

SODIS

Stellar Occultation Data Input System

Upgrade

to the

Reviewer-Documentation V 31-01-2023



About this document

After one year of SODIS, we can see the rapid development (more than 3000 reviewed reports). The current version of the Reviewer-Documentation dated 31 January 2023 therefore requires some updates, which are described in this document.

The text follows the main headings of the Reviewer-Documentation, but lists the topics one after the other without paying attention to the subchapters of the Reviewer-Documentation. Only main points that have changed or have been added are treated here.

The document is not intended for public use.

Change log

V 03-02-2024 First version.

C. Weber

1 SODIS overview

SODIS data flow

Figure 1.1 shows the current SODIS data flow, noting in particular that SODIS/Occult4 also sends light curves to VizieR in dat format (<https://cdsarc.cds.unistra.fr/viz-bin/VizieR?-source=B/occ>, for an example see Figure 1.3). In addition, the CORA mirror (<https://astro.kretlow.de/?CORA>) of SODIS reports is working now (Figure 1.2).

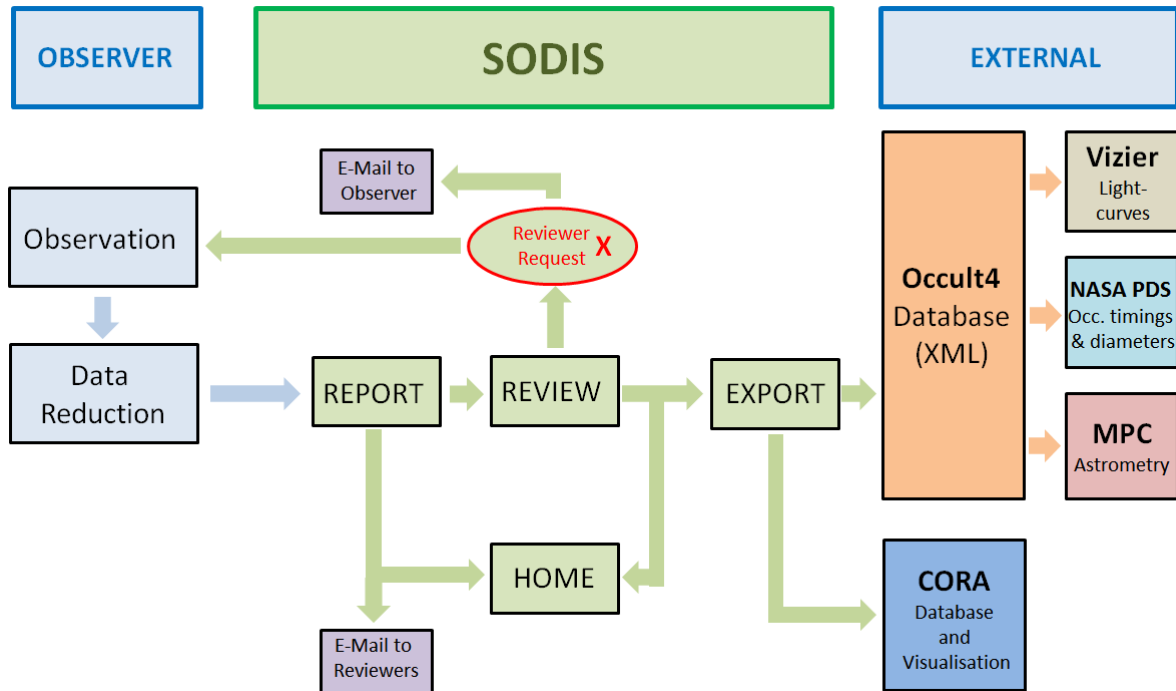


Figure 1.1. SODIS data flow

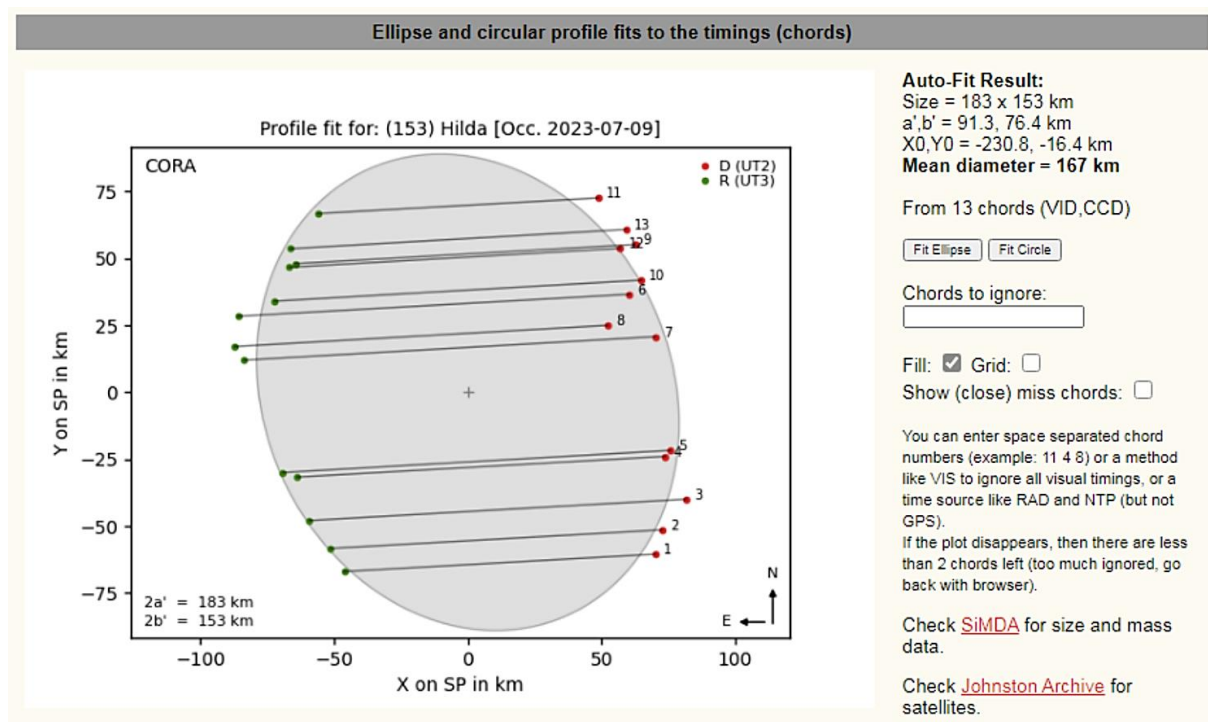


Figure 1.2. CORA mirroring SODIS data (Source: CORA)

