Occultation of Chariklo on May 22 2015

3 septembre 2015

1 Post-Prediction

The last update of the prediction shows a shadow across South of Chile and Argentina.

Chariklo NIMA4/DE432,STAR/Danish21may,DB/jun15 Offset(mas): −119.2   18.6

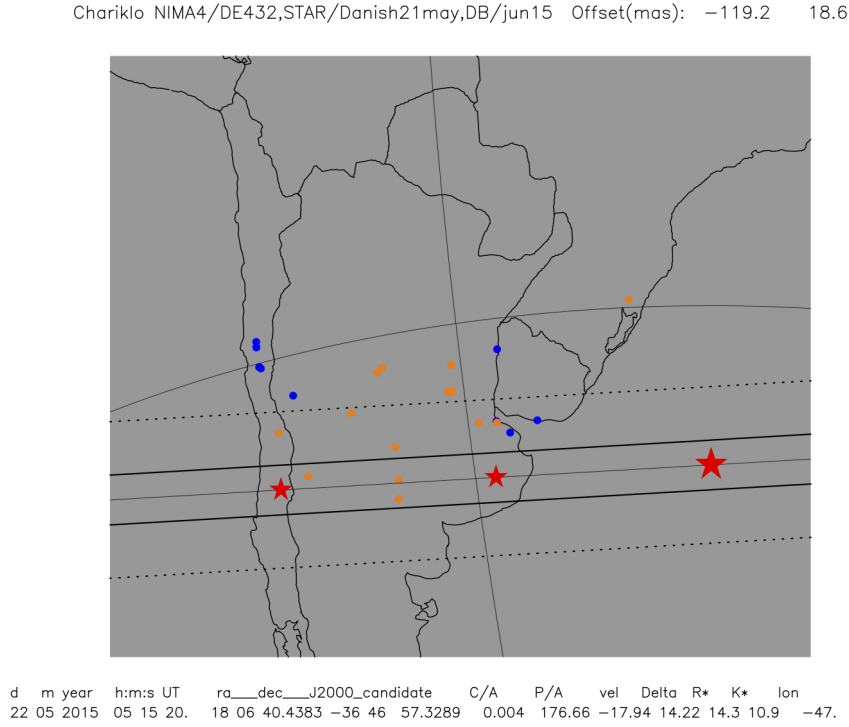| d	m year	h:m:s UT	ra___dec___J2000_candidate	C/A	P/A	vel	Delta	R∗	K∗	lon
22 05 2015	05 15 20.		18 06 40.4383 −36 46 57.3289	0.004	176.66	−17.94	14.22	14.3	10.9	−47.

FIGURE 1 – Last updated prediction and observers. The blue dots are the observers who could observe. The orange ones are the failed observations (because of bad weather or technical failure). The red stars represent position of Chariklo's center (the bigger one is at the hour of the occultation and then, each small star is separated by one minute). The dotted lines define the rings shadow and the unbroken line is for the main body shadow.

2 Observations Report

Site	coordinates altitude (m)	telescope	instrument DIT (and possibly cycle)	observers
Bosque Alegre Argentina	31° 35' 54.0" S 64° 32' 58.7" 1250	154cm	Raptor	J. Desmars P. Guzzo R. A. Artola C. Quiñones A. Scavuzzo S. Morero cloudy- no data
Pierre Auger Observatory Argentine	35 29 44.5884 S 69 26 58.1748 O 1385 m	FRAM 30cm	Raptor	D. Bérard E. Meza J. Ebr et M. Masek (on skype) cloudy- no data
Santa Martina Chili	33 16 09.0 S 70 32 04.0 W 1450	M16	Raptor/Merlin127	R. Leiva Espinoza cloudy-no data
Santa Rosa Argentina	36 38 16 S 64 19 28 W 182	El Catalejo 8 pouces	CCD Meade DSI I 3 s ? ?	J. Spagnotto S. Gurovich cloudy- no data
General Acha Argentine	37 21 53 S 64 34 27 W	C14	Raptor	C. Colazo R. Melia cloudy - no data
Porte Alegre Brésil		T 11" et T10"	Raptor	A. Dias de Oliviera G. Rossi Chariklo too close to the zenith
Rosario Santa Fe - argentine	32 59 15.5 S 60 38 48.2 W	ecuatorial newtoniano 30cm f/6.5	DSRL Canon EOS Rebel T3i	L. Mansilla cloudy
Mercedes	34 34 11 S 59 24 47 W			Mario and Miguel cloudy- no data
Santa Rosa Argentine	36 31 21 S 64 22 40 W	Meade Lx 200 16"	Raptor	L. Maquet L. Tapia M. Starck cloudy- no data
Realico Argentine	35 03 10 S 64 14 34.5 W	Meade LX200 12"	Merlin127 Raptor	JL. Dauvergne S. Galarza cloudy- no data
Observatorio cruz del sur Buenos Aires - Argentine	34 39 55 S, 58 24 35 O	Newton 315mm F/4	Meade DSI I (mono)	A. Chapman N.D. Diaz (via internet) cloudy- no data
Obs. Buenaventura Suárez San Luis, Argentina	33 09 07.16 S 66 18 43.62 W	Schmidt Cassegrain 25cm	CCD SBIG ST8	E. Gonzalez R. Tapia cloudy- no data
Villa Gobernador Gálvez Santa Fe, Argentina	33 01 36.21 S 60 38 13.97 W	Newtoniano SW 150 F5	Canon EOS dsl1 D100	J. Nardon cloudy- no data
Zavalla Santa Fe, Argentina	33 01 10 S 60 52 36 W	Newtoniano 8"	Canon eos.	J. Burzacca cloudy- no data
Obs. Galileo Galilei Oro Verde, Argentina	31 49 22.9584 S 60 31 14.3724 W	C11	CCD Celestron Sensor Kodak KAI-10100	C. Fornari cloudy- no data
Obs. Astronómico Córdoba Argentine	31 25 12.2 S 64 11 55.1 W	Cassegrain Celestron 14"	SBIG ST7	C. Girardini M. Tornatore L. Balanzino cloudy- no data
Cerro Tololo Chili	30 10 03.4 S 70 48 19 W 2207	PROMPT 0.4m	U47-MB	J. Pollock

