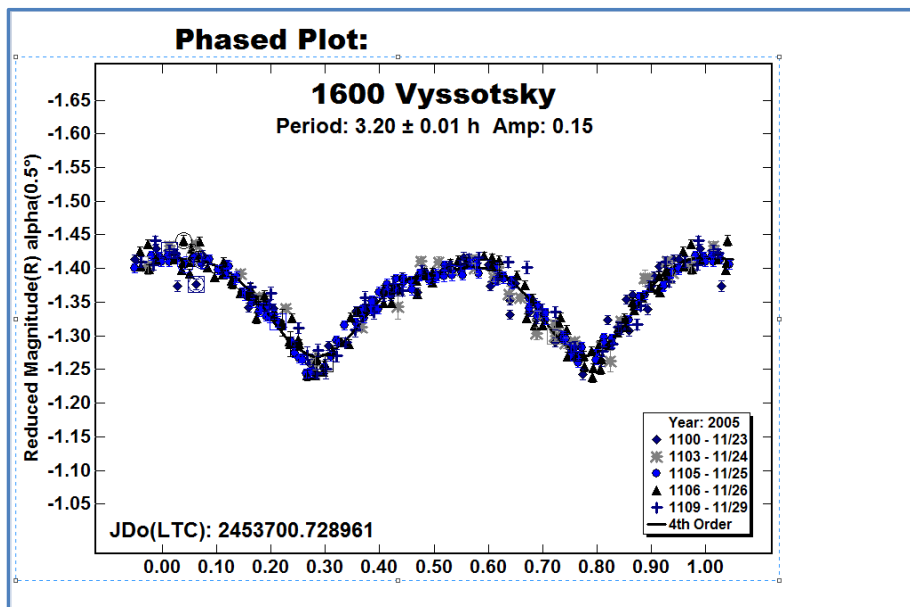
- Drag the legend (selected region) to a place within the chart area.



6. In a like manner, drag the title into the chart area (do not include “Phased Plot:”) as well as the Period/Amplitude and JDo regions. Try to keep the JDo near the bottom-left, i.e., near the zero-point of the X-axis.