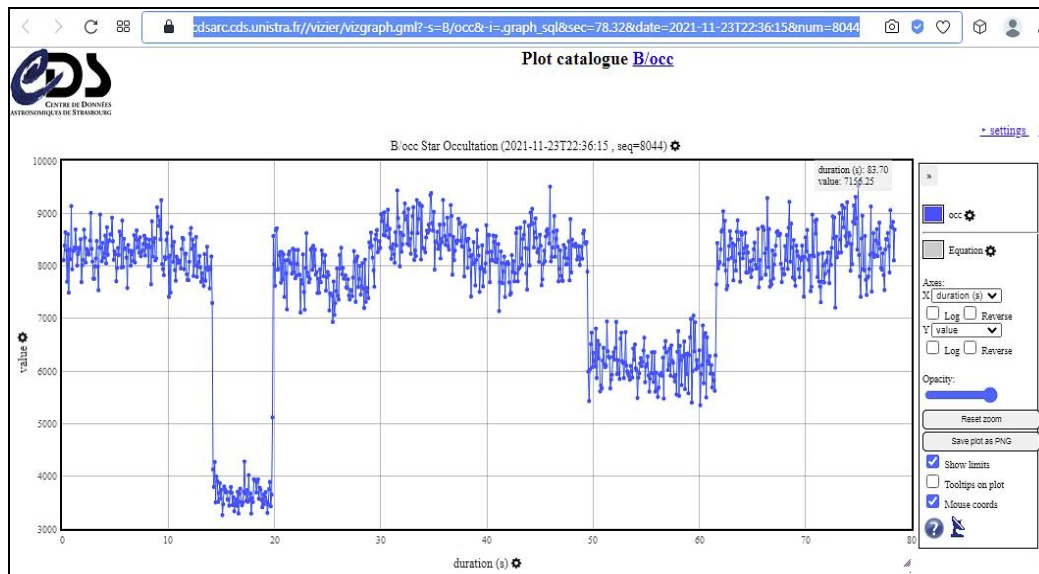


Figure 1.3. Example of a lightcurve on the Vizier portal (Source: Vizier)

SODIS account

An account is required for most activities at SODIS (and also for the highly recommended SODIS forum, <https://forum.iota-es.de/index.php>). Furthermore, SODIS users must have verified their email accounts in order to receive emails from the SODIS system (e.g. in the case of a reviewer request to an observer), see Figure 1.4. Email provider can block emails from `sodis-noreply@iota-es.com`. This is always the case with Gmail addresses.

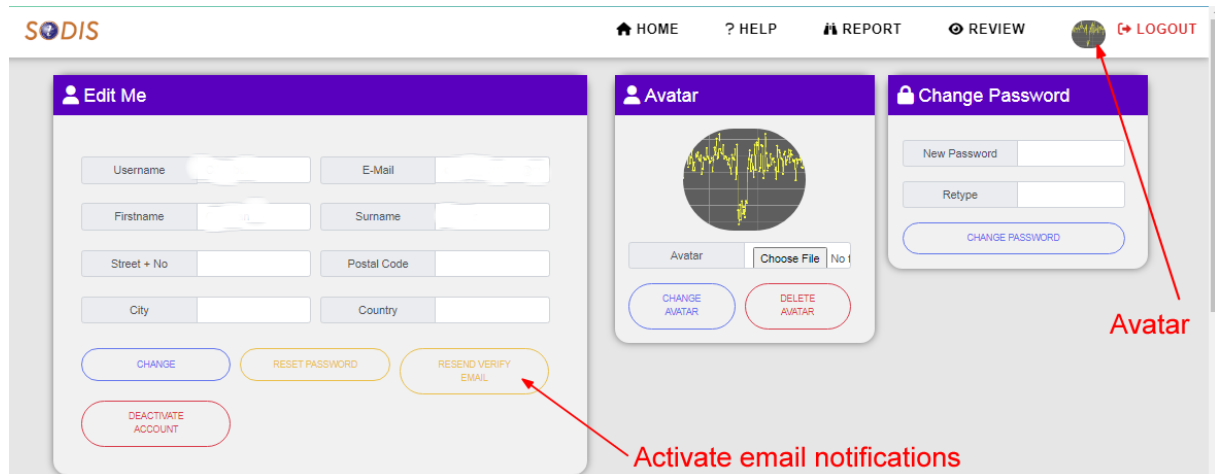


Figure 1.4. The SODIS user account settings are available via the avatar at the top right of the SODIS website. The email verification is done with the RESEND VERIFY EMAIL button.

Rating of observations and Occult4/SODIS classification

- **Detection of an event (positive observation)**

...

Depending on the event type observed, the Occult4 event codes can be “D”, “d”, “M”, “G”, “g”, “N” for disappearance and “R”, “r”, “M”, “B”, “b”, “N” for reappearance (see Figure 1.5). The observer does not have to deal with the letter codes, SODIS does that automatically.

D	Main Star		D Time																		
Duration		<table border="1"> <tr> <td>Main Star</td> <td>D</td> <td>R</td> </tr> <tr> <td>Second Star</td> <td>d</td> <td>r</td> </tr> <tr> <td>Non Detection</td> <td>M</td> <td>M</td> </tr> <tr> <td>Satellite Main Star</td> <td>G</td> <td>B</td> </tr> <tr> <td>Satellite Second Star</td> <td>g</td> <td>b</td> </tr> <tr> <td>Ring</td> <td>N</td> <td>N</td> </tr> </table>	Main Star	D	R	Second Star	d	r	Non Detection	M	M	Satellite Main Star	G	B	Satellite Second Star	g	b	Ring	N	N	
Main Star	D	R																			
Second Star	d	r																			
Non Detection	M	M																			
Satellite Main Star	G	B																			
Satellite Second Star	g	b																			
Ring	N	N																			
R	Main Star																				

Figure 1.5. D and R SODIS (and Occult4) event classification on the SODIS REPORT screen. Added: Event codes in red for disappearance and in green for reappearance. These codes will appear in the event's xml file.

...

- **“Uncertain”**

...

Events with *only one up to three data points* are a special case. Depending on the actual situation, there may be reasons not to exclude them immediately (at least if there are other detections). The handling of such events was deeply discussed in the community and AOTA as well as PyOTE have new tools regarding such events.

2 Review as a process

Reviewer teams

The review areas and the names of the reviewers are:

Team	Chief reviewer	Deputy reviewer	Reviewer
BE			Olivier Schreurs (BE), Roland Boninsegna (BE)
CH	Jonas Schenker (CH)	Stefan Meister (CH)	
CZ+SK	Jan Manek (CZ)	Jiri Polak (CZ)	Karel Halir (CZ)
DE+AT+NL	Wolfgang Beisker (DE)	Gregor Krannich (DE)	
EE+LT+LV		... coming soon ...	
ES+PT	Carlos Perello (ES)	Ricard Casas (ES)	Carles Schnabel (ES)
FR	Thierry Midavaine (FR)	Arnoud Leroy (FR)	Pierre le Cam (FR), Matthieu Conjat (FR)
GB+IE	Tim Haymes (GB)	Alex Pratt (GB)	Simon Kidd (GB), William Stewart (GB)
GR		... coming soon ...	
IT	Stefano Sposetti (CH)	Claudio Costa (IT)	
PL	Wojciech Burzynski (PL)	Daniel Blazewicz (PL)	

Exporters of SODIS results to D. Herald

Sven Andersson, Wolfgang Beisker, Tim Haymes, ... [reinforcement in prospect](#) ...

