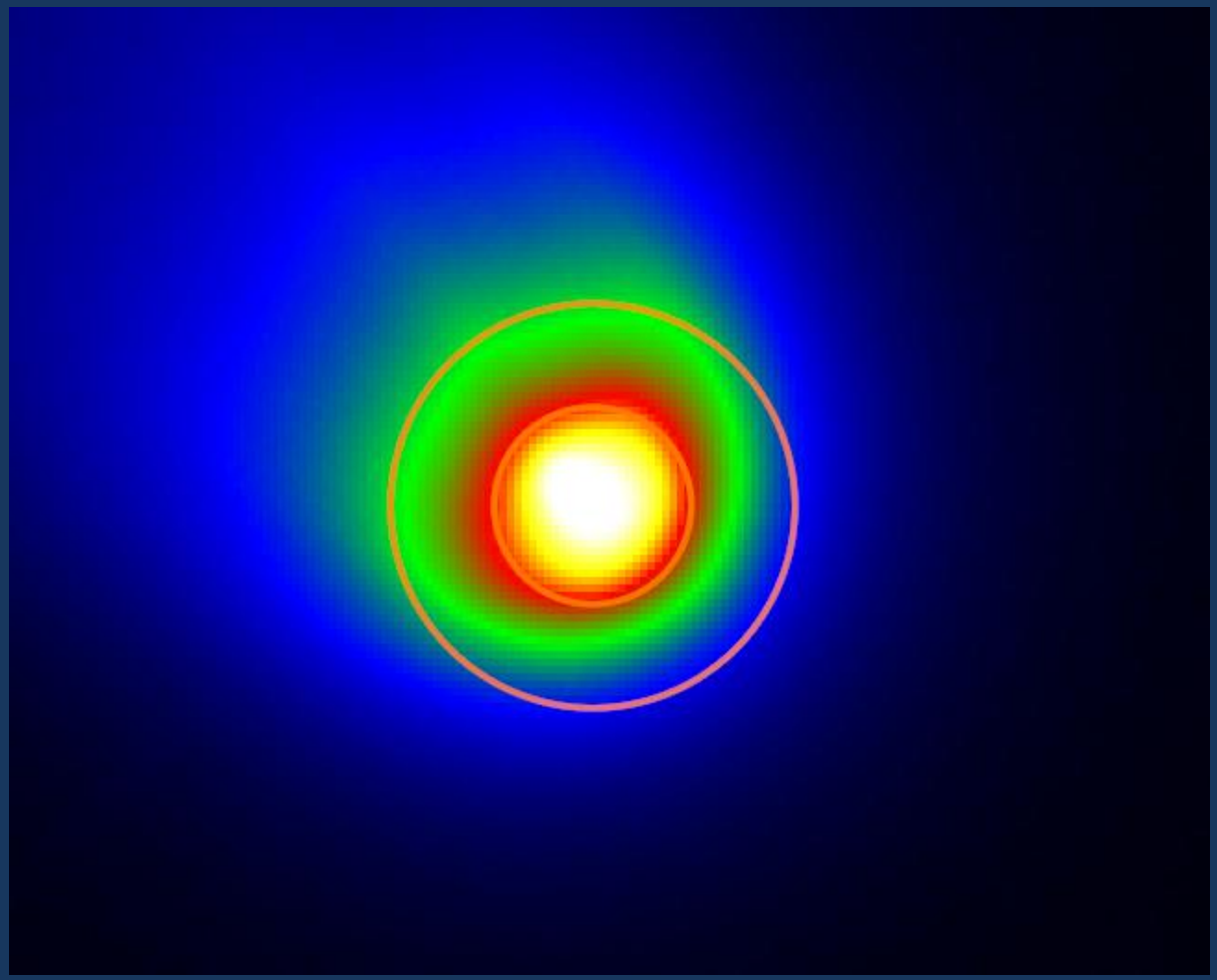
ritratti fotometrici
ovvero: le comete in numeri

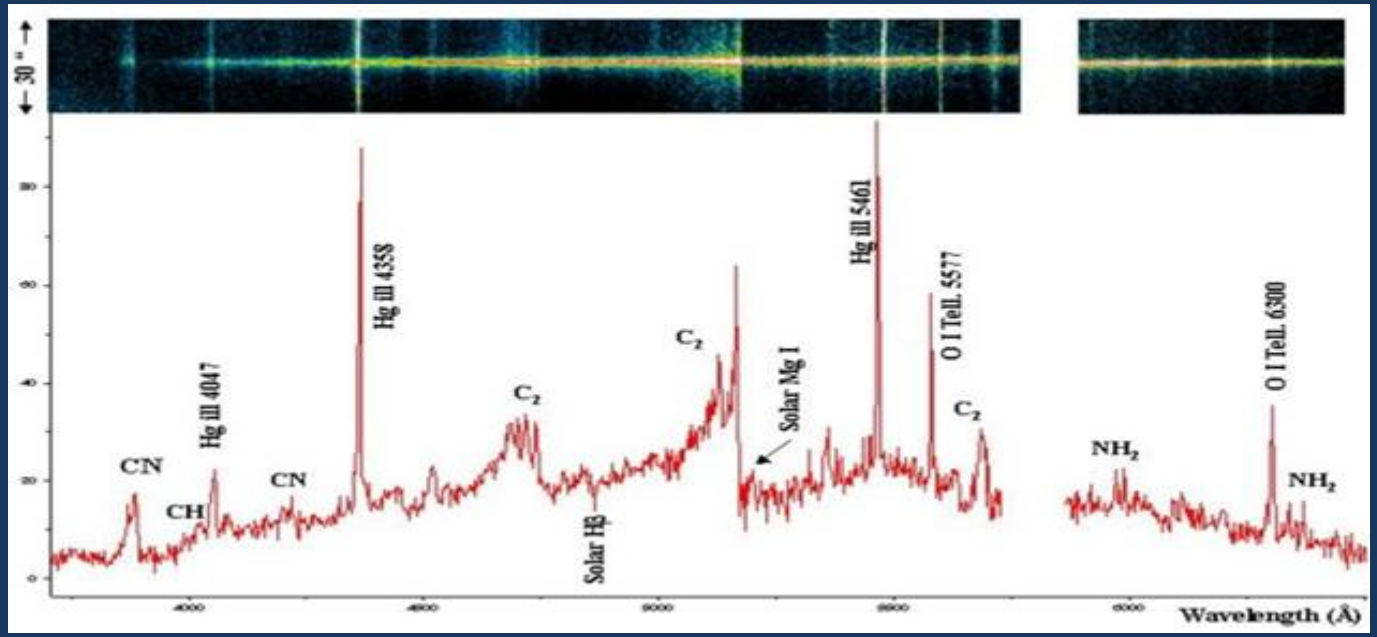


Adriano Valvasori & Giannantonio Milani

Fotometria di comete, possibili approcci:

- **Magnitudine totale visuale o in banda V o G**

- **Fotometria in multiapertura nelle bande R, I, 647 nm,**



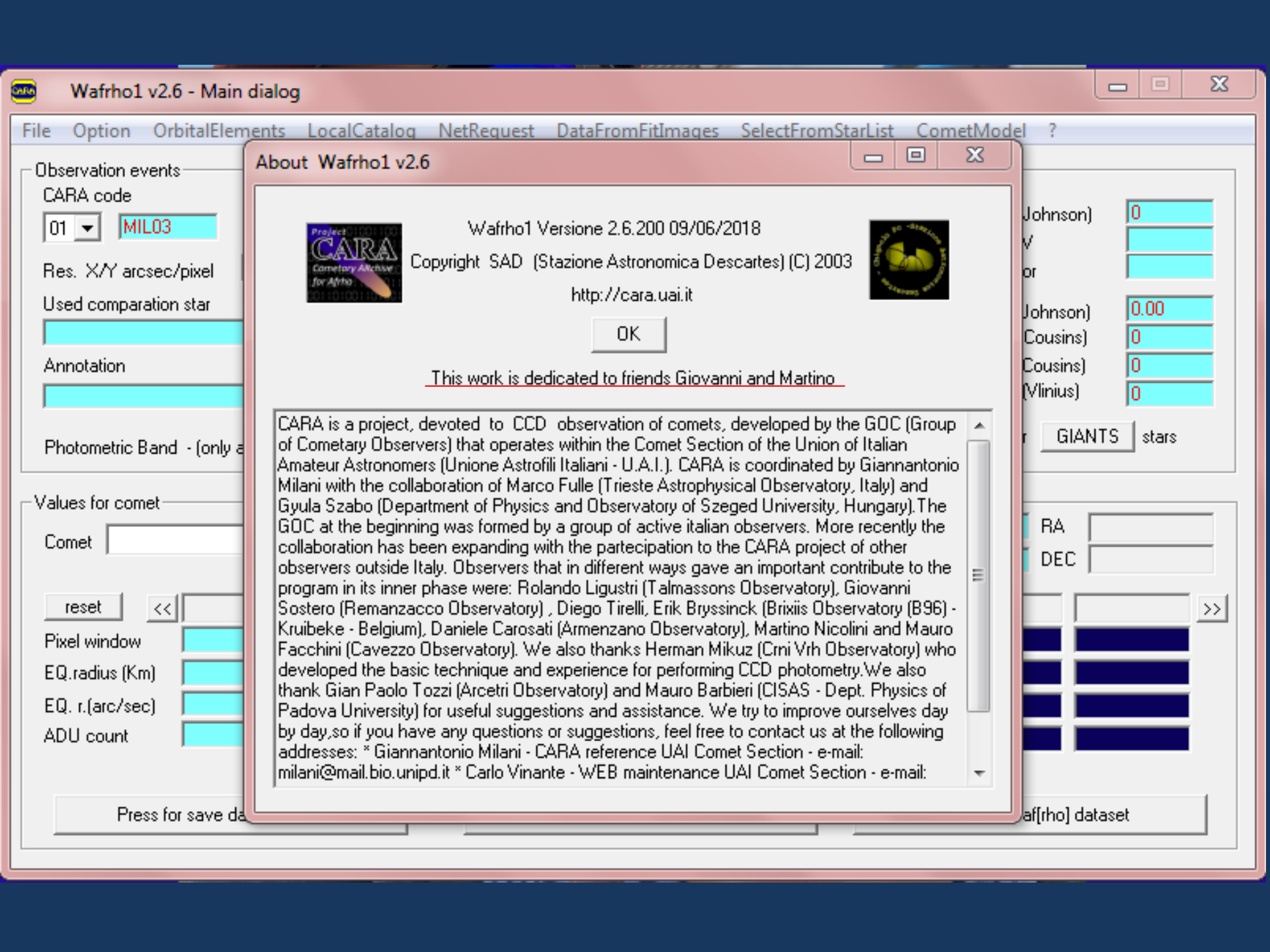
La banda R è la più utilizzata,
copre una regione spettrale dominata dalle polveri

•Tra i vantaggi della banda R, oltre a poter determinare il valore Afρ, c'è la possibilità di correggere le variazioni legate all'angolo di fase e di ottenere curve di luce che danno un quadro più realistico dell'attività della cometa

• nell'analisi fotometrica sono state selezionate le finestre di misura comprese tra 8000 e 12000 km. Questo ha comportato ad una certa dispersione dei punti nei grafici