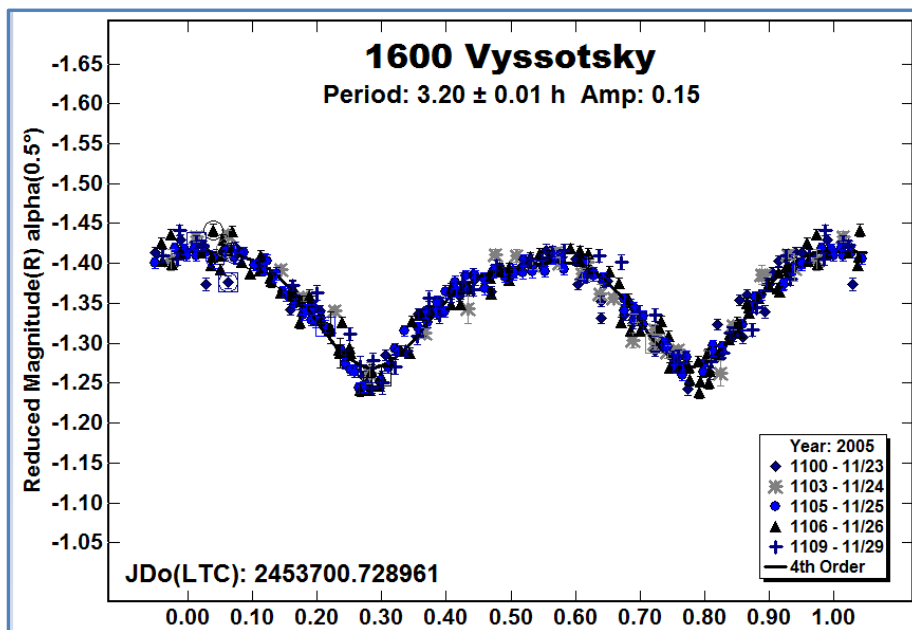


7. Select the chart, leaving a very small amount of white space on all four sides.

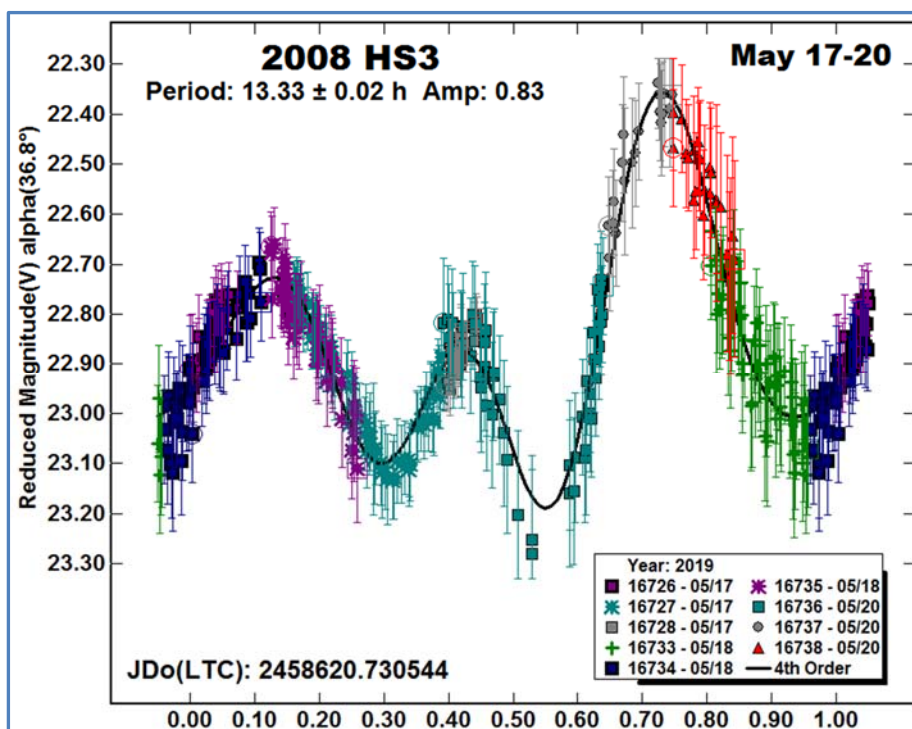


To repeat, the thin blue border around the images in this tutorial have been added to show the extent of the graphic. It will not be in the actual graphic you're editing.

8. Press <Ctrl+Shift+X> to crop the graphic to just the selected area and save the final result.



This is a very simple example. It may take more creative editing to get everything to fit and not cover up the actual lightcurve and data points. For example, the vertical height of the plot has been increased to make room for the legend, which has been edited from the original single column to multiple columns.