Country codes

The CC list now contains worldwide codes.

Reviewer observations

It is obvious that reviewers should not review their own observations. In such cases, they should ask reviewers from the neighboring region or another reviewer from their own team.

Frequent input errors by observers

The SODIS input mask is not yet perfect and there are a lot of suggestions for improvement - but most of them have not yet been implemented, so reviewers should watch out for common errors. Only a few are listed here, see Figures 2.1 - 2.5.

The screenshot shows the SODIS input mask with several errors highlighted. At the top right, the text "No predicttime" is displayed in orange. The input fields are as follows:

- Occultation: Negative (dropdown)
- Date: 13/03/2023 (calendar icon)
- Predictdate: 13/03/2023 (calendar icon)
- Predicttime: --:--:-- (clock icon)
- Observer 2: (empty field)
- Star: UCAC4 552-010307 (red box around the entire field)
- Asteroid: 2009SH76 (red box around the entire field)
- No: 432271

Below the input fields, the text "Wrong star and asteroid designations (spaces)" is displayed in orange. At the bottom, two boxes show the correct designations: "UCAC4 552-010307" and "2009 SH76".

Figure 2.1. Missing predicttime and wrong star and asteroid designations

Start Obs HH MM SS ms End Obs HH MM SS ms

D Main Star D Time HH MM SS ms Acc_D s.ss

Duration s

R Main Star R Time HH MM SS ms Acc_R s.ss

Zoom: 100% Größe: 1311 x 196

ClpBrd5.bmp

Start Obs 1 35 30 93 End Obs 1 36 59 73

D Main Star D Time 1 36 6 97 Acc_D 0.04 s.ss

Duration 1.96 s

R Main Star R Time 1 36 8 93 Acc_R 0.04 s.ss

Zoom: 100% Größe: 1294 x 183

ClpBrd6.bmp

Start Obs 01 35 30 93 End Obs 01 36 59 73

D Main Star D Time 01 36 06 97 Acc_D 0.04 s.ss

Duration 1.96 s

R Main Star R Time 01 36 08 93 Acc_R 0.04 s.ss

SODIS mask

Wrong!

OK

Figure 2.2. Non-compliance with input formats

Aperture 305 cm Focal Length 1188 cm

Note the units of measurement

Wind + Bft.

Wind no Bft.

Figure 2.3. Non-compliance with units of measurements

Latitude 38 04 44 868 Longitude 23 15 59 826

Altitude 302.3 m Datum Type WGS84

Wrong geographical data

#E40

256 m

Google Earth

38°04'43.45" N 23°15'56.41" E elev. 256 m eye alt. 1.03 km

Figure 2.4. Wrong geographical data

Observer comments

The "Comment" field may contain some remarks by the observer. The reviewer can copy observer remarks to a comment in the site log and delete observer comments that should not be included in the xml file (e.g. an observer remark about weather conditions, for examples see Figure 2.5).

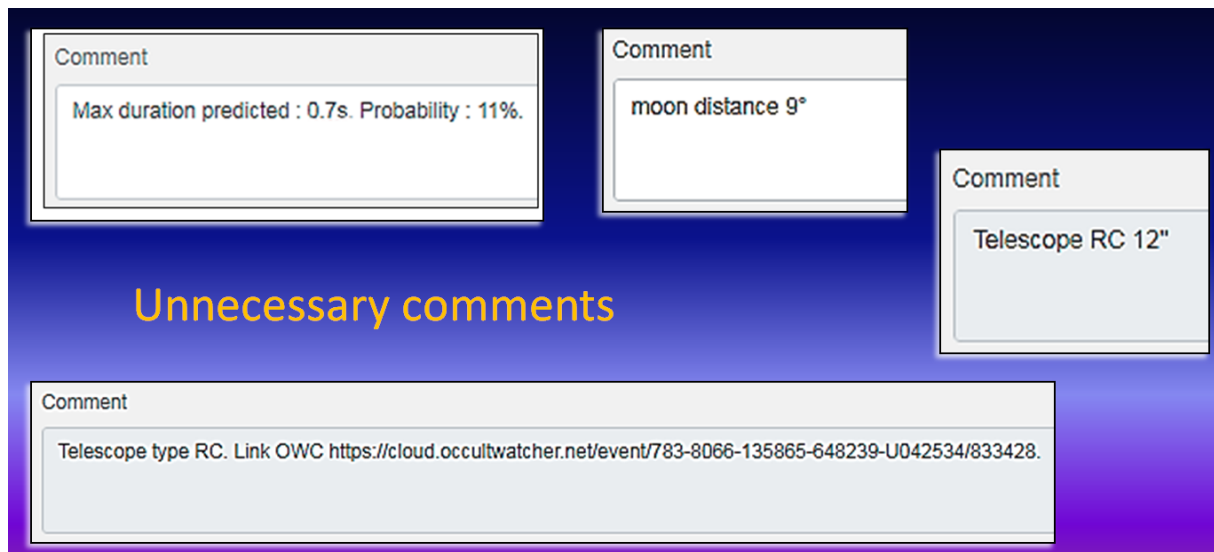


Figure 2.5. Unnecessary comments

Files to add to a positive observation report

To support the reviewers, during data entry, observers are asked to submit additional data as shown in Figure 2.6. In the case of an event detection, the respective complete data set must be submitted. Figure 2.6 also shows how to get the different files. The embedded pictures in Figure 2.6 give examples of what the inputs should look like.

The "Event" image is generated by Occult4, but called by OccultWatcher with a right click on the event (OW add-in "Occult Tools for OccultWatcher" required: get the DLL: <http://www.hristopavlov.net/OccultWatcher/OccultWatcher.OccultTools.zip>, copy it to the OW folder - start OW, update OW as requested).

If Occult4 is not installed, one can get the image also from OWC: On the first page of the event, click "Show OccultMap" at the very bottom.

It is important to add an Occult image and not a screenshot from Google maps or similar because the Occult map shows all the event details at its top, this helps the reviewer to check the report.

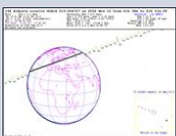
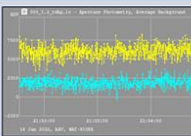


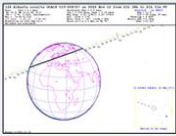
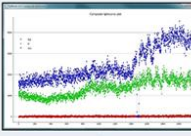
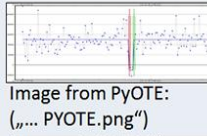
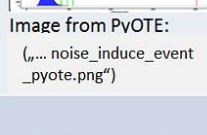

Pipeline	Event	Overview	Reduction	Log	csv File
Tangra, AOTA	 PNG-Image from Occult-Watcher: „Open Event in Occult“	 PNG-Image from Tangra: „Export lc / Save as Image File“	 PNG-Image from AOTA: „tab 5“	 Textfile („... AOTA_Report.txt“) from AOTA „tab 6“: „Save Report“	csv file from Tangra: „Export lc / Save as csv File“
Py-Movie, PyOTE	 PNG-Image from Occult-Watcher: „Open Event in Occult“	 PNG-Image from PyMovie: „Plot“ („Composite Lightcurve Plot“)	 Image from PyOTE: („... PYOTE.png“)  Image from PyOTE: („... noise_induce_event_pyote.png“)	 Textf. („... PYOTE.log“) from PyOTE	PyMovie csv file (Result of PyMovie photometry)
Other (SORA, Li-movie, ...)	Please provide similar information as described above.				