Site	coordinates altitude (m)	telescope	instrument DIT (and possibly cycle)	observers
La Silla Chili	29° 15' 16.6" S 70° 44' 21.8" W 2315	TRAPPIST 0.6m no filter	FLI PL3041-BB 4.5s ? ? ?	E. Jehin negative
La Silla Chili	29° 15' 39.55" S 70° 44' 53.76" W 2386	NTT 3.55m H-band (1.6 microns)	SOFI 0.1s ? ? ?	V. Ivanov negative
La Silla Chili	29° 15' 21.3" S 70° 44' 20.2" W 2336	Danish 1.54m H-band (1.6 microns)	Lucky Imager 0.1s	C. Snodgrass negative
Buenos Aires (AAAA) Argentina	34°36'16.94"S 58°26'4.37"O 0	M10	ST9e 4s	A. Blain negative
Los Molinos Uruguay	34 45 30 S 56 11 23 W 0	OALM 46cm	FLI CCD 3s <3.8s	S. Roland R. Salvo G. Tancredi D. Fernandez negative
Los Molinos Uruguay	34 45 30 S 56 11 23 W 0	OALM 30cm	Raptor 0.5s 0s	S. Roland R. Salvo G. Tancredi D. Fernandez negative
Las Campanas Chili	29 00 52.56 S 70 41 33.36 O 2380 m	Magellan 6 m	0.05s	D. Osip negative
CASLEO Argentine	31 47 55.10 S 69 17 44.30 O 2478 m	T215 JS 2.15	Raptor 1s	R. Gil Hutton negative
LCOGT		3 x 1m	1s or 0.5s	F. Bianco negative
OLASU Salto - Uruguay	31 23 33.09 S 57 58 42.93 W 37.m	Meade 12 "	3s	E.M. Alvarez negative
Cerro Pachon Chili	30 14 16.8 S 70 44 01.35 O 2738m	SOAR 4m	Raptor 0.05s	R. Leiva Espinoza negative
Los Dos Vagones Buenos Aires - Argentine	35 10 54.804 S 57 45 08.980 W	250/1200 SW	Meade DSI pro III	JL. Sanchez A.S. Kleiman negative

distance Δ= 2167673150 km,

scale : 1 arcsec= 10509.18 km,

NOMAD magnitudes : B= 12.41, V= 14.33, R=13.61, J=11.96, H=11.18, K=11.02

Star position measured on Danish telescope data (La Silla - Chile) on May 21 2015 :

18 06 40.4383 RA and -36 46 57.289 DEC

3   Reduction of LCOGT data

The occultation was observed by 3 telescopes of 1 meter-diameter, named EF06 - 07 - 08 in this report. EF06 observed with an integration time of 0.5s, and the others with an integration time of 1s, but the reading time between images was very long (around 3s) and irregular. Observations have been made between 05h UT and 05h 35 UT. No dark or flat treatment was applied.
We chose an aperture of 7-8-9 pix depending on the telescope and we smoothed the reference flux on 3 or 5 points.