• il software utilizzato è stato Winafrho

•Tutte le immagini sono state pre-trattate con le correzioni del *dark* e del *flat feld*


Wafrho1 v2.6 - Main dialog
File Option OrbitalElements LocalCatalog NetRequest DataFromFitImages SelectFromStarList CometModel ?
Observation events
CARA code
01
MIL03
Res. X/Y arcsec/pixel
Used comparation star
Annotation
Photometric Band - (only a
Values for comet
Comet
reset
<<
Pixel window
EQ.radius (Km)
EQ. r.(arc/sec)
ADU count
Press for save da
Johnson)
0
V
or
Johnson)
0.00
Cousins)
0
Cousins)
0
(Vlinius)
0
GIANTS
stars
RA
DEC
>>
af[rho] dataset
About Wafrho1 v2.6
Project CARA Cometary Archive for Afrho
Wafrho1 Versione 2.6.200 09/06/2018
Copyright SAD (Stazione Astronomica Descartes) (C) 2003
http://cara.uai.it
OK
This work is dedicated to friends Giovanni and Martino
CARA is a project, devoted to CCD observation of comets, developed by the GOC (Group of Cometary Observers) that operates within the Comet Section of the Union of Italian Amateur Astronomers (Unione Astrofili Italiani - U.A.I.). CARA is coordinated by Giannantonio Milani with the collaboration of Marco Fulle (Trieste Astrophysical Observatory, Italy) and Gyula Szabo (Department of Physics and Observatory of Szeged University, Hungary).The GOC at the beginning was formed by a group of active italian observers. More recently the collaboration has been expanding with the partecipation to the CARA project of other observers outside Italy. Observers that in different ways gave an important contribute to the program in its inner phase were: Rolando Ligustri (Talmassons Observatory), Giovanni Sostero (Remanzacco Observatory) , Diego Tirelli, Erik Bryssinck (Brixiis Observatory (B96) - Kruibeke - Belgium), Daniele Carosati (Armenzano Observatory), Martino Nicolini and Mauro Facchini (Cavezzo Observatory). We also thanks Herman Mikuz (Crni Vrh Observatory) who developed the basic technique and experience for performing CCD photometry.We also thank Gian Paolo Tozzi (Arcetri Observatory) and Mauro Barbieri (CISAS - Dept. Physics of Padova University) for useful suggestions and assistance. We try to improve ourselves day by day,so if you have any questions or suggestions, feel free to contact us at the following addresses: * Giannantonio Milani - CARA reference UAI Comet Section - e-mail: milani@mail.bio.unipd.it * Carlo Vinante - WEB maintenance UAI Comet Section - e-mail:

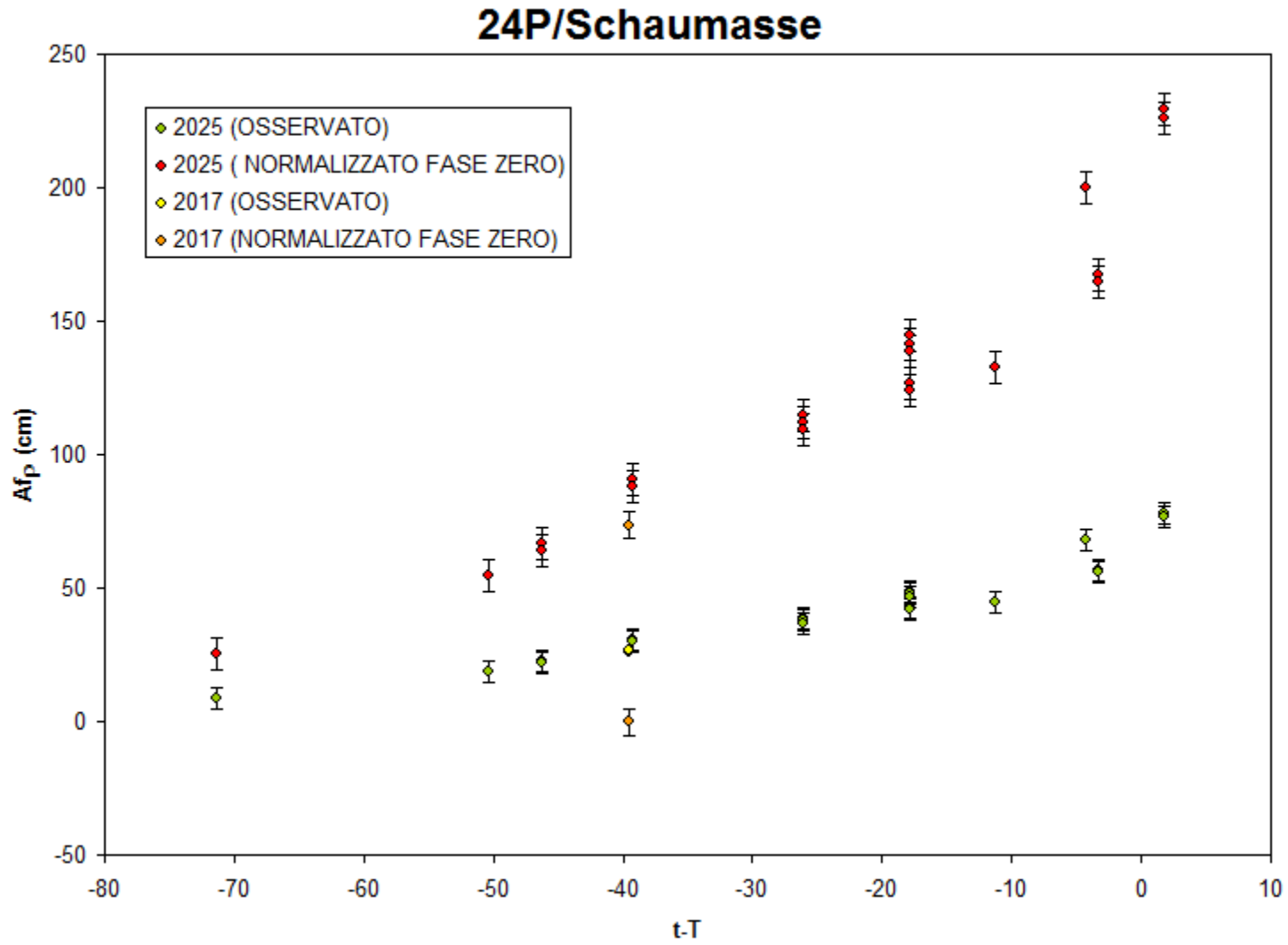
OSSERVATORI

- Andrea Aletti
- Paolo Bacci
- Roberto Bacci
- Giorgio Bay
- Federico Bellini
- Erik Bryssink
- Antonio Catapano
- Daniele Carosati
- Mauro Facchini
- Mario Feraco
- Ernesto Guido
- François Kugel
- Rolando Ligustri
- Giannantonio Milani
- Francois Kugel
- Luciano Tinelli
- Diego Tirelli
- Adriano Valvasori

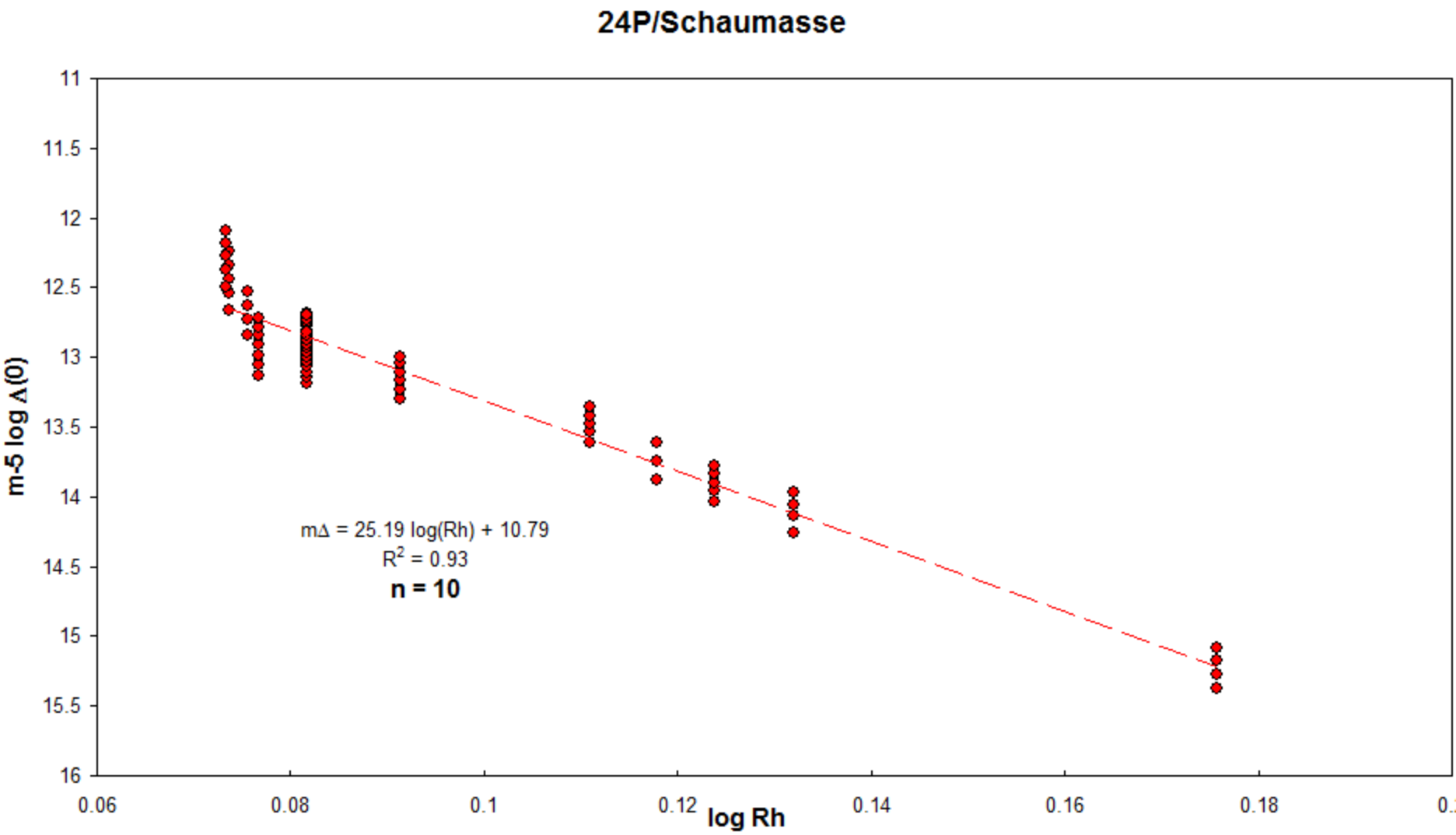
COMETE OSSERVATE:

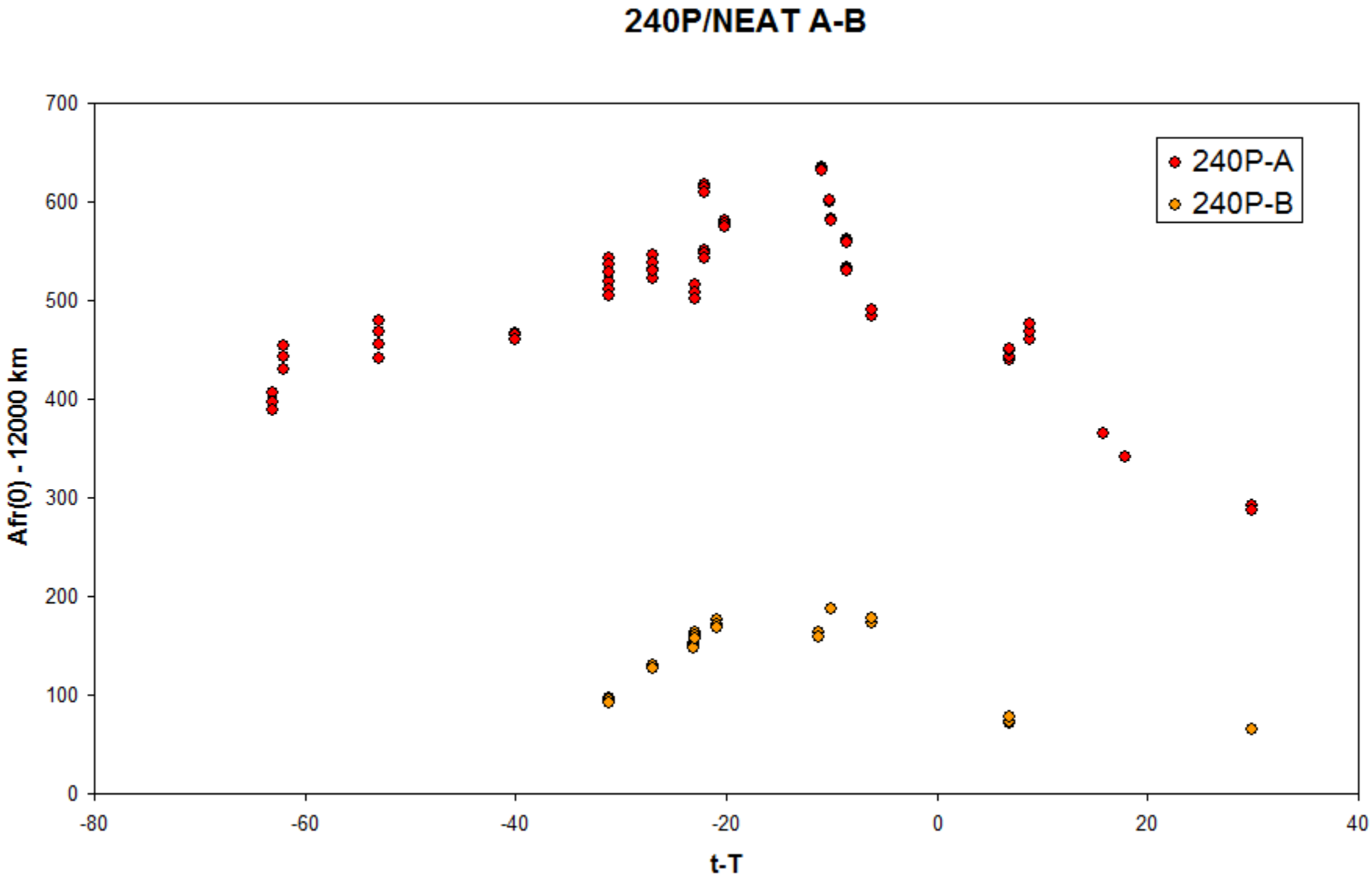
- 24P/Schaumasse
- 29P/Schwassmann-Wachmann
- 240P/NEAT
- C/2025 K1 (ATLAS)
- C/2024 E1 (Wierczhos)
- C/2025 A6 (Lemmon)
- C/2025 F2 (SWAN)
- C/2025 K2 (SWAN)
- C/2025 R2 (SWAN)
- 3I/ATLAS

- C/2026 A1 (SWAN)

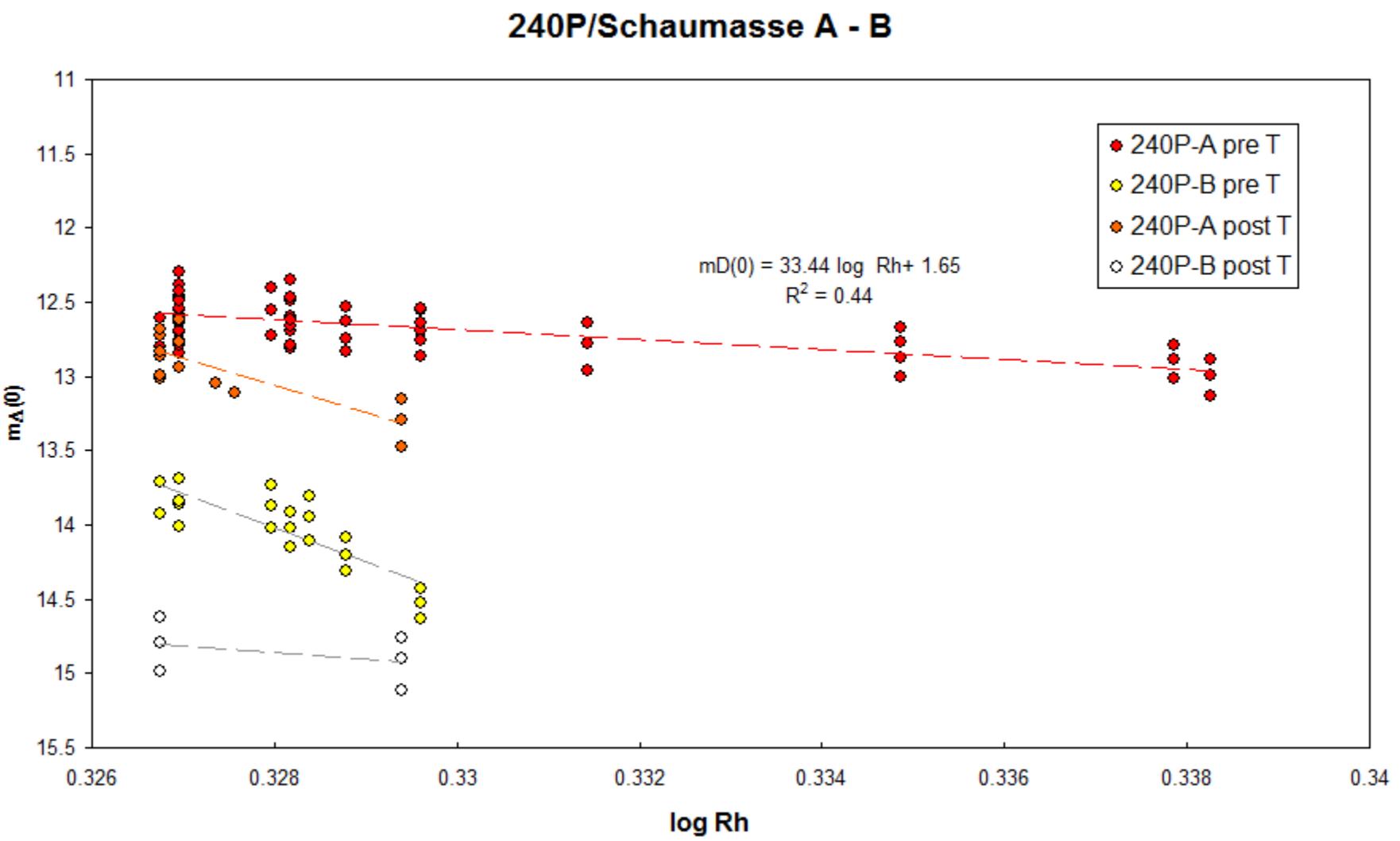


Il nucleo si e spezzato in due componenti A e B probabilmente durante l'estate ,o prima

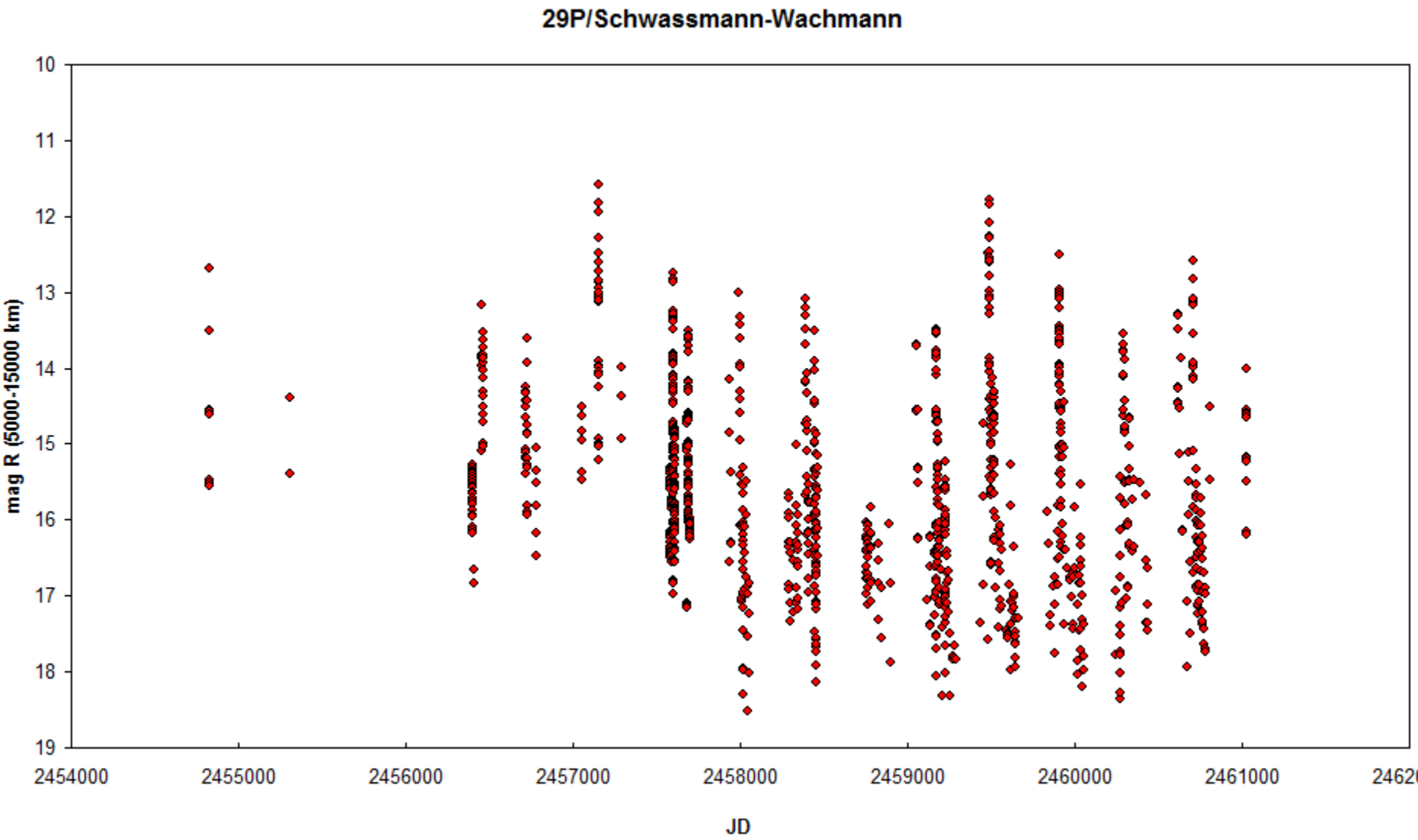

24P/Schaumasse
m-5 log Δ(0)
log Rh
mΔ = 25.19 log(Rh) + 10.79
R2 = 0.93
n = 10
11
11.5
12
12.5
13
13.5
14
14.5
15
15.5
16
0.06
0.08
0.1
0.12
0.14
0.16
0.18