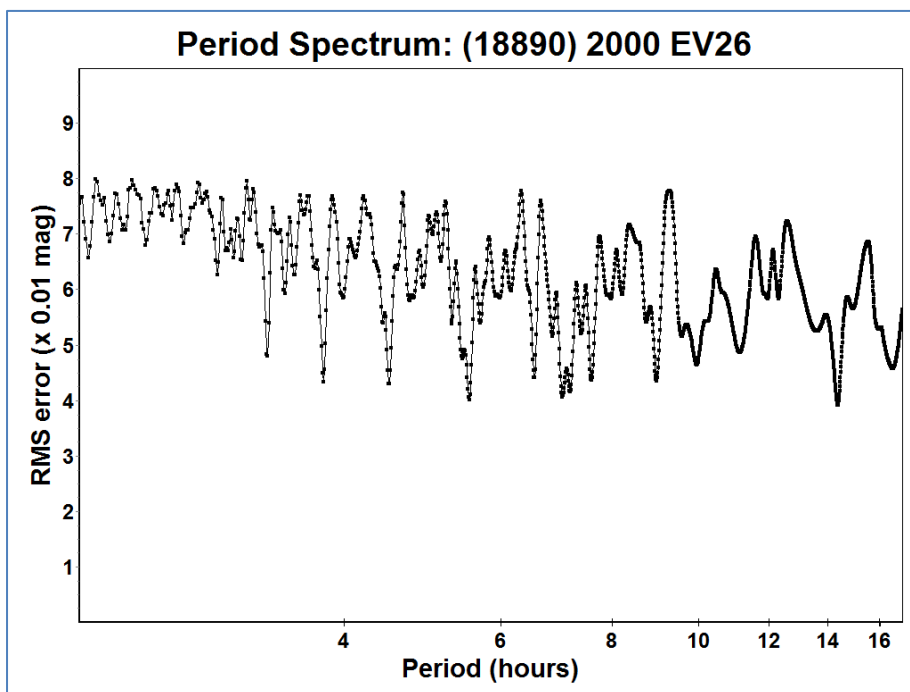


9. Insert the final plot into the Word document using “In Line with Text” wrapping. Do not use square, top/bottom, etc.

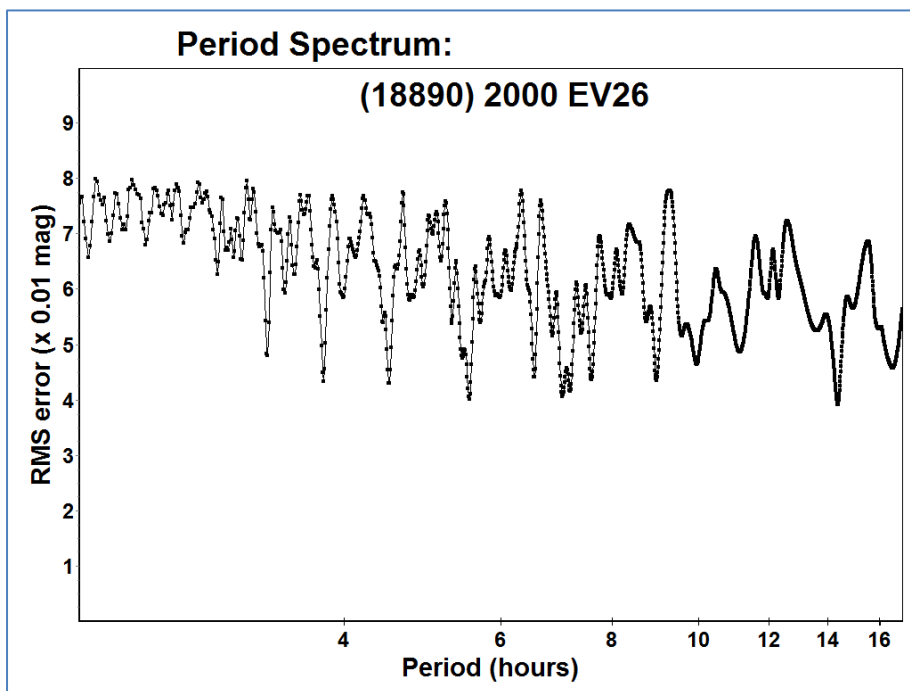
MPO Canopus Period Spectra

Many times, there is a large amount of white space in the period spectrum. Not all spectra in a paper must have the same height. Reducing the white space may help fit more graphics onto the page.