Figure 2.6. Observer required additional submissions (in case of an event detection)

The “Overview” images should show the entire recording (or a large part of it), including the light curve of at least one comparison star.

The “Reduction” images should have a higher temporal resolution and give a good overview of the extraction of the D and R times.

For AOTA, a "tab5" image is required because of its statistics (*not "tab6"*, whose results are already included in the AOTA report, which is also mandatory).

Note that when using PyOTE, the “Noise Induced Event” = “NIE”-test image must also be submitted.

csv files

The csv files are created according to Figure 2.7. Reviewers should load the csv files into AOTA and/or PyMovie to look for possible csv issues (sometimes the csv files do not contain timestamps or unreadable ones) and also for a quick re-check of observer’s data reduction.

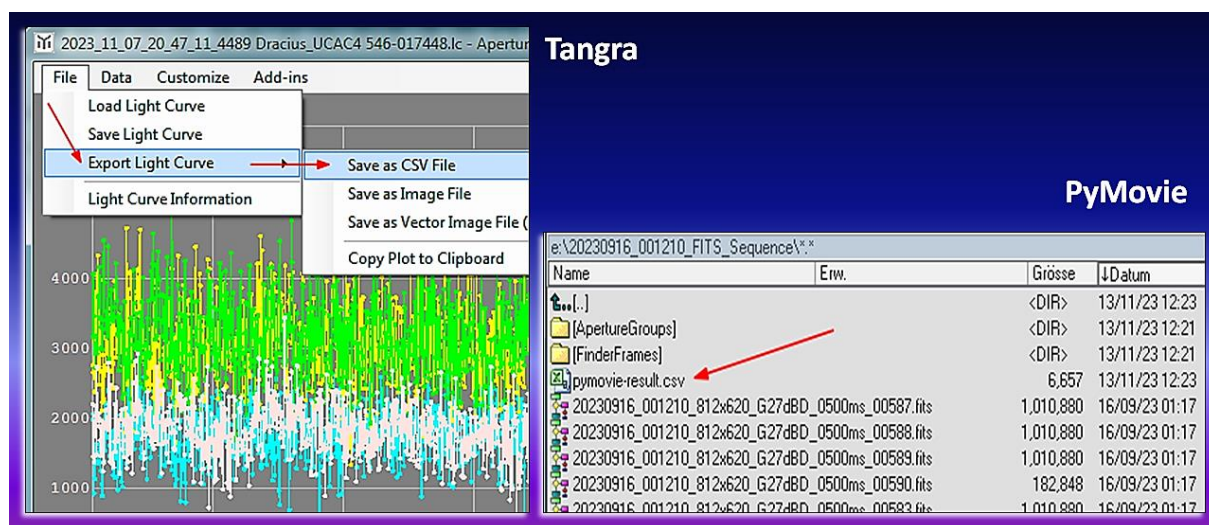


Figure 2.7. Creating csv files with Tangra and PyMovie

How to create light curves for VizieR (dat format)

Occultation event dat format lightcurves are sent by Dave Herald to VizieR (for an example see Figure 1.3). These lightcurves are produced by the related tools of Occult4 using the csv files from Tangra or PyMovie.

There are two possibilities. One relates on tab 6 of AOTA (“Report lightcurve”) and requires more user interaction than the method described below.

To create a dat lightcurve use the event's SODIS exported xml file (Figure 2.8).

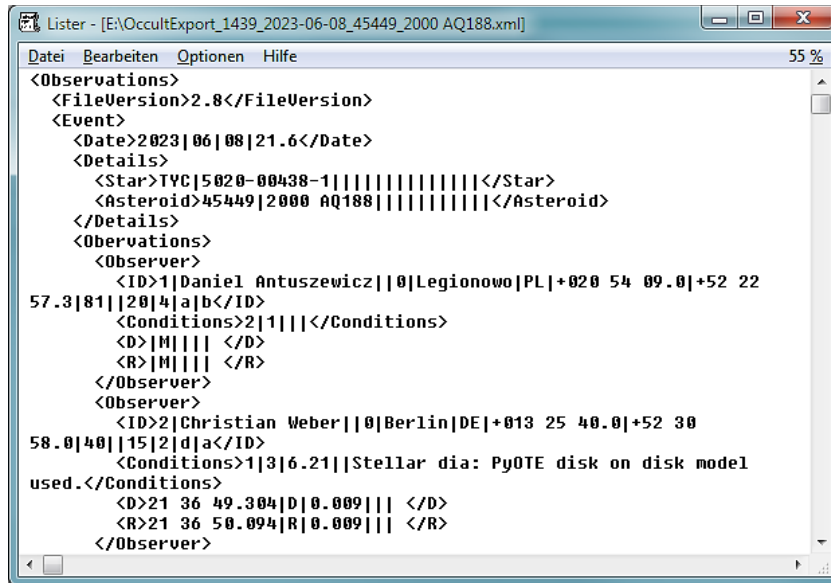


Figure 2.8. Part of the SODIS xml export file

Open the event xml in the Observations Editor (Figure 2.9).