The FIG 2 presents an image of each telescope (green square is the target and green circle is the reference) and the optimal ratio flux target/smoothed reference flux.
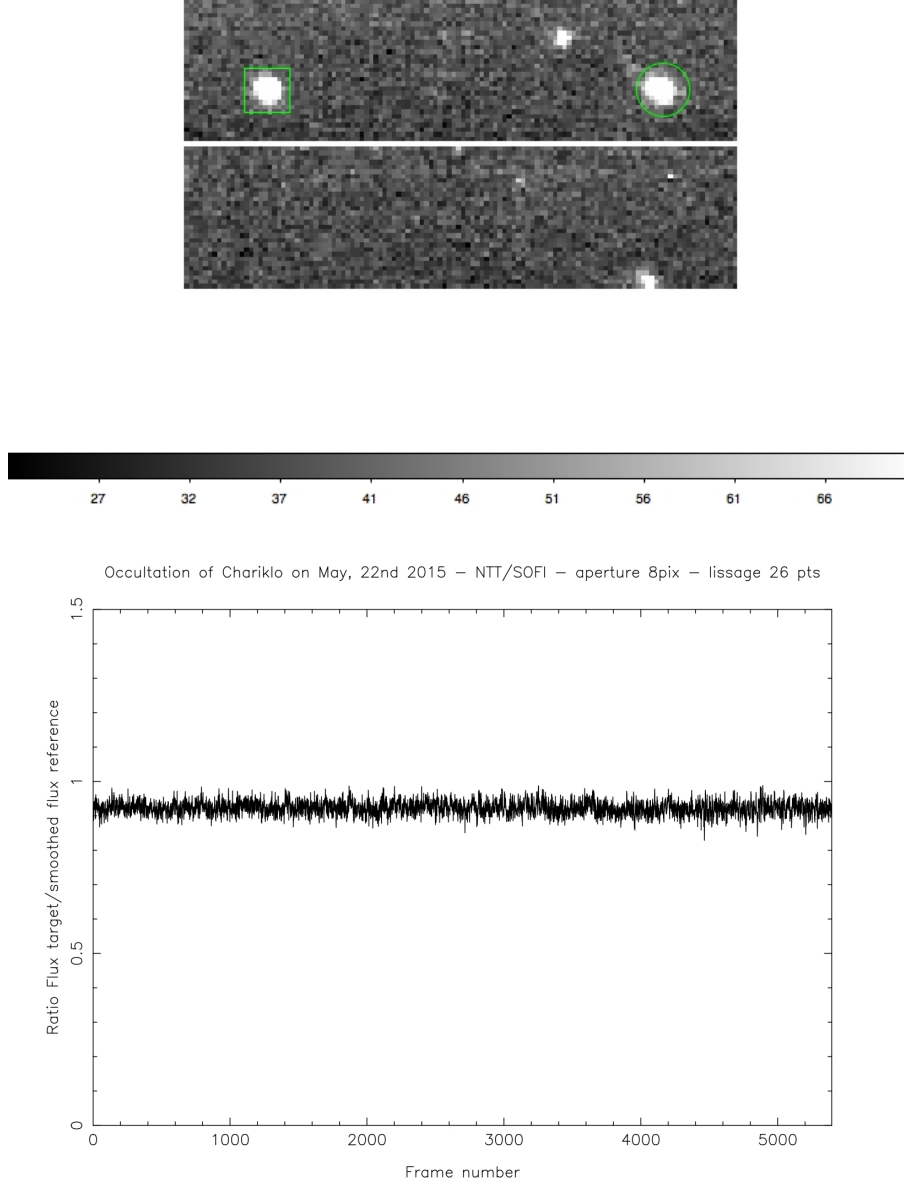No event is detected.
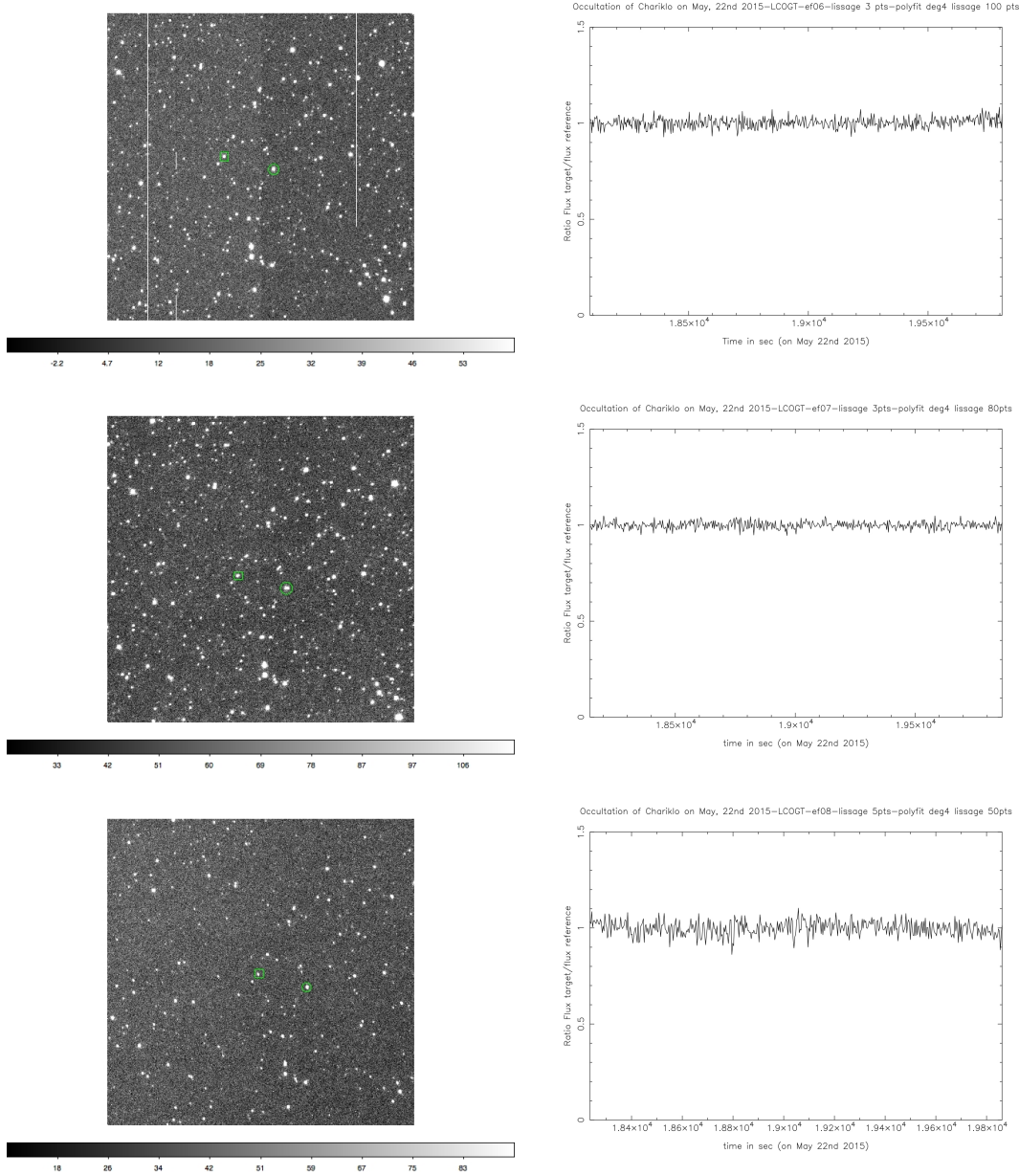
FIGURE 2 – LCOGT results : Each line shows the image (green square is the target and green circle is the reference) and the optimal ratio flux target/smoothed reference flux for each telescope of LCOGT (EF06-EF07-EF08). No event is detected