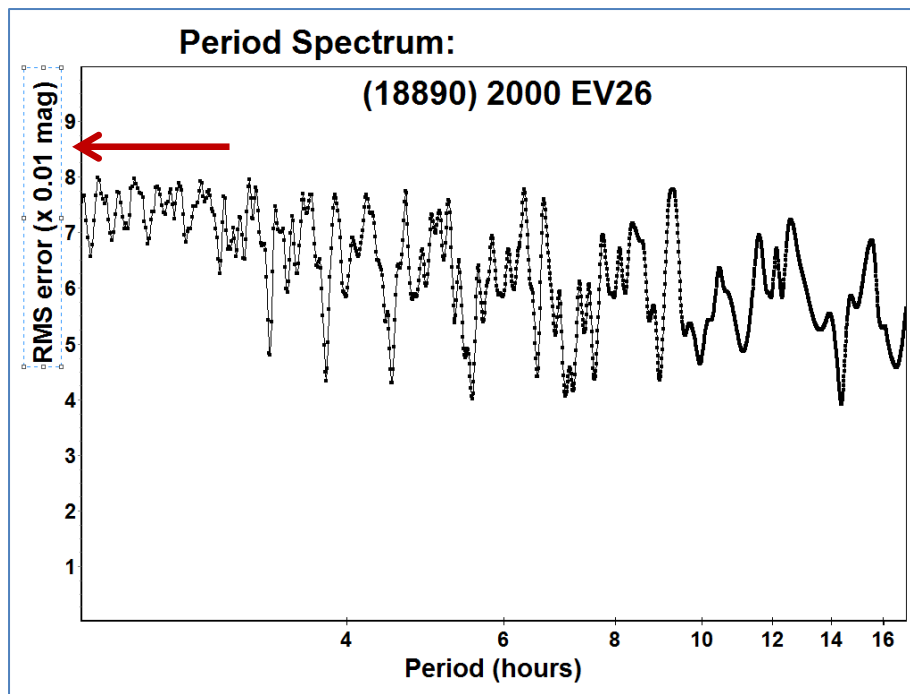
Here is the starting period spectrum. *As before, a thin blue line surrounds the graphic to show its actual size on the page.*



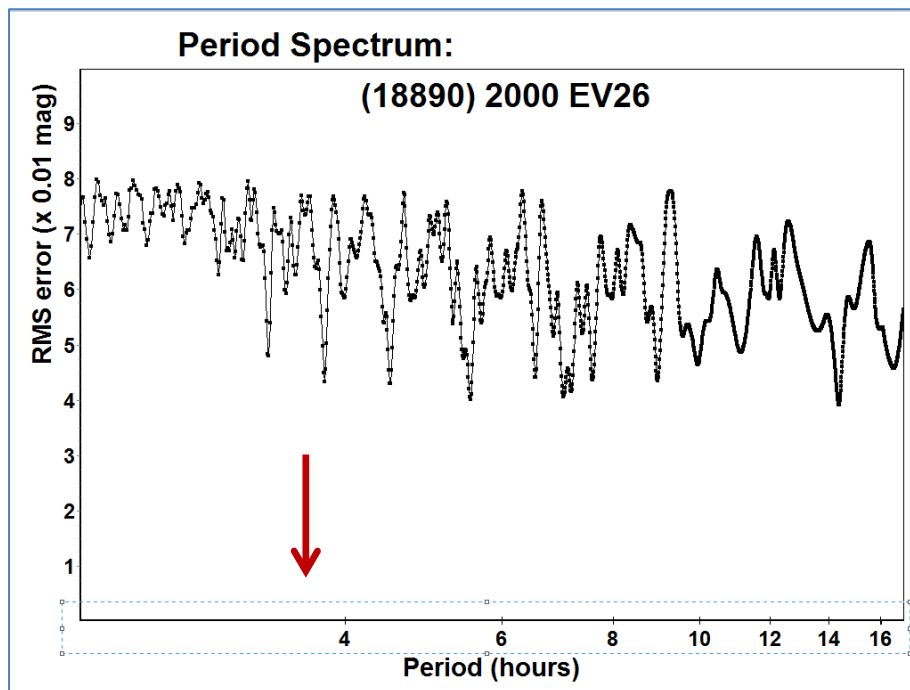
1. Move the number/name of the asteroid into the plot area at the top. It is not necessary to include "Period Spectrum."