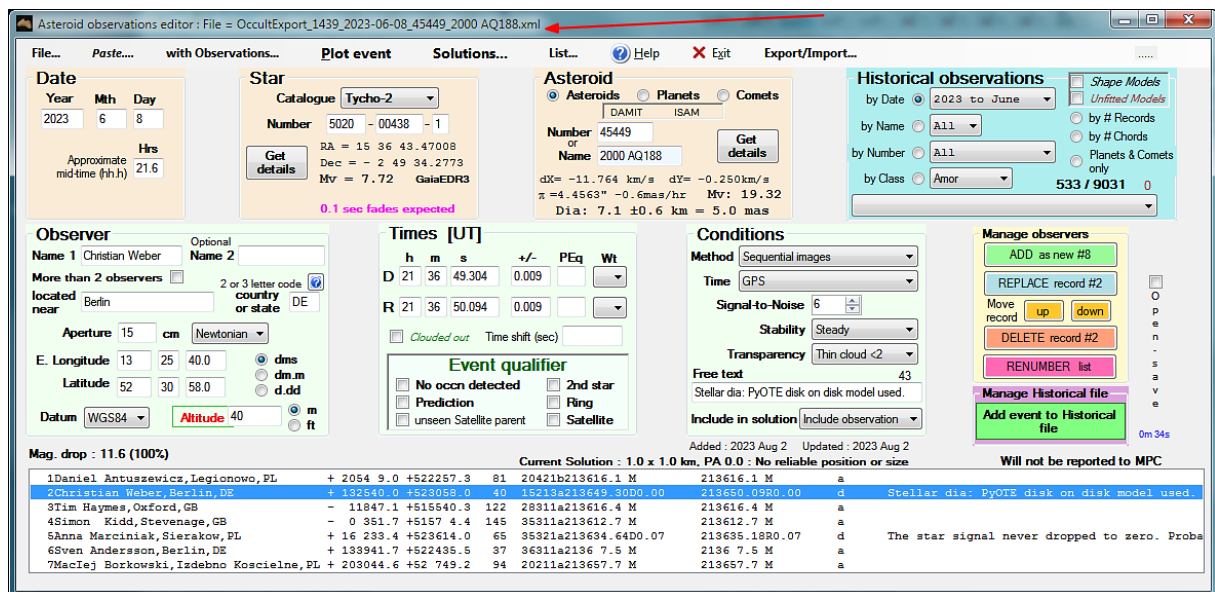


Figure 2.9. The xml file loaded in the in the Observations Editor

Then right mouse click on the observer's line, Figure 2.10.

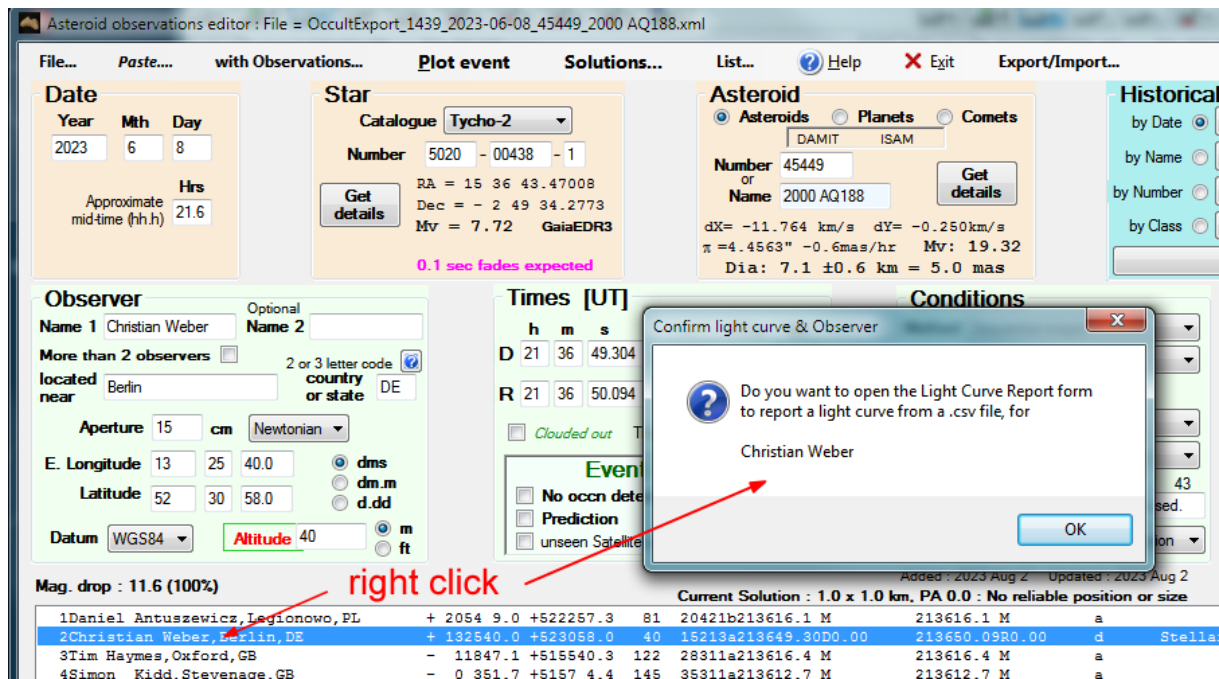


Figure 2.10. Select observer in the Observations Editor

Next select the observer's csv file, Figure 2.11.

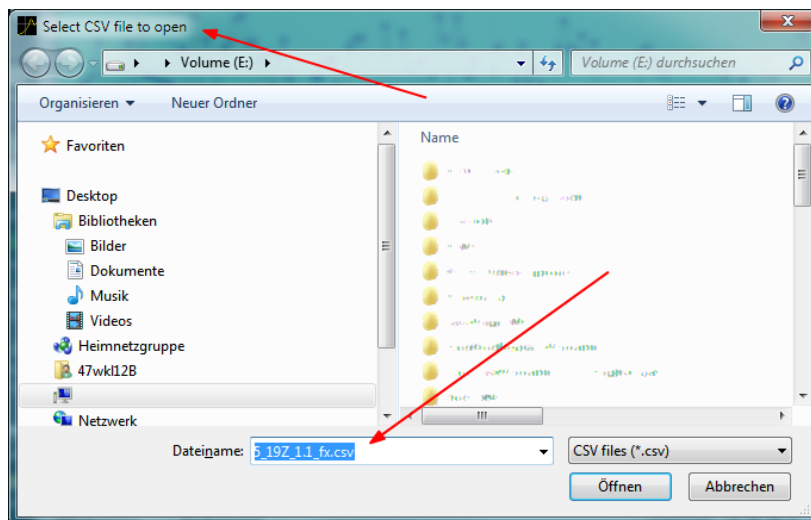


Figure 2.11. Selecting the csv file

Select the target star, Figure 2.12.

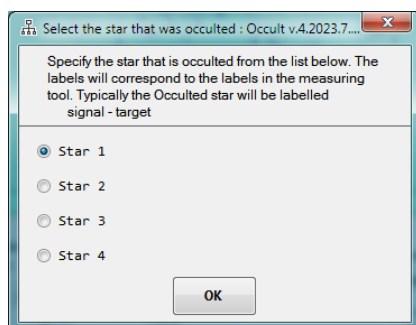


Figure 2.12. Selecting the target star

Then open familiar AOTA windows (Figures 2.13 and 2.14).