4   Reduction of NTT/SOFI data

SOFI took 5394 images and darks of 120x64 pix with an exposure time of 0.1s. We chose an aperture of 8 pixels and a smoothing of the reference on 26 points. The FIG 3 shows an image (green square is the target and green circle is the reference) and the optimal ratio flux target/smoothed reference flux. No event is detected.
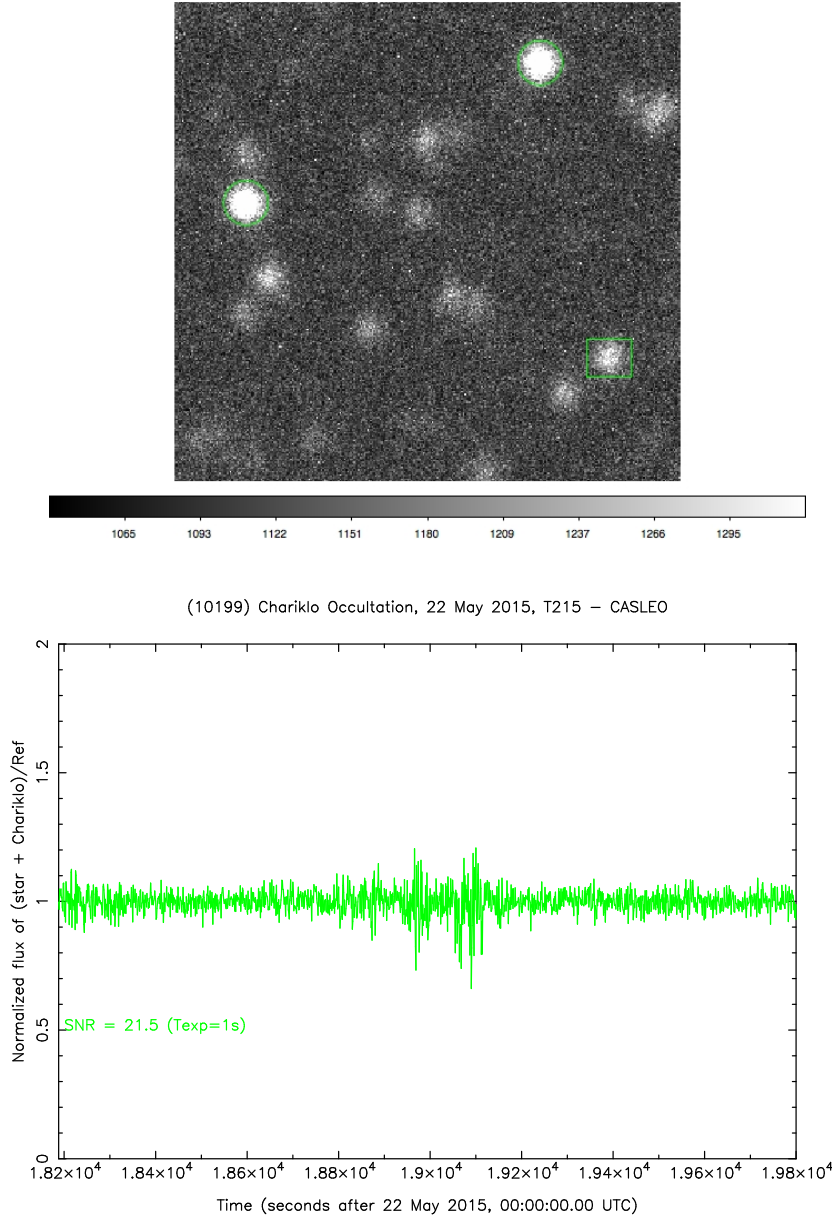