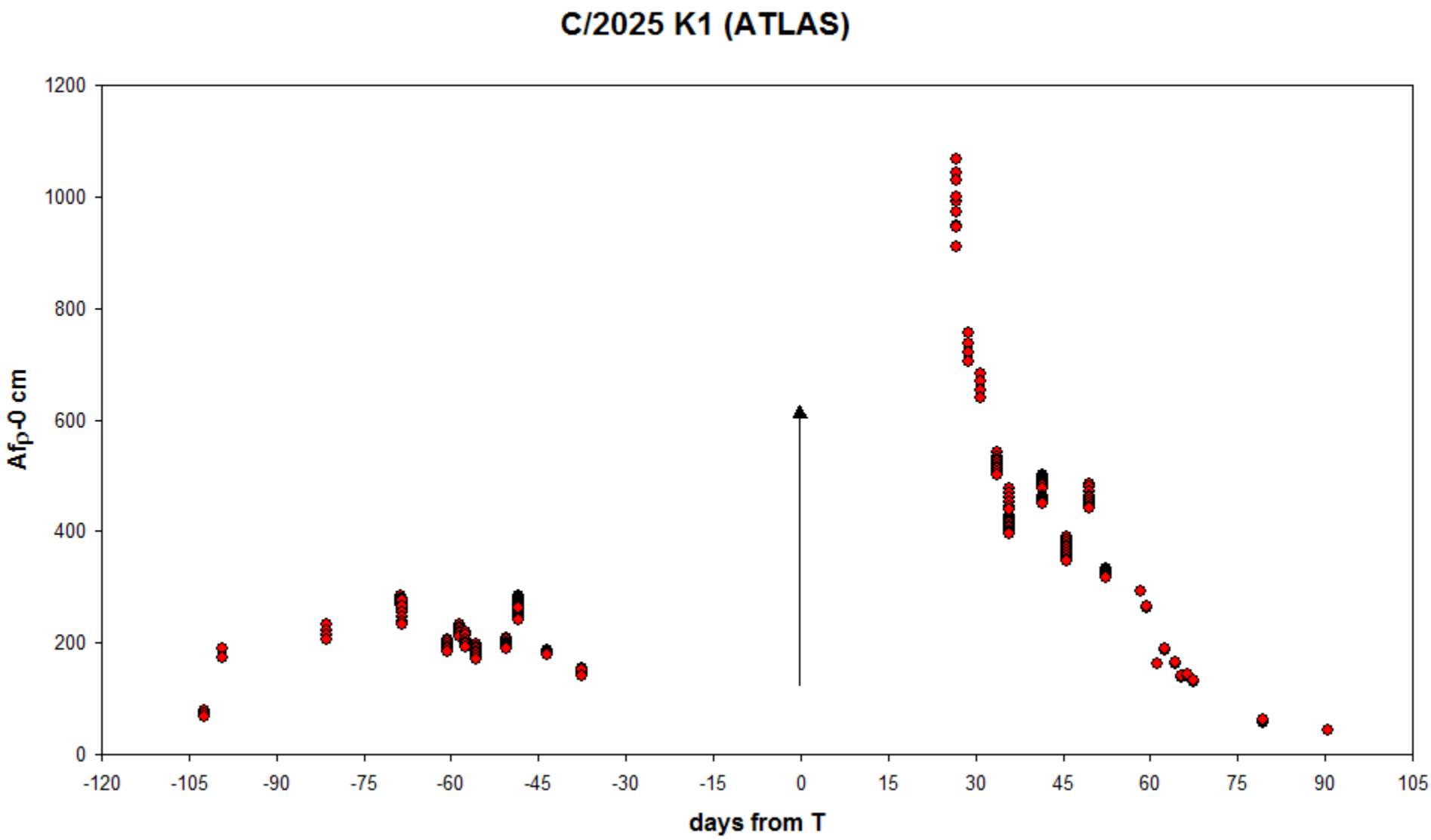
La curva di A è asimmetrica con declino più rapido
La curva di B ha una salita rapida ma poi i valori crollano



In seguito allo sdoppiamento del nucleo gli andamenti delle curve di luce non sono indicativi dell'andamento medio essendo la cometa in una fase di instabilità

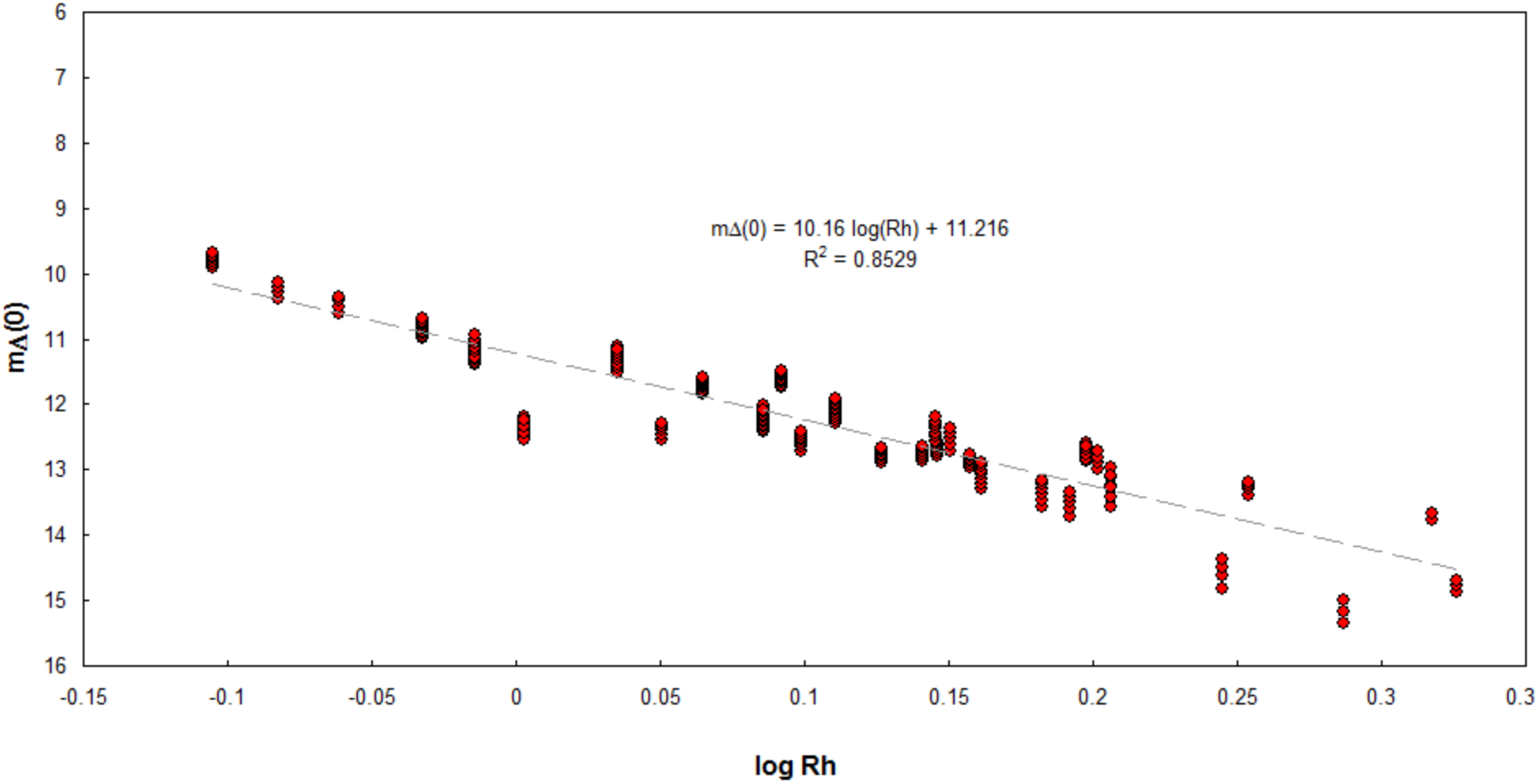


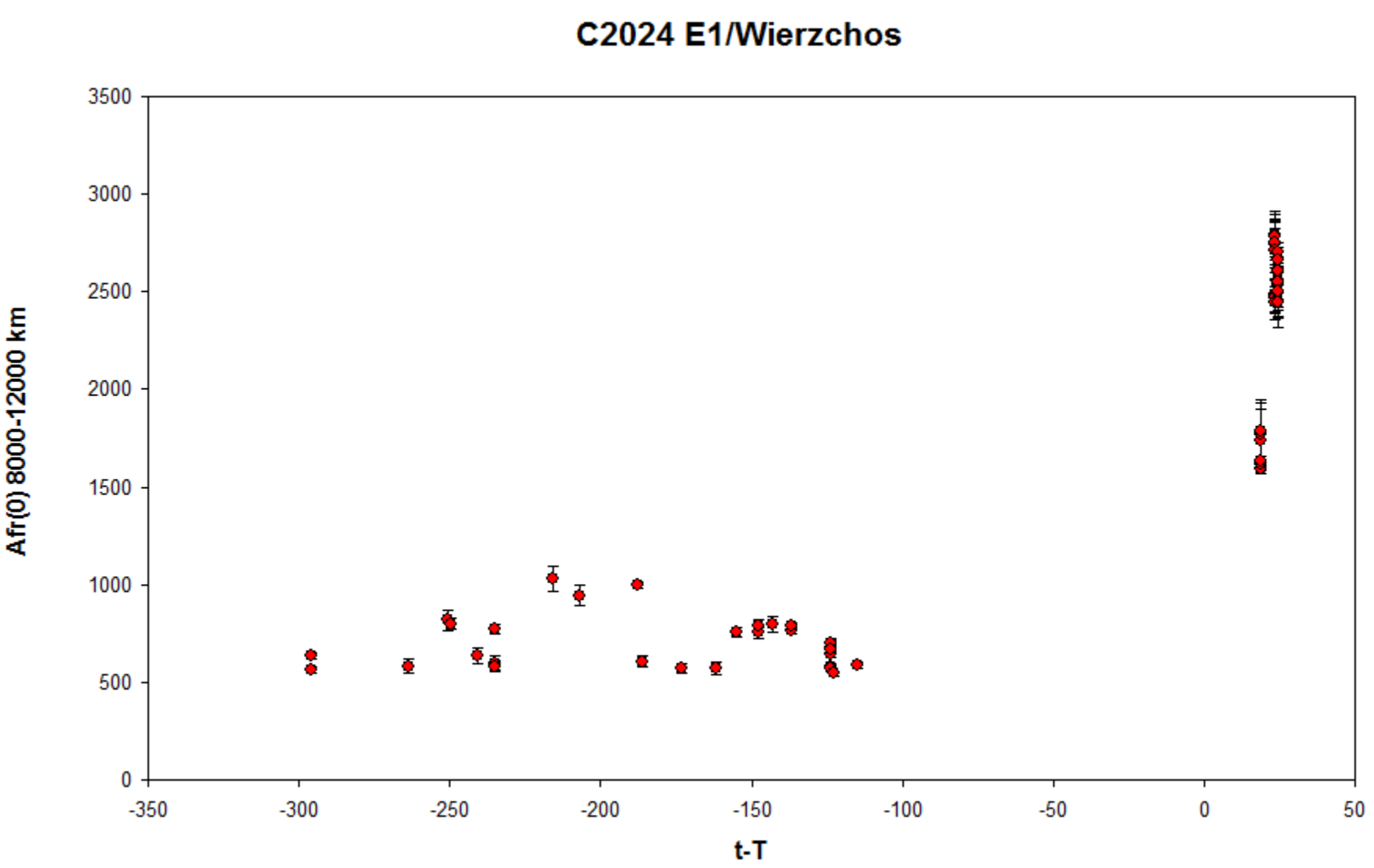
Come sempre la 29P continua a manifestare incessantemente i suoi outburst