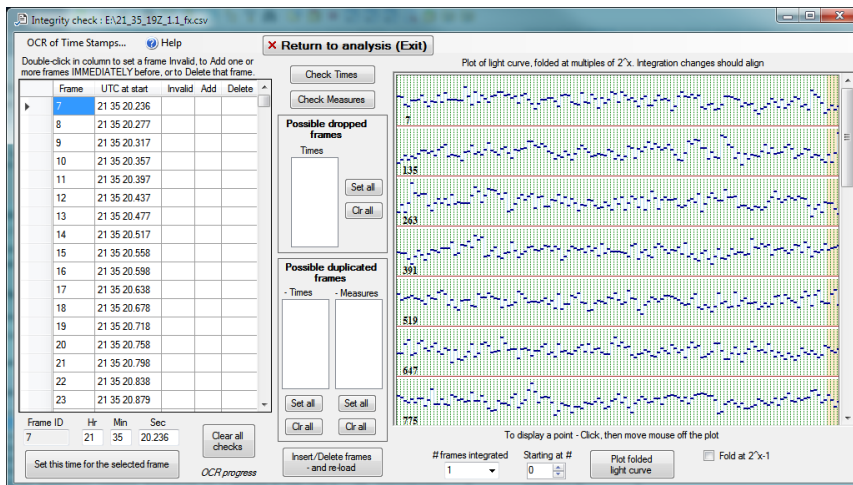


Figure 2.13. AOTA window

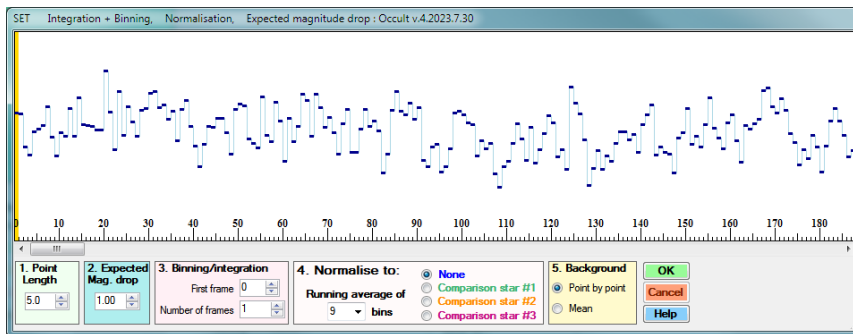


Figure 2.14. AOTA window

Now you see your lightcurve with all the data automatically filled in, Figure 2.15.

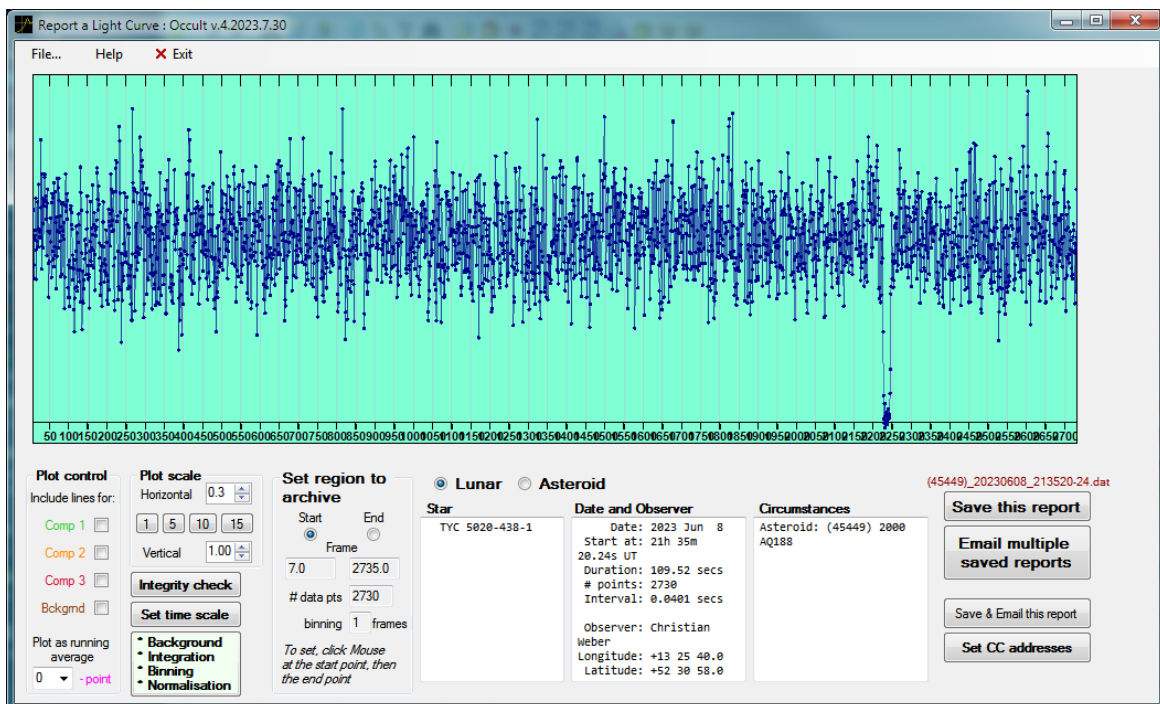


Figure 2.15. Lightcurve window

Next select appropriate start and end (Figure 2.16).

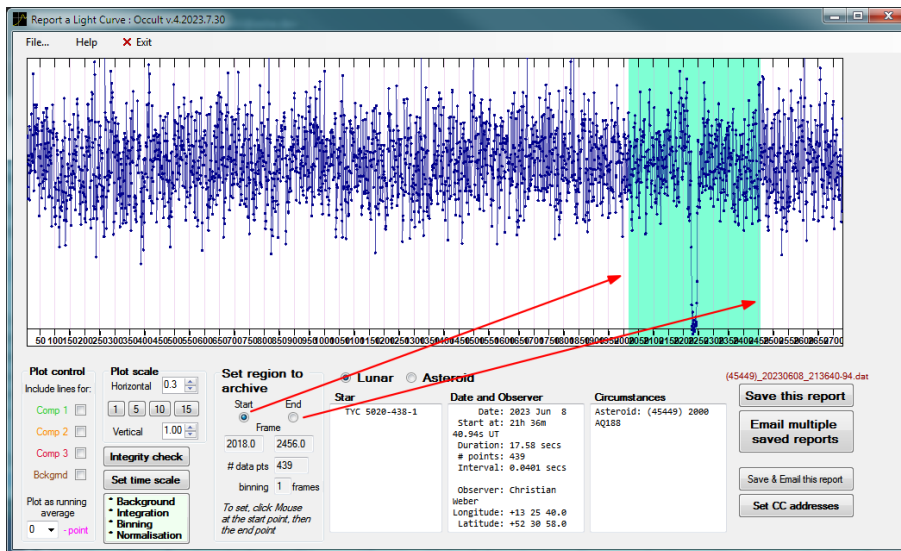


Figure 2.16. Selecting region to archive

Finally, save the light curve as dat, Figure 2.17.