FIGURE 3 – NTT/SOFI results : One of the taken image (green square is the target and green circle is the reference) and the optimal ratio flux target/smoothed reference flux. No event is detected

5   Reduction of SOAR data

SOAR observed with a Raptor at 20fps (exposure time 0.05s). There are 44598 images. We used 3 reference stars and we smoothed the reference flux (sum of the 3 references) on 3 points (number which maximize the SNR). The FIG 4 shows an image (green circle shows the target) and the optimal ratio flux target/smoothed reference flux.To simplify the reading of the figure, the ratio is presented in Julian Date but we subtracted 2457164.7JD. Time on the figure is in JD after 22/05/2015 at 04h48 UT. As reminder : 05h10 UT corresponds to 0.015 on the figure and 05h20 corresponds to 0.022. No event is detected.

Occultation of Chariklo on May, 22nd 2015—SOAR—lissage 3 pts —sum 3 ref
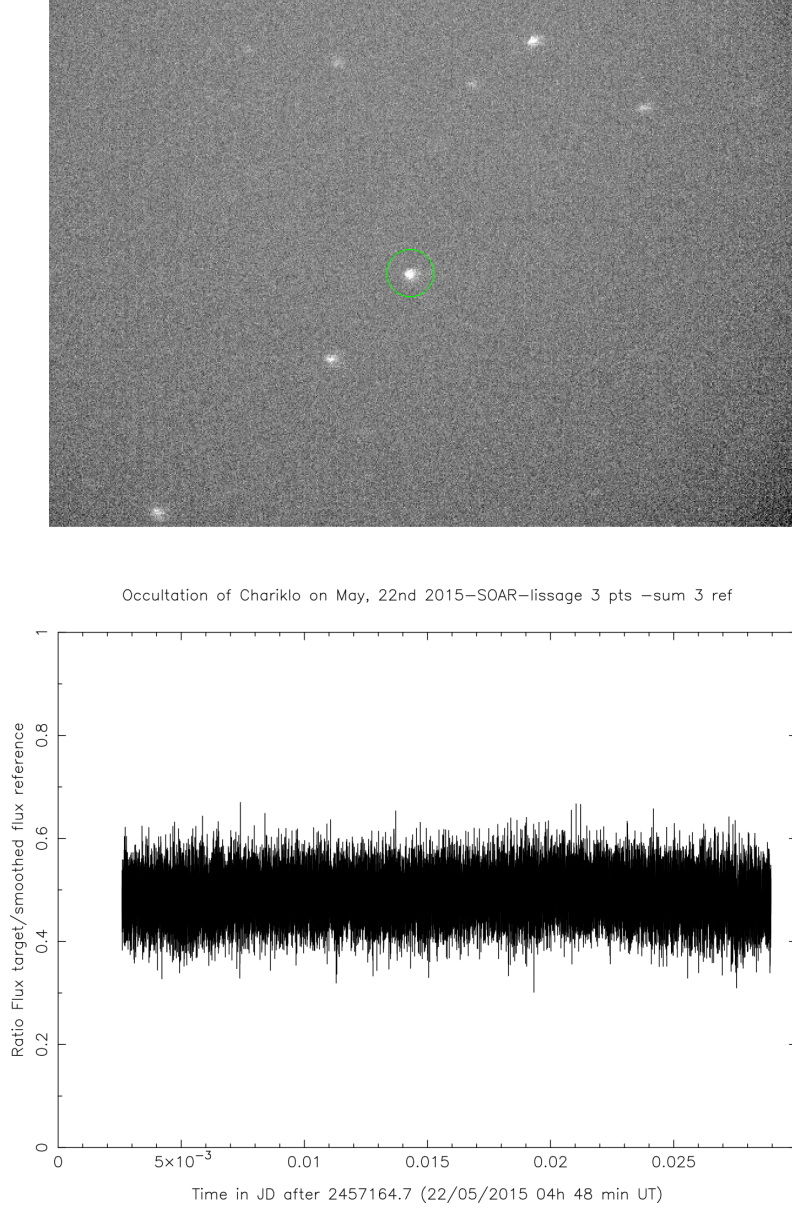
FIGURE 4 – SOAR results : One of the taken image (green circle is the target) and the optimal ratio flux target/smoothed reference flux. No event is detected

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6   Reduction of CASLEO data