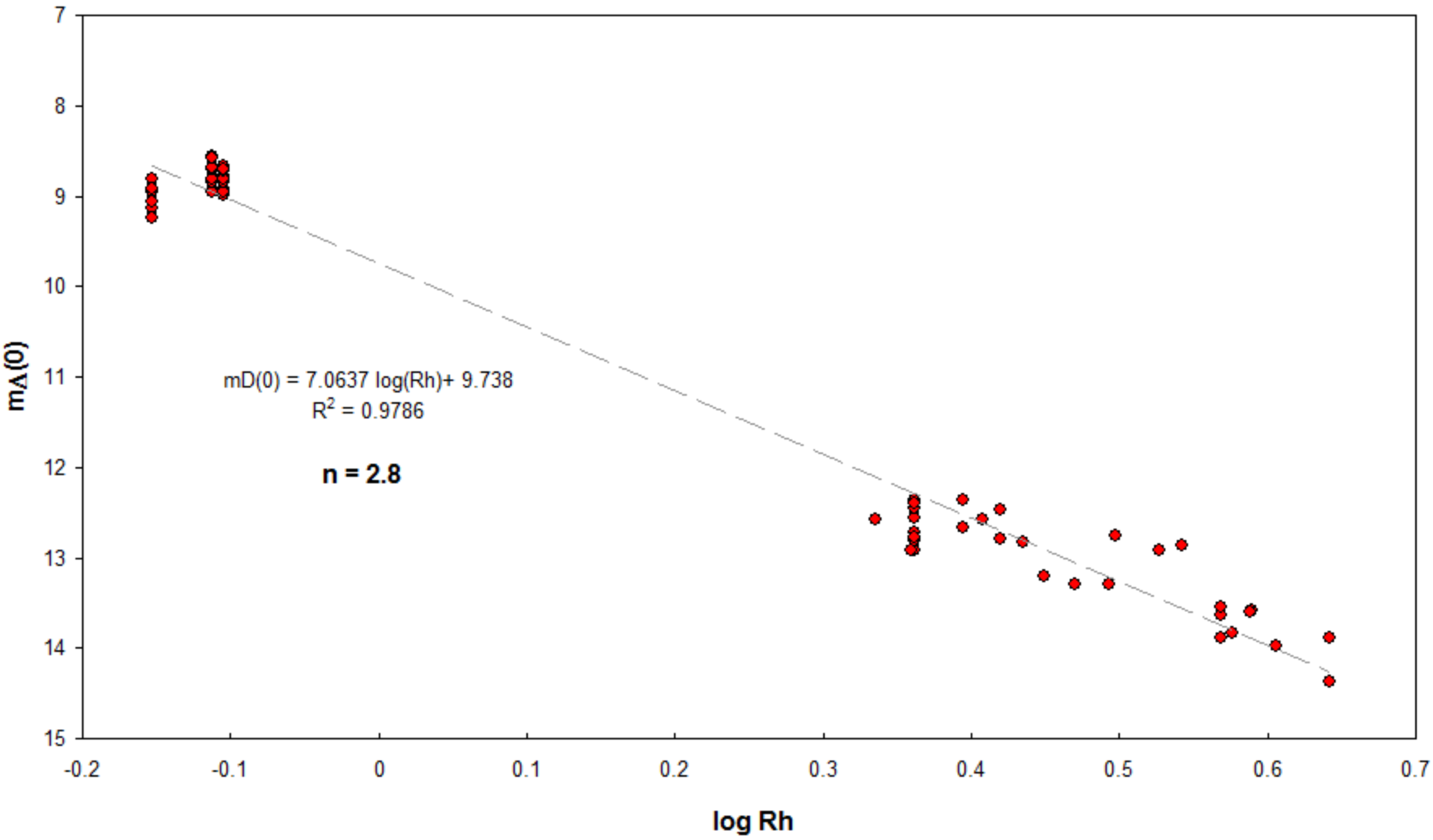


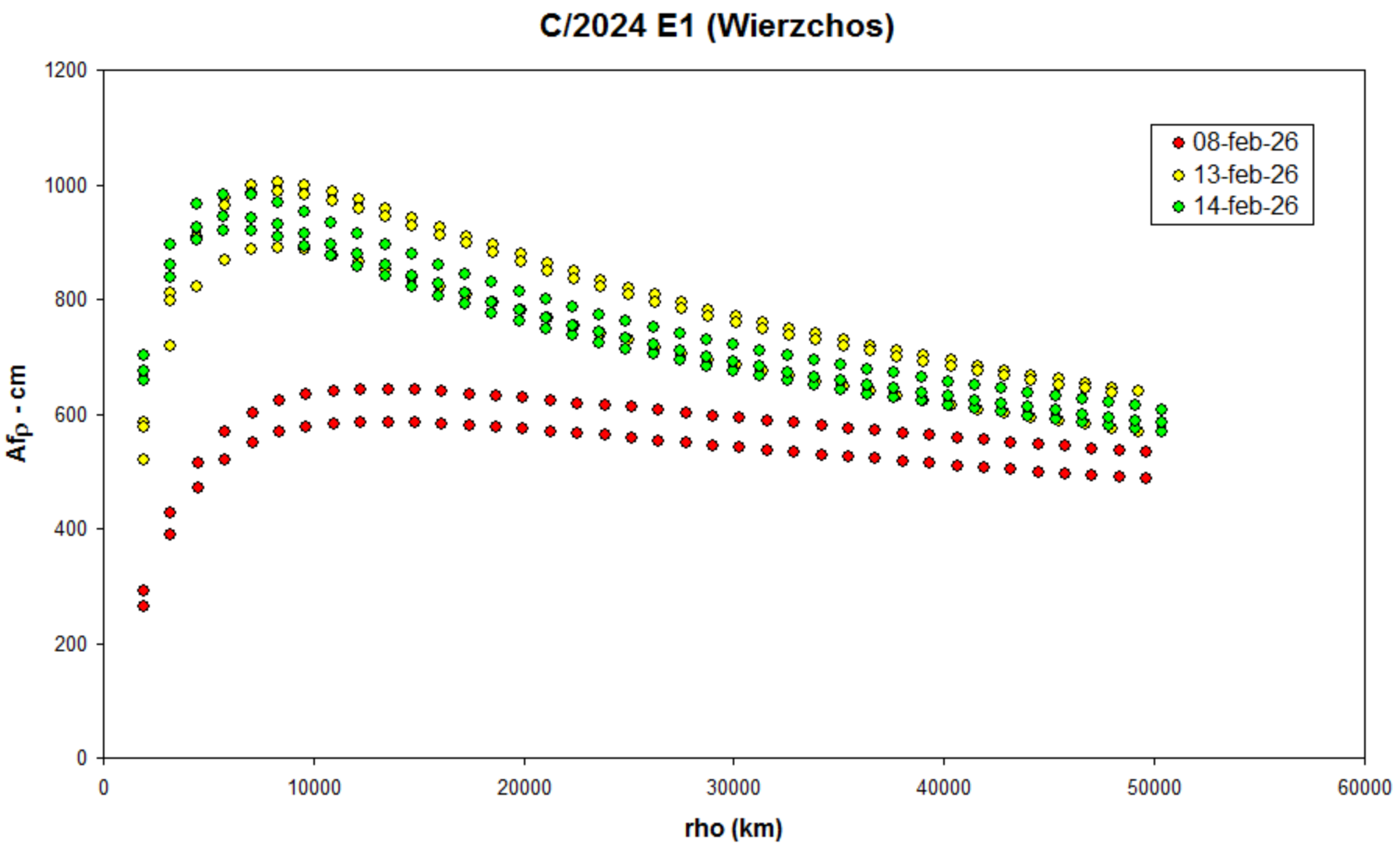
Un evento inatteso è stato l'*outburst* legato alla frammentazione finale del nucleo

C/2025 K1 (ATLAS)