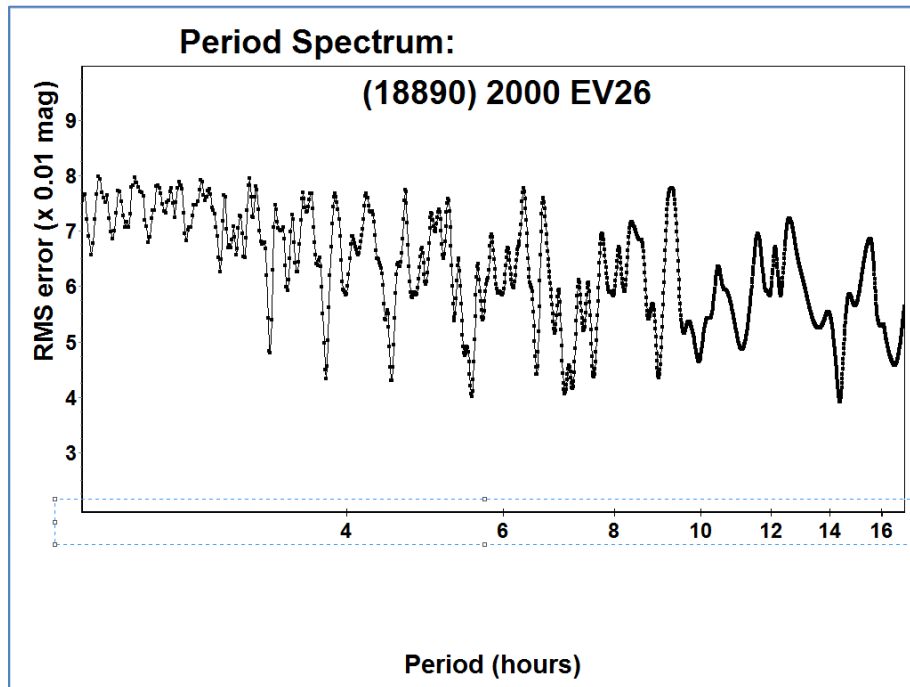
2. Select the Y-axis label and then drag it upwards. To keep its horizontal position, you can use the up arrow key instead of dragging the area.



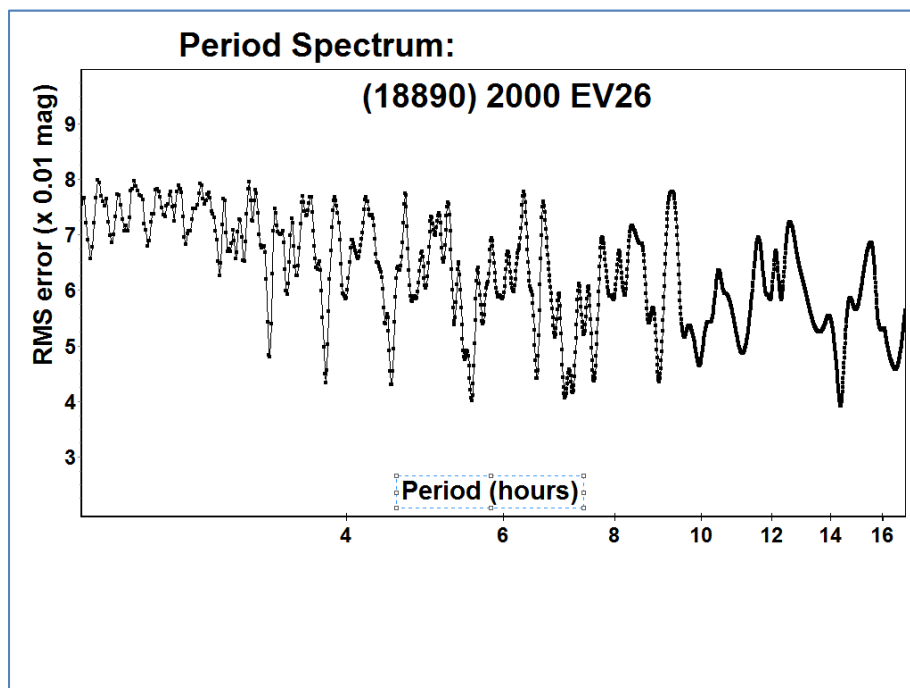
3. Select an area that includes the bottom X-axis but not "Period (hours)." Make sure the left side of the selection is to the left of the lowest value on the Y-axis ("1"). The right side of the selection area should be just to the right of the right Y-axis. Do not go all the way to the right of the graphic. Do not click anywhere on the graphic since this will change the selection area.