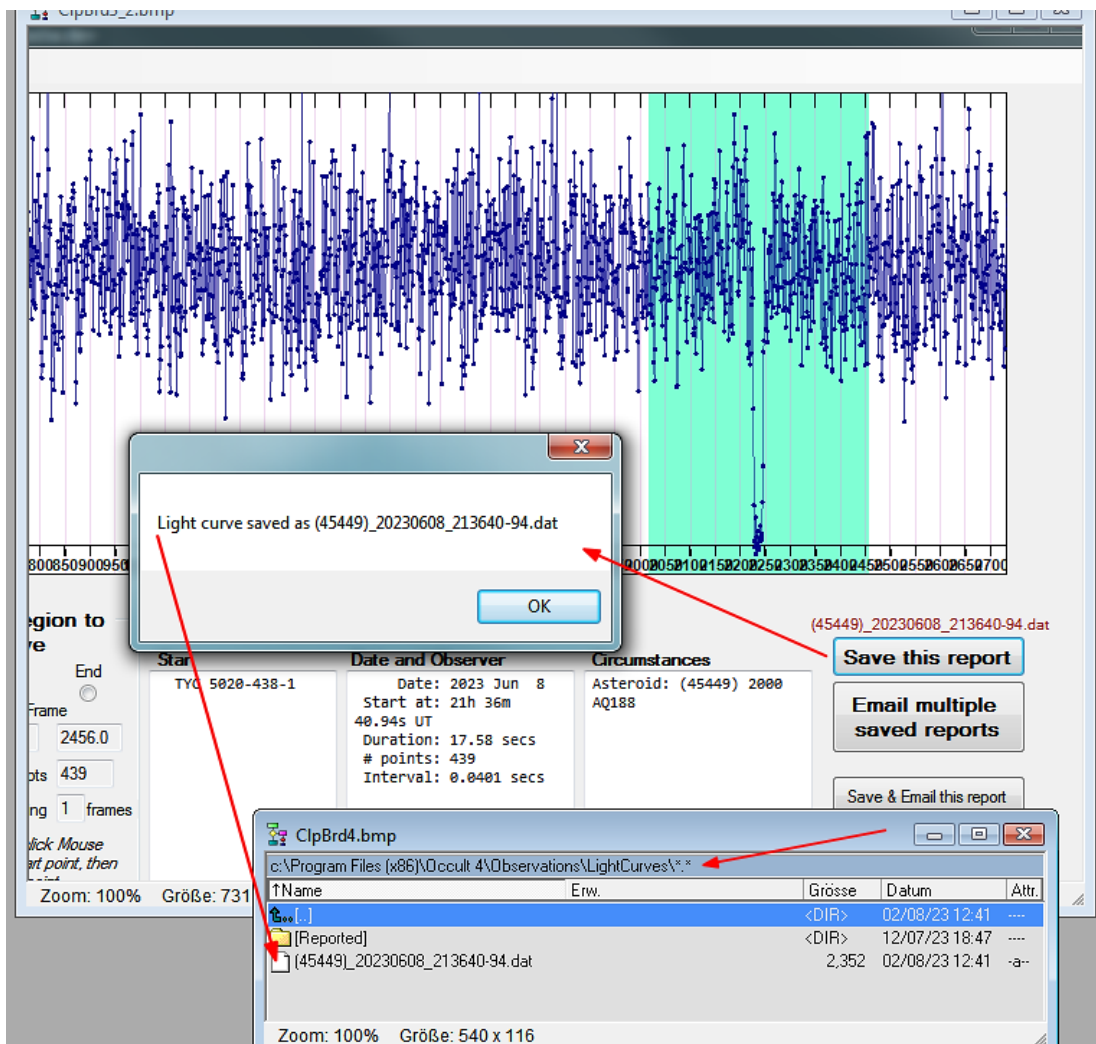


Figure 2.17. After saving the dat lightcurve it is written to the dedicated Occult4 folder

One can check the dat file using a lister, Figure 2.18.

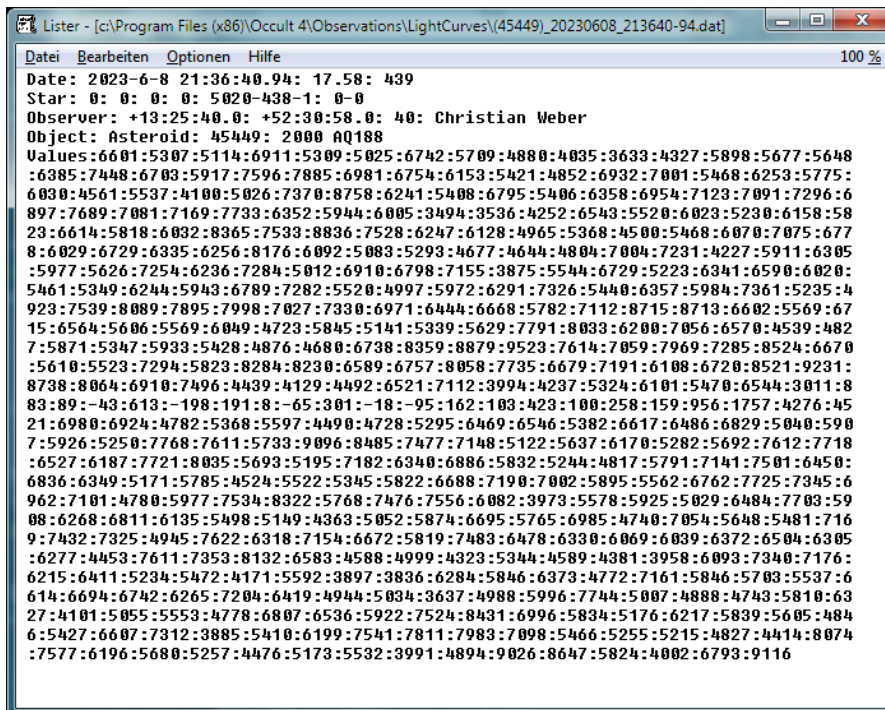


Figure 2.18. dat lightcurves are basically text files

Now you also can check how the lightcurve will look if it is published in Occult. To do so, open Occult's "Light curve viewer" from "Asteroid observations", see Figure 2.19.

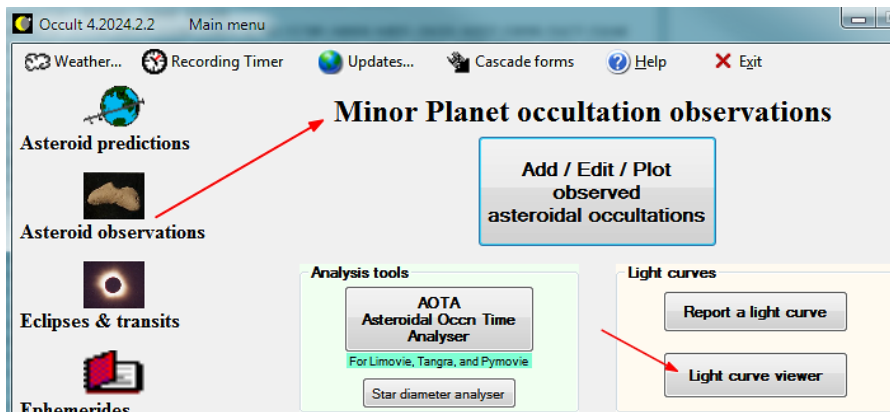


Figure 2.19. Light curve viewer

In the Light curve viewer select "View" > "My 1 unsubmitted light curves", Figure 2.20.