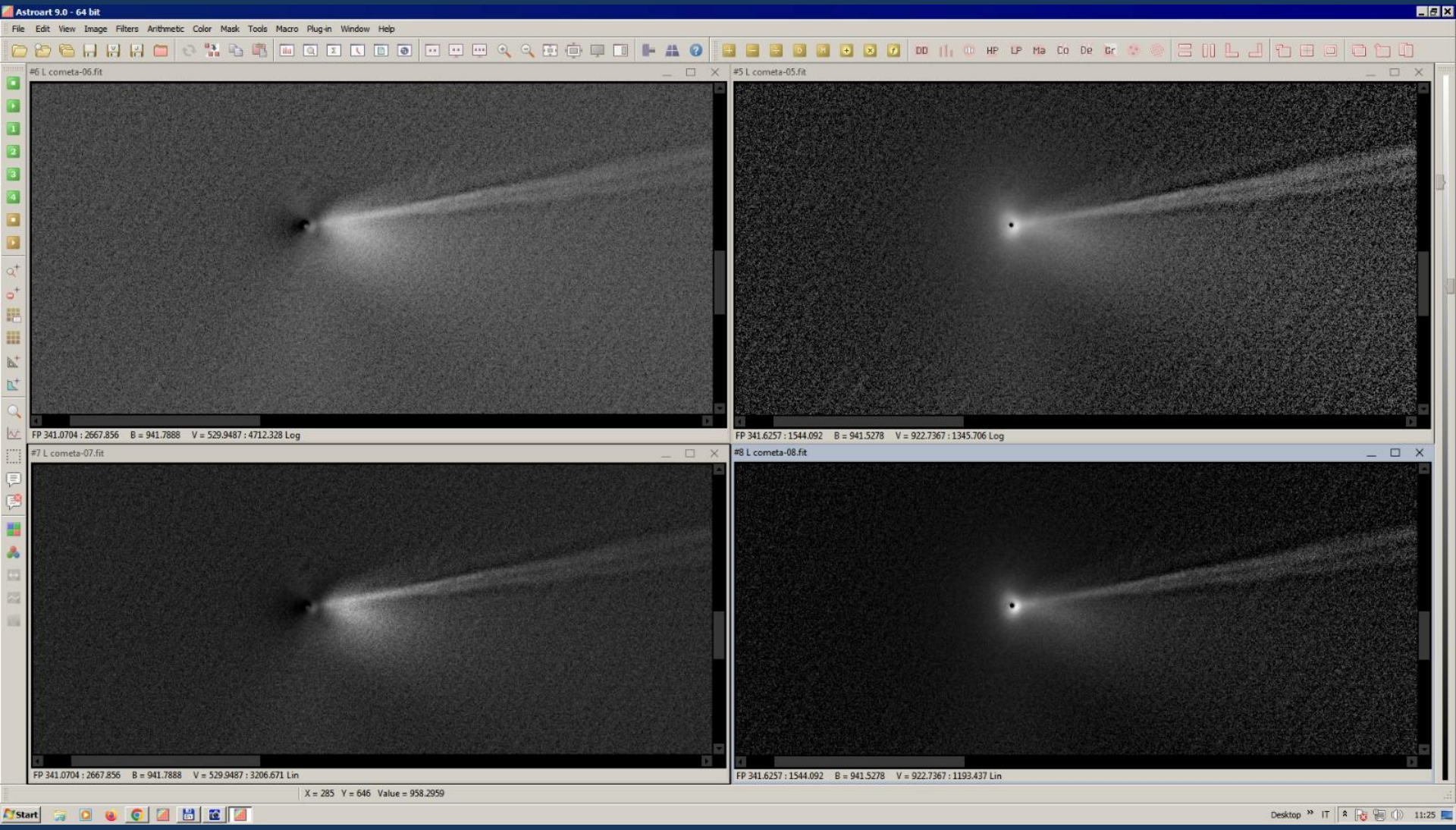


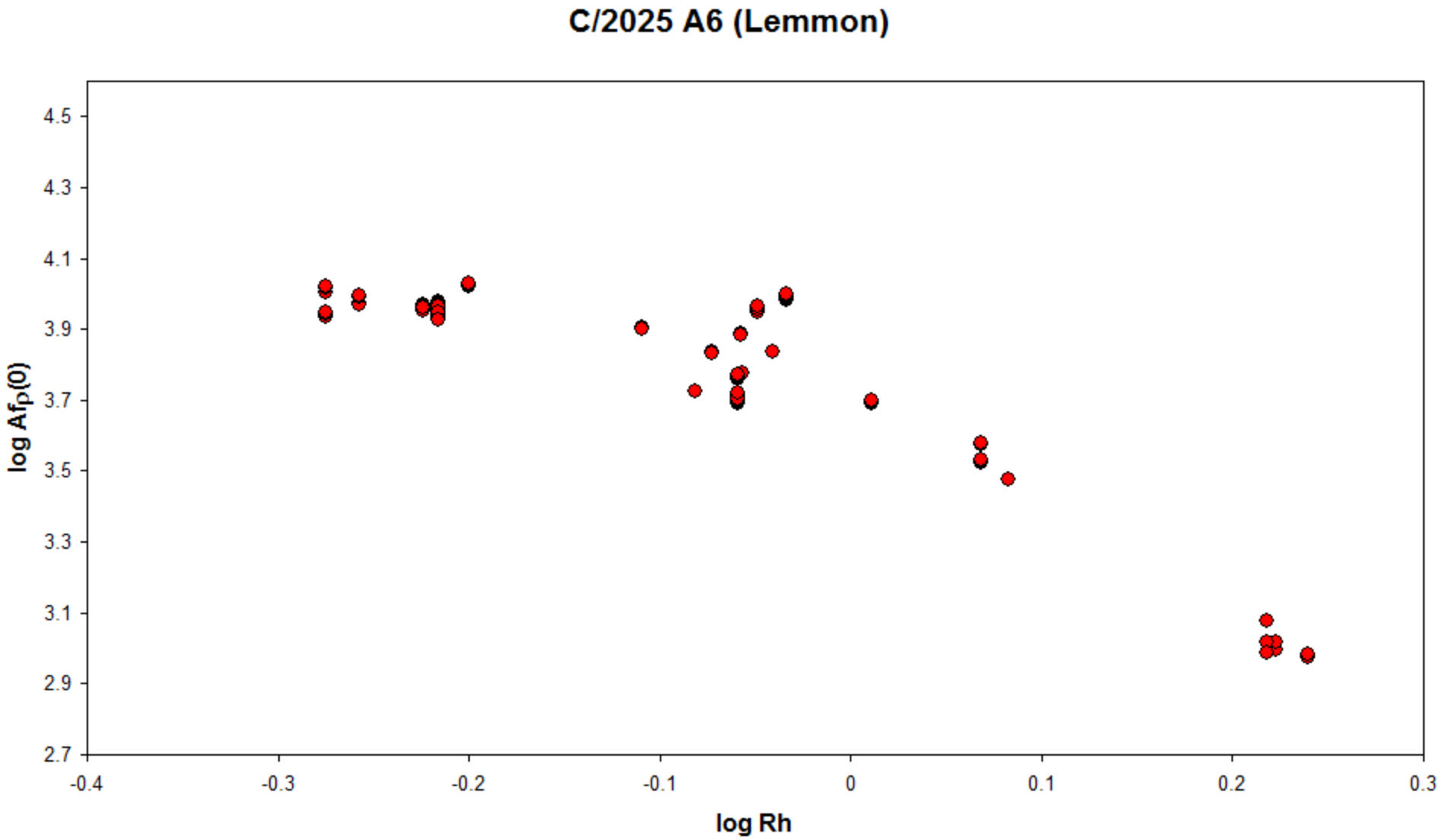

C2024 E1/Wierzchos
Afr(0) 8000-12000 km
3500
3000
2500
2000
1500
1000
500
0
-350
-300
-250
-200
-150
-100
-50
0
50
t-T


C/2024 E1 (Wierzchof)
mD(0) = 7.0637 log(Rh)+ 9.738
R2 = 0.9786
n = 2.8
mΔ(0)
log Rh
7
8
9
10
11
12
13
14
15
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

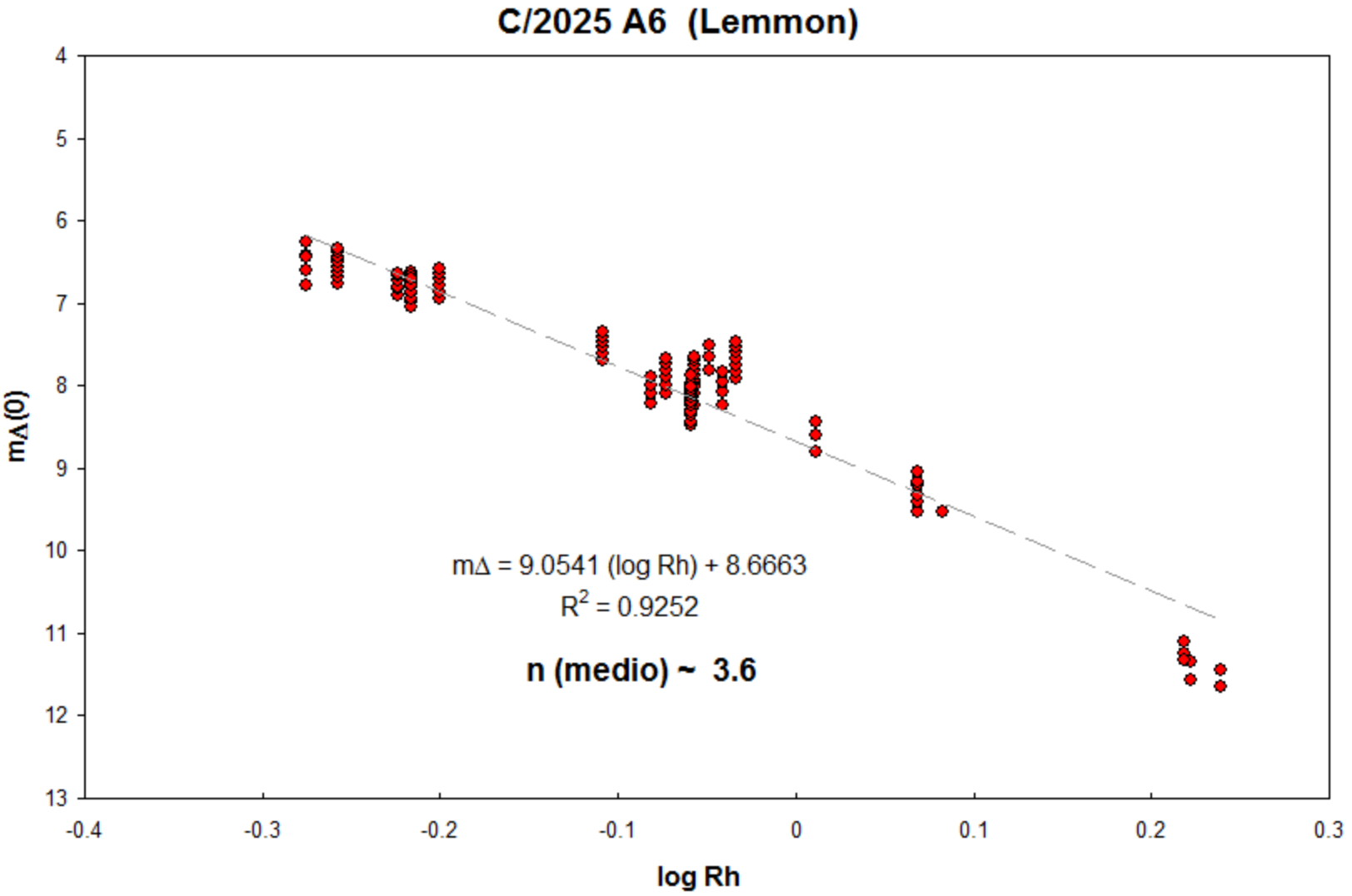


Un modesto outburst?