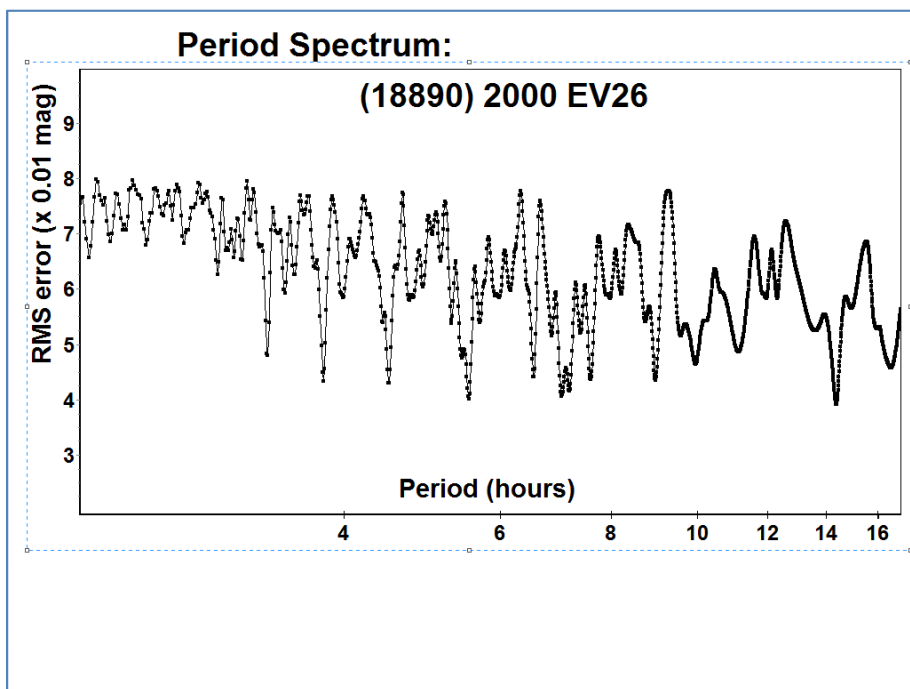
4. While holding down the <Ctrl>, press the up arrow. This moves the selection upwards and erases the background. If you just used the up arrow, anything below the selection area would still be visible.



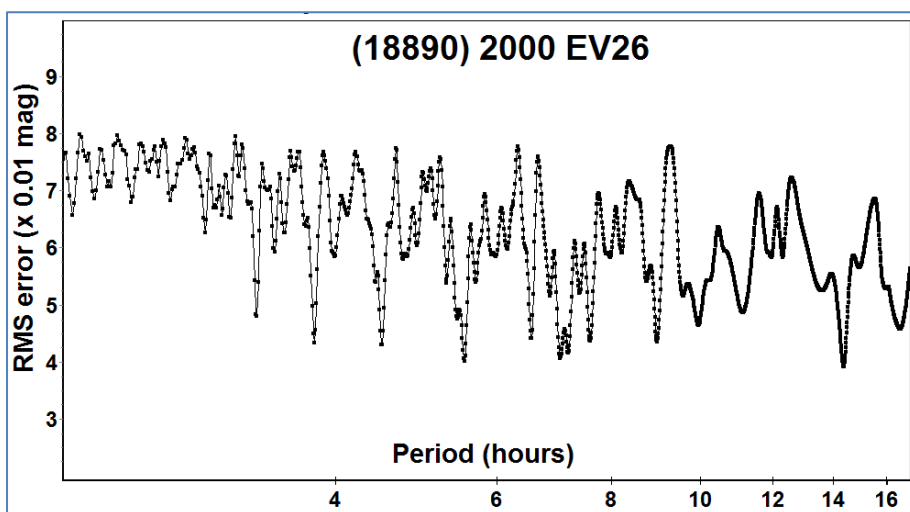
5. Move the “Period (hours)” label to within the plot area.