At the Observatorio El Leoncito, in Argentina, we observe with the T2.15m and a raptor. The exposure time was 1s and we obtained 1614 images (between 05 :03 :07.515 UT and 05 :30 :00.553 UT). The reduction have been made using 2 brighter reference stars than the target. No smoothing was applied. Darks images were subtracted. The FIG 5 shows an image (green square is the target and green circles are the references) and the optimal ratio flux target/summed references flux. The weather was unstable, so during the event, clouds appears. This explains the increasing noise in the center of the figure. No event is detected.
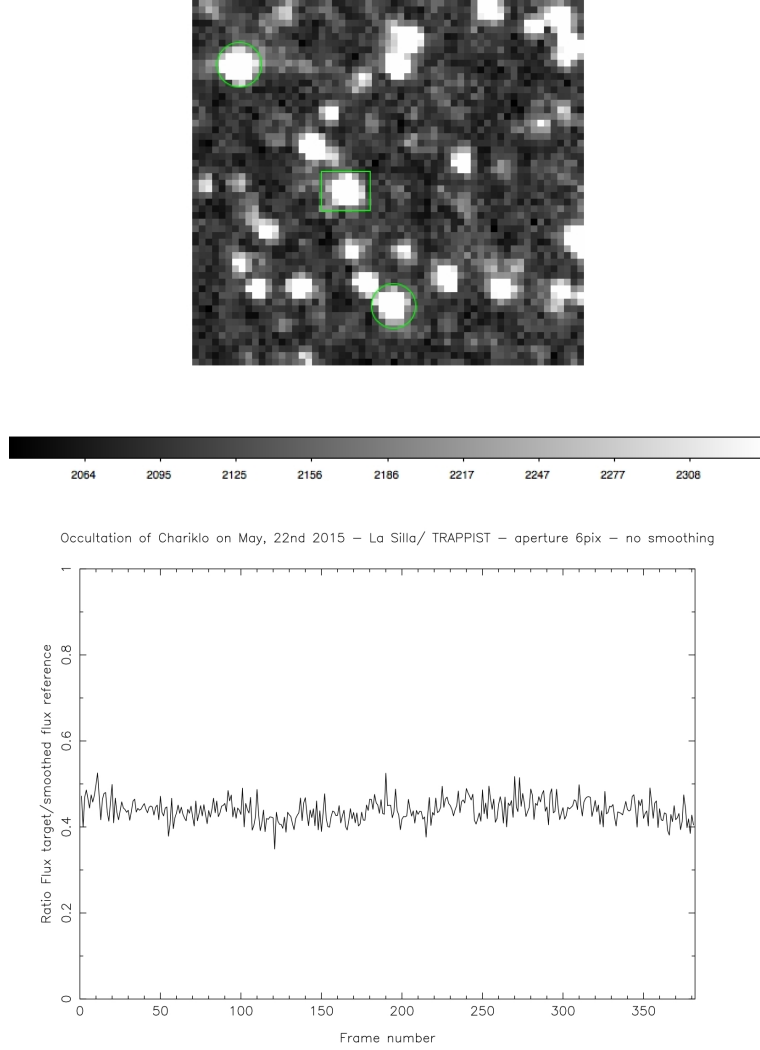

FIGURE 5 – CASLEO results : One of the taken image (green square is the target and green circles are the references) and the optimal ratio flux target/summed references flux. In the center of the figure, the noise is due to clouds appearance. No event is detected

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7 Reduction of TRAPPIST data

At La Silla, the occultation has been observed with TRAPPIST. The DIT was 2.5s, thus we obtained 382 images between 05h05 UT and 05h29 UT with a 2x2 binning. For the reduction, we chose 2 reference stars and an aperture of 6 pixel. The smoothing of the reference didn't improve the SNR so we didn't do it. The FIG 6 shows an image (green square is the target and green circles are the references) and the optimal ratio flux target/summed references flux.
No event is detected.

FIGURE 6 – TRAPPIST results : One of the taken image (green square is the target and green circles are the references) and the optimal ratio flux target/summed references flux. No event is detected

8 Reduction of Lucky Imager data

The Danish telescope took pictures at 10 fps. The photometry has been processed by Colin Snodgrass. It could be improved but no event is detected so we didn't improve the photometry. The gap in the middle is between individual data spools (FIG 7).
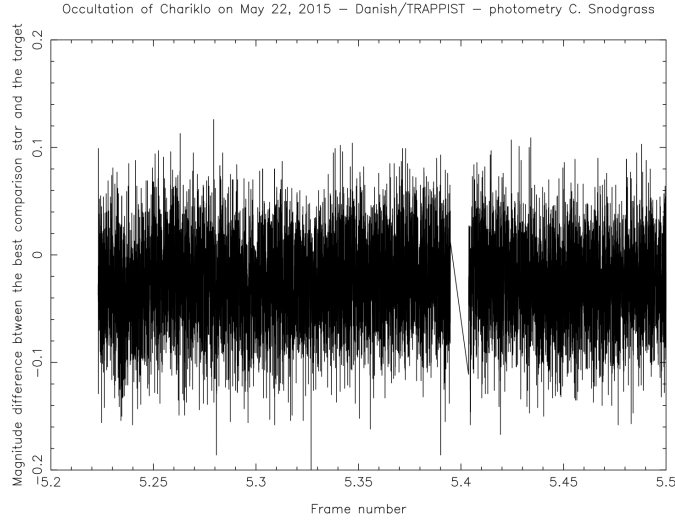

FIGURE 7 – Lucky Imager results : Magnitude difference between the best comparison star and the target. The gap in the middle is between individual data spools.