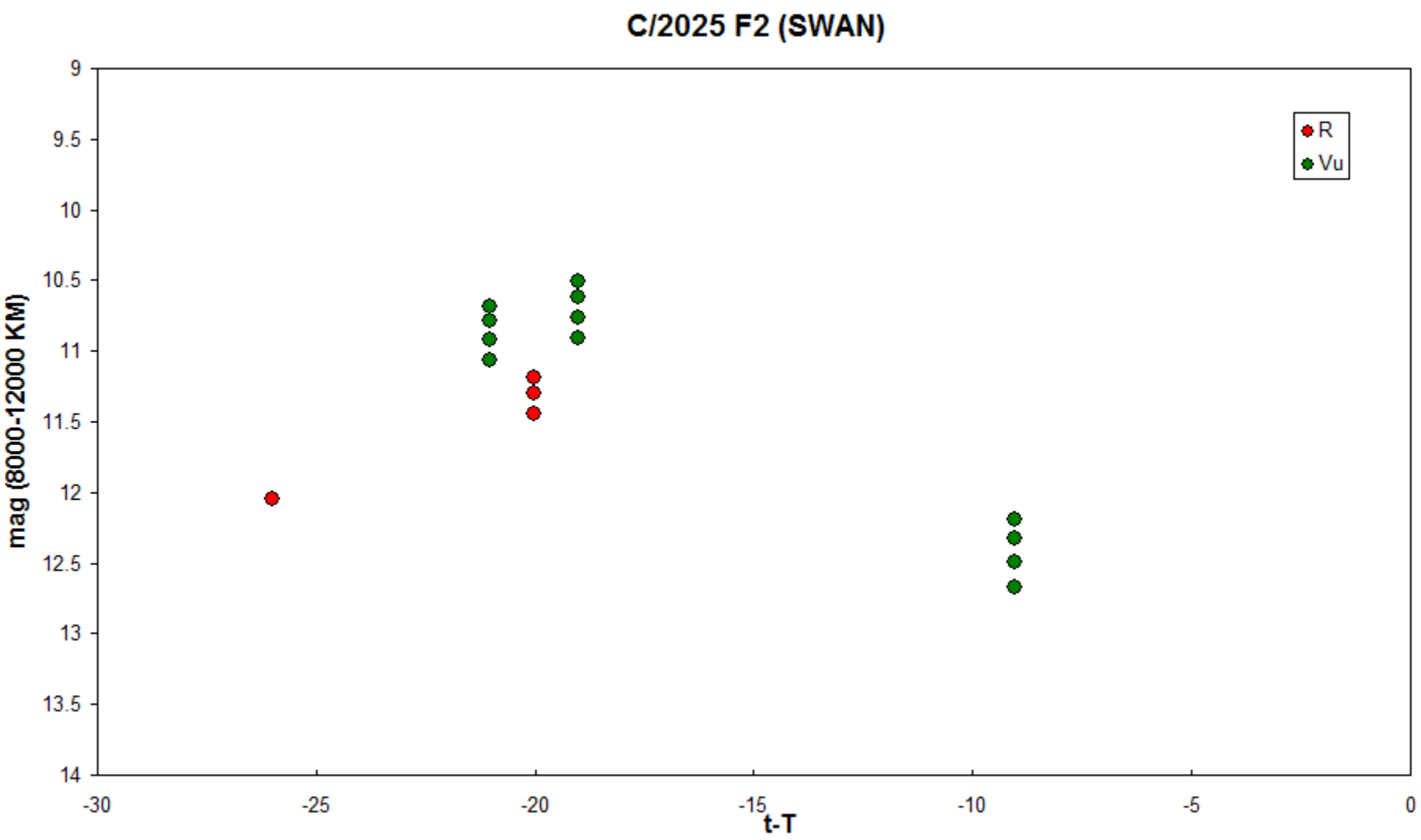

Astroart 9.0 - 64 bit
File Edit View Image Filters Arithmetic Color Mask Tools Macro Plug-in Window Help
#6 L cometa-06.fit
FP 341.0704 : 2667.856 B = 941.7888 V = 529.9487 : 4712.328 Log
#5 L cometa-05.fit
FP 341.6257 : 1544.092 B = 941.5278 V = 922.7367 : 1345.706 Log
#7 L cometa-07.fit
FP 341.0704 : 2667.856 B = 941.7888 V = 529.9487 : 3206.671 Lin
#8 L cometa-08.fit
FP 341.6257 : 1544.092 B = 941.5278 V = 922.7367 : 1193.437 Lin
X = 285 Y = 646 Value = 958.2959
Start
Desktop
IT
11:25



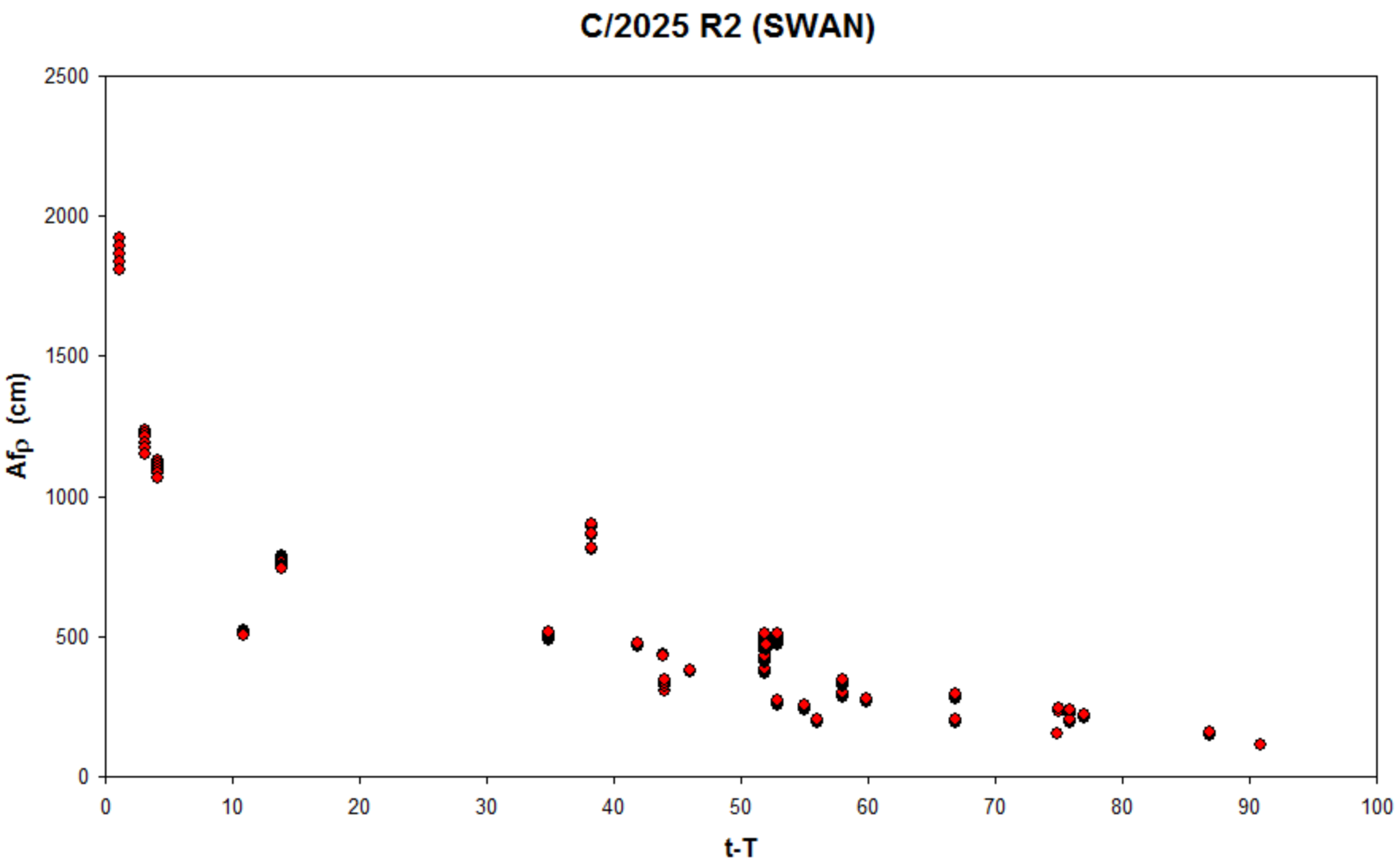
L’analisi Afρ ci mostra un appiattimento verso il perielio