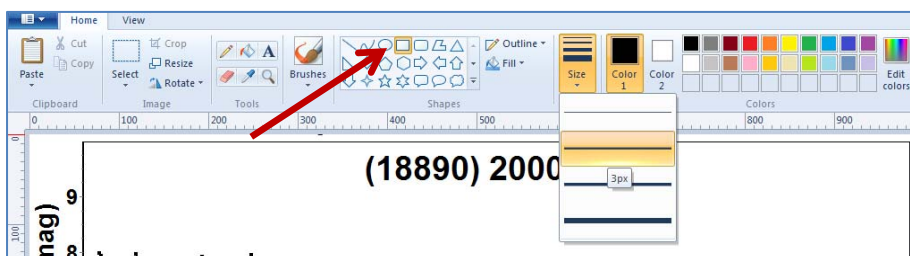
6. Select a region that includes the entire plot area, i.e., the X-axis label to just outside the right-hand side of the chart area box and just above the chart area box to just below the values for the bottom X-axis.



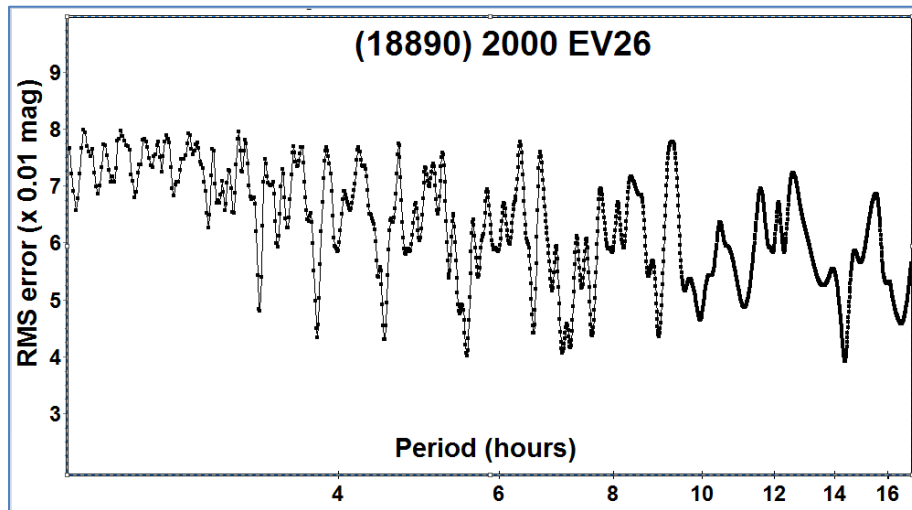
7. Press <Ctrl+Shift+X> to crop the graphic to the selected area. For aesthetic purposes, you can move the Y-axis label so that it's roughly centered along the left-hand Y-axis.



8. The line defining the chart area box sometimes doesn't appear correctly because it is too thin. So, on the Paint menu, select the rectangular shape and 3 pt line size. Do not select "Fill".



9. Start at the upper-left of the chart area box and drag down and right so that the new box replaces the old.



To repeat, the thin blue line around the graphic is not part of the graphic but only shows the graphic's dimensions.

10. Save the final version and then insert the final plot into the Word document using "In Line with Text" wrapping. Do not use square, top/bottom, etc.