9   Reduction of OALM data

In OALM (Uruguay), 2 telescopes observed : a Centurion 46 cm and a Meade 12". The photometry has been made by the observers and unfortunately the data are noisy. Nothing can be said about the detection (FIG 8 and 9).
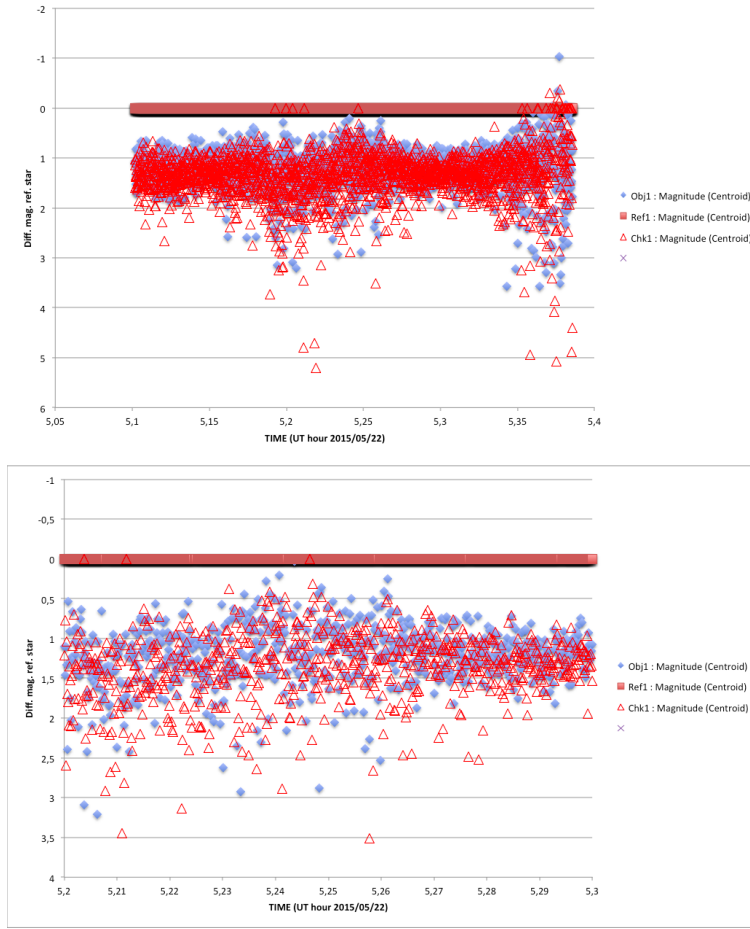

FIGURE 8 – OALM results : Difference of magnitude between a comparison star and the target obtained with the meade 12" telescope. No event is detected
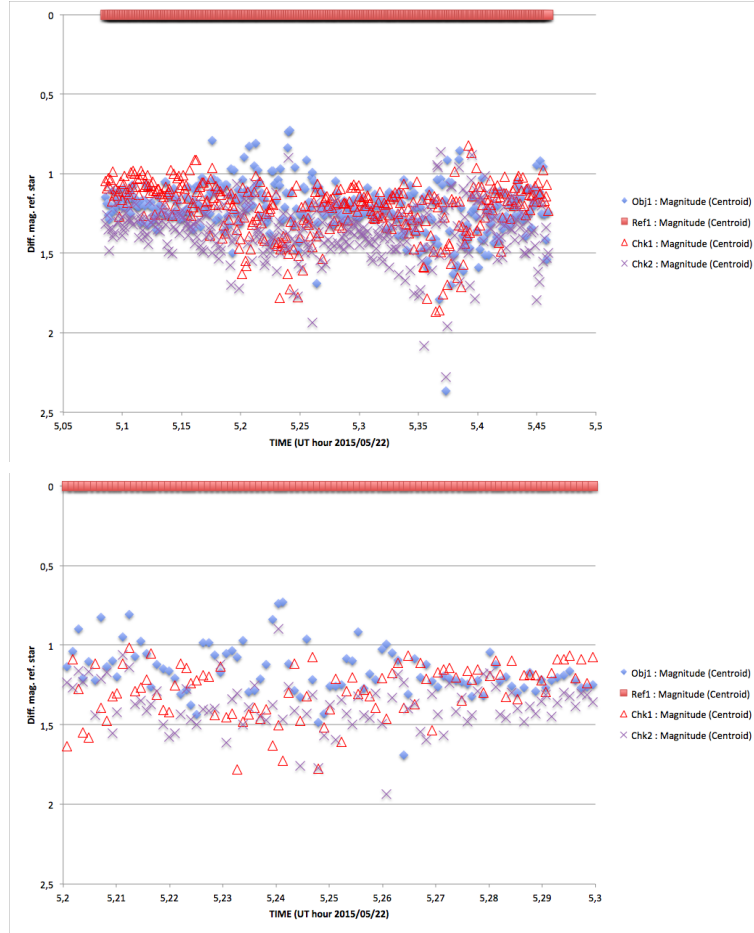
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FIGURE 9 – OALM results : Difference of magnitude between a comparison star and the target obtained with the centurion 46cm telescope. No event is detected