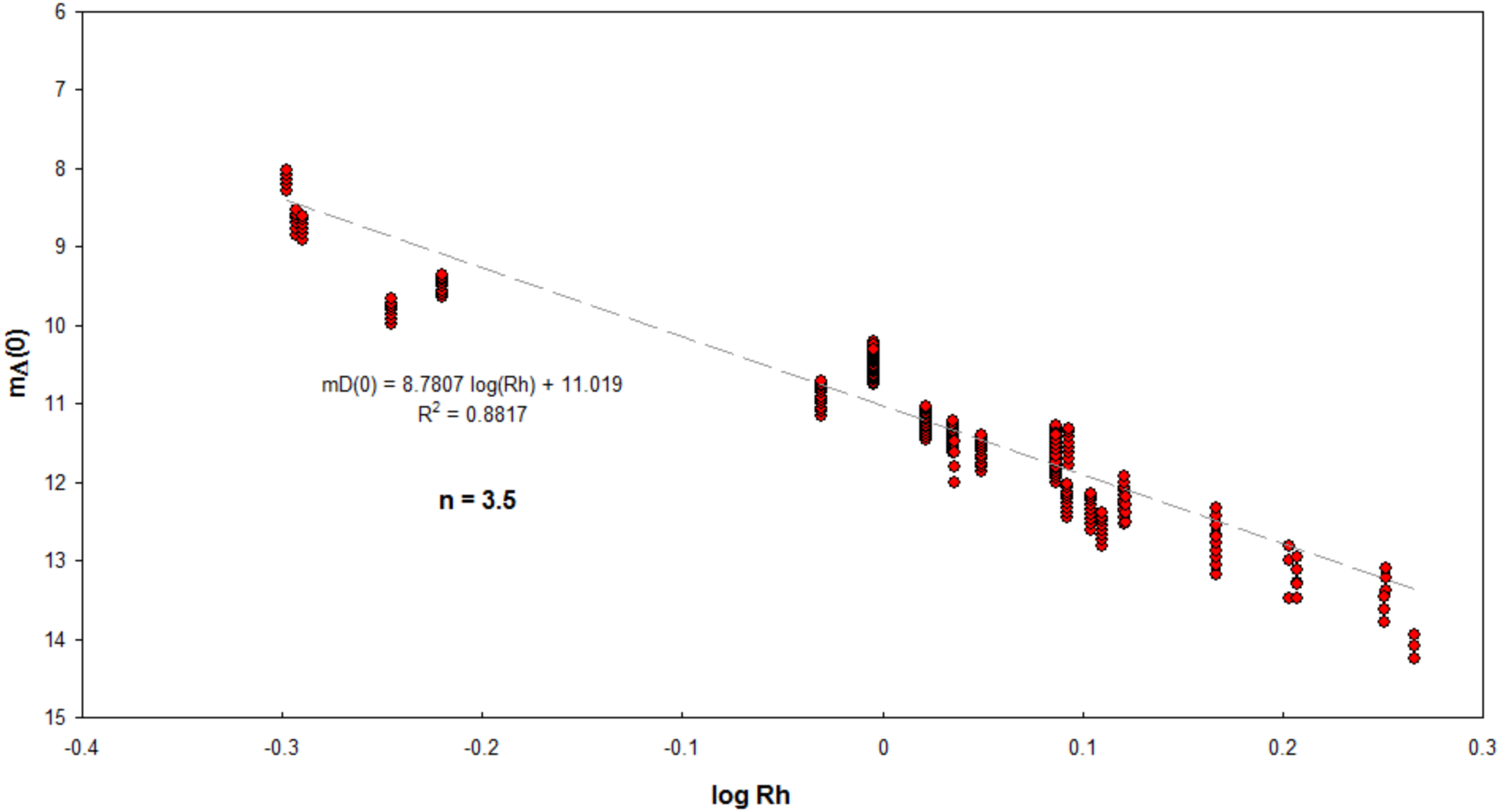
Curva di luce con andamento medio

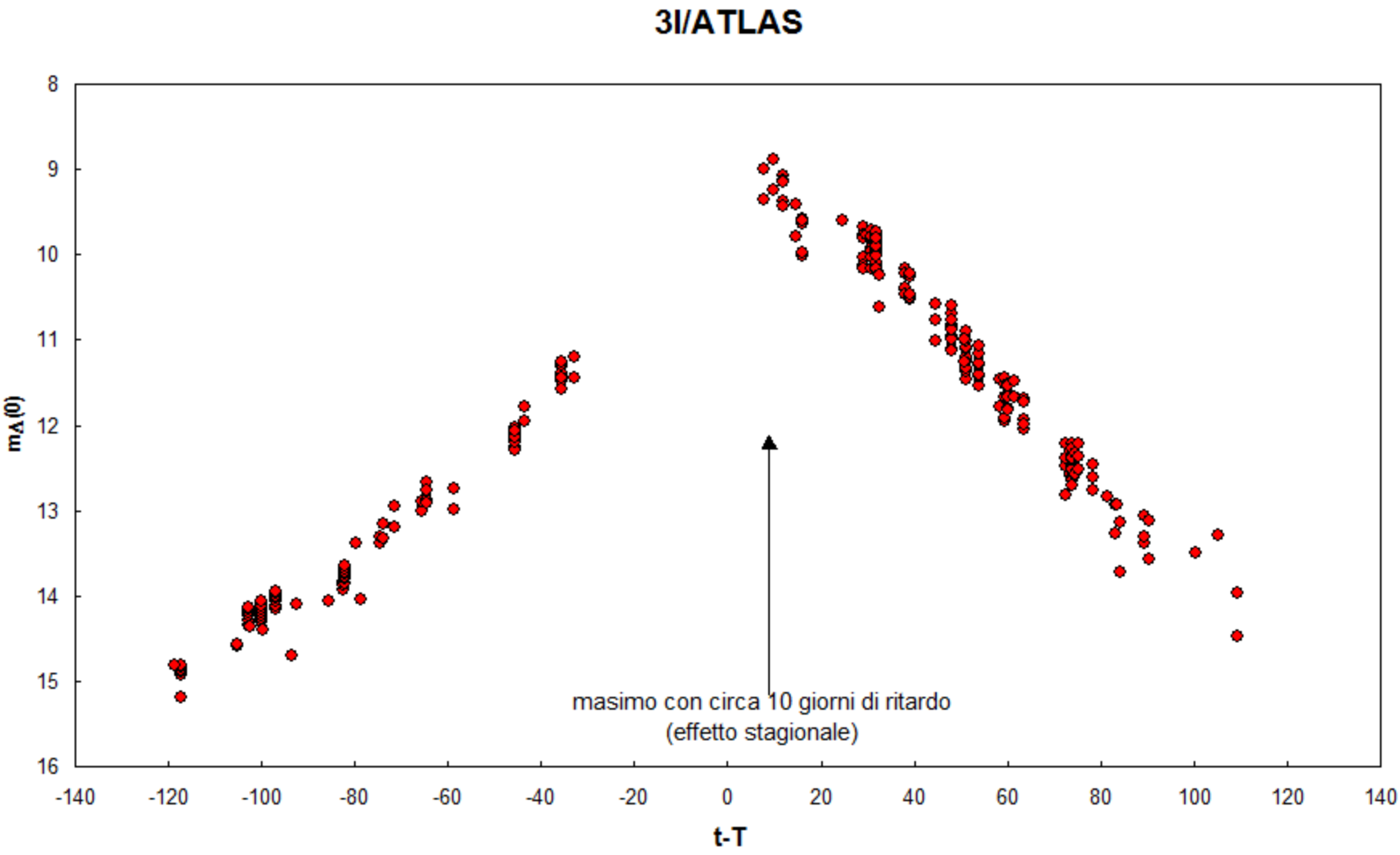


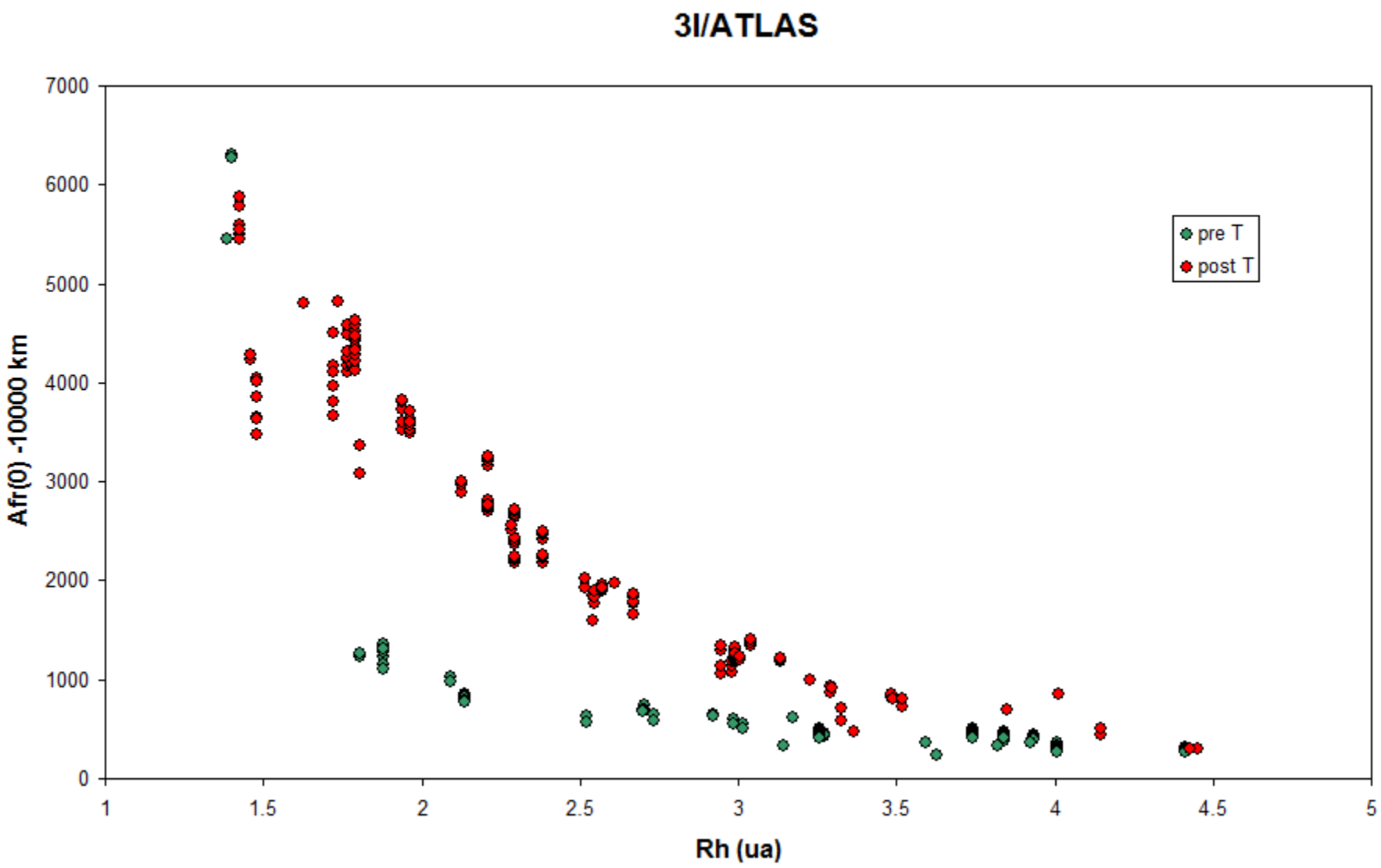
POCHE OSSERVAZIONI INDICATIVE DI UNA DIMINUZIONE VERSO IL PERIELIO


C/2025 R2 (SWAN)
Afρ (cm)
t-T
2500
2000
1500
1000
500
0
0
10
20
30
40
50
60
70
80
90
100

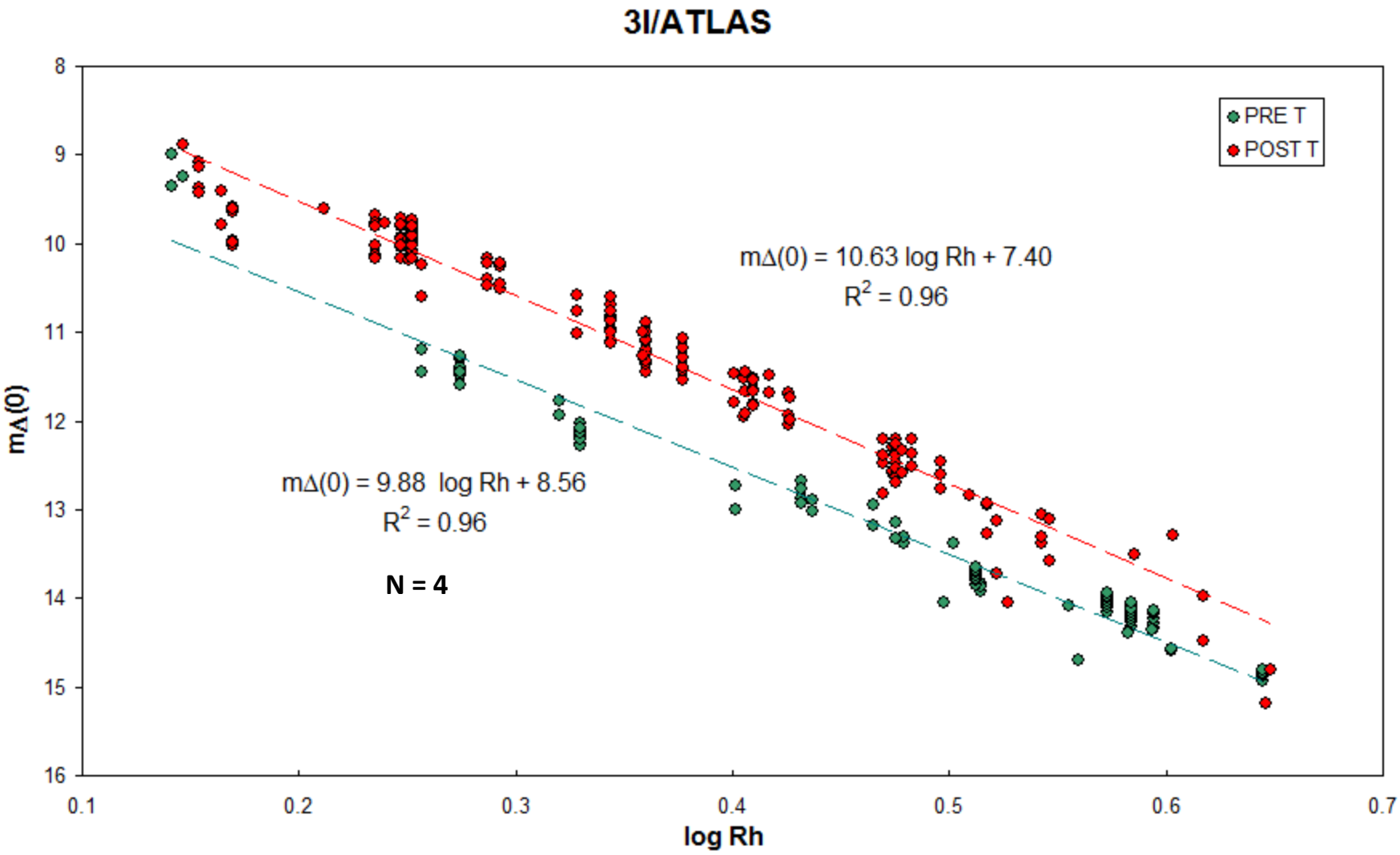
C/2025 R2 (SWAN)