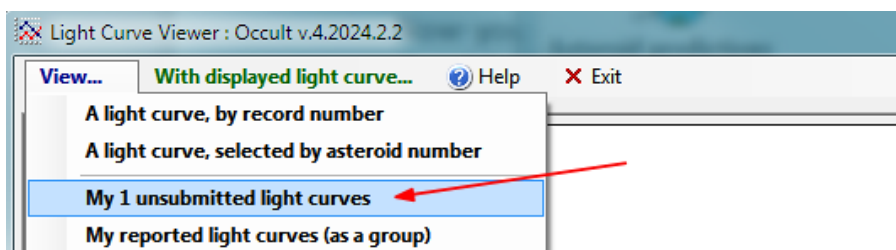


Figure 2.20. Selecting the lightcurve to show

Figure 2.21 shows the dat lightcurve in the Occult format.

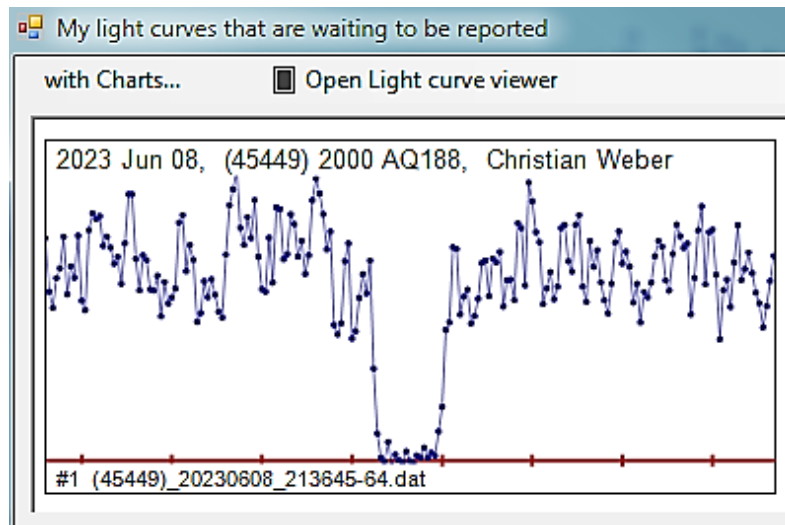


Figure 2.21. Created lightcurve

Since version 4.2024.2.2, Occult has undergone a comprehensive revision of the interfaces for handling light curves. It is strongly recommended that you familiarise yourself with these changes and additions. A good starting point is the chapter "Light Curve Editor" in the Occult Help.

SODIS handling of the dat formatted lightcurve files

a) Observers create the dat file by themselves

a1) Observers have sent the dat file to Dave Herald already. Important: Users must make a comment in the reports comments field that the dat file was already sent. In this case the observers should not upload a dat file to the SODIS report site. (Regardless of this, the csv file must always be uploaded to SODIS).

a2) Observers uploaded the dat lightcurve with the observation report to SODIS. The reviewer should check the dat file by opening it in the Occult lightcurve viewer as described above. The SODIS exporter will send the dat file to Dave Herald together with the xml file. (Regardless of this, the csv file must always be uploaded to SODIS).

b) The observer lets the reviewer produce the dat file. The dat file is saved by the reviewer on the SODIS report site. The SODIS exporter will send the dat file to Dave Herald together with the xml file. (Regardless of this, the csv file must always be uploaded to SODIS).

Reviewers produce dat files (if needed) as described above using the observer's csv file.

Files to add to a negative observation report

For non detection observations only the "Event" and "Overview" images are required, *but note that the csv file must be uploaded too* (Figure 2.22). For details see the text describing those for a positive observation.

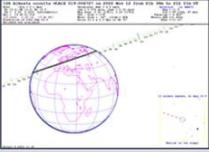
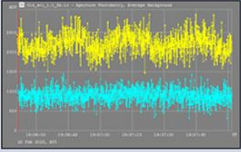
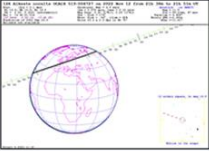
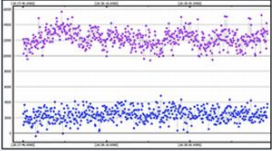
Pipeline	Event	Overview	csv File
Tangra, AOTA	 <p>PNG-Image from Occult-Watcher: „Open Event in Occult“</p>	 <p>PNG-Image from Tangra: „Export lc / Save as Image File“</p>	<p>csv file from Tangra: „Export lc / Save as csv File“</p>
Py- Movie, PyOTE	 <p>PNG-Image from Occult-Watcher: „Open Event in Occult“</p>	 <p>PNG-Image from PyMovie: „Plot“ („Composite Lightcurve Plot“)</p>	<p>PyMovie csv file (Result of PyMovie photometry)</p>
Other (SORA, Li- movie, ...)	Please provide similar information as described above.		

Figure 2.22. Files to upload to SODIS for a non detection report

Multiple events (double stars, satellites)

Observers sometimes overlook signs of double stars or satellites in their light curves. The reviewers should keep an eye on this and, if necessary, carry out further investigations together with the observers. In particular, steps in D and/or R are often overlooked (Figure 2.23). Observers must submit separate reports for double stars/satellites.

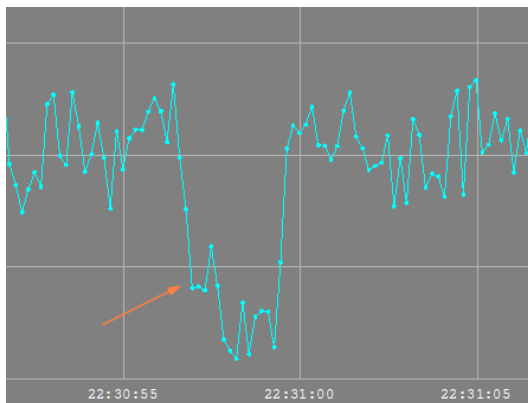


Figure 2.23. Step in D, indicating a double star (Source: A. Marciniak)

Occult has sophisticated tools to handle double stars and also satellites, see the Occult help and ask the SODIS team if necessary.

For such multiple events, Dave Herald expects xml files that already contain the double star/satellite solution - so all reviewers should familiarise themselves with these issues.

Weighting and plot code

Note that for a *single* positive report Weight “0” and/or Plot code “Exclude observation” cannot be processed by Occult and must therefore be avoided.

3 Scientific issues during the review process

Data reduction software

Both PyMovie/PyOTE and AOTA have evolved. Everyone should familiarise themselves with the new functions and always use the latest programme versions. The latter also applies to observers - older software versions used can lead to errors in data reduction. The reviewers should therefore also take a look at the software versions used by the observers.

PyMovie/PyOTE installation (compare Chapter 5.3 of the Reviewer-Documentation)

It seems that Anaconda installations (in particular updates to the latest versions of PyMovie/PyOTE) actually do not work anymore (mismatch of package versions).

So it is recommended to avoid Anaconda and use the procedure described under <https://occultations.org/sw/pymovie/WinPyMoviePyOTE-Install-2022-9-16.zip>.