10   Reduction of OLASU data

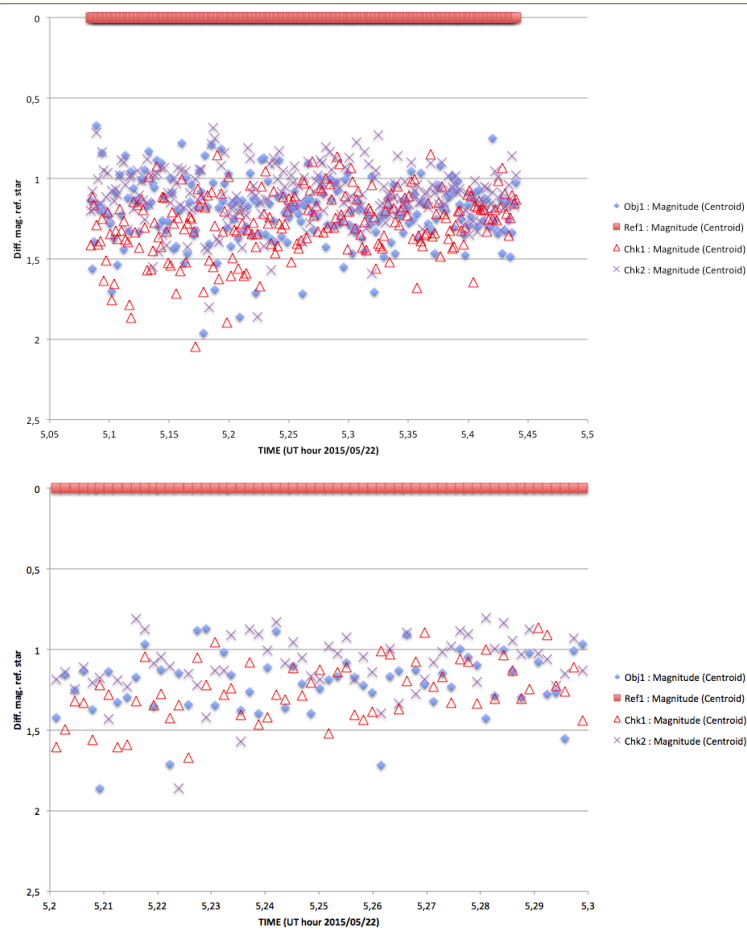In OLASU, the occultation has been observed with a Meade 12" (FIG 10).

FIGURE 10 – OLASU Results : Difference of magnitude between a comparison star and the target. No event is detected

11 Reduction of Los Dos Vagones data

The data from Dos Vagones are very noisy. G. Tancredi analysed the data and produced the plots on FIG 11. Nothing is detected.
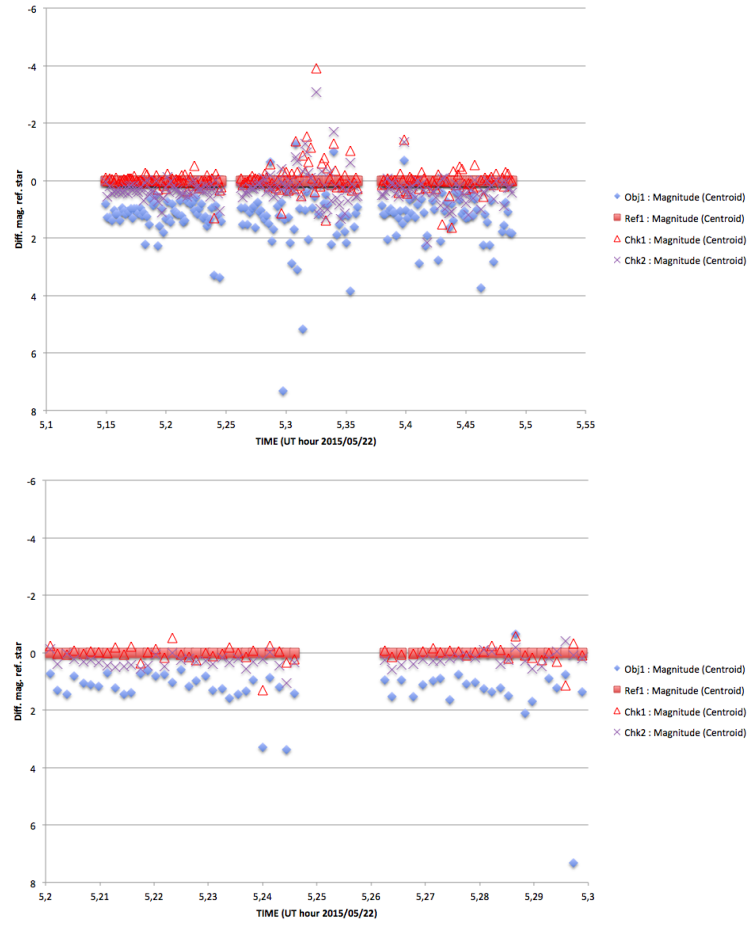

FIGURE 11 – Los Dos Vagones Results : Difference of magnitude between a comparison star and the target. No event is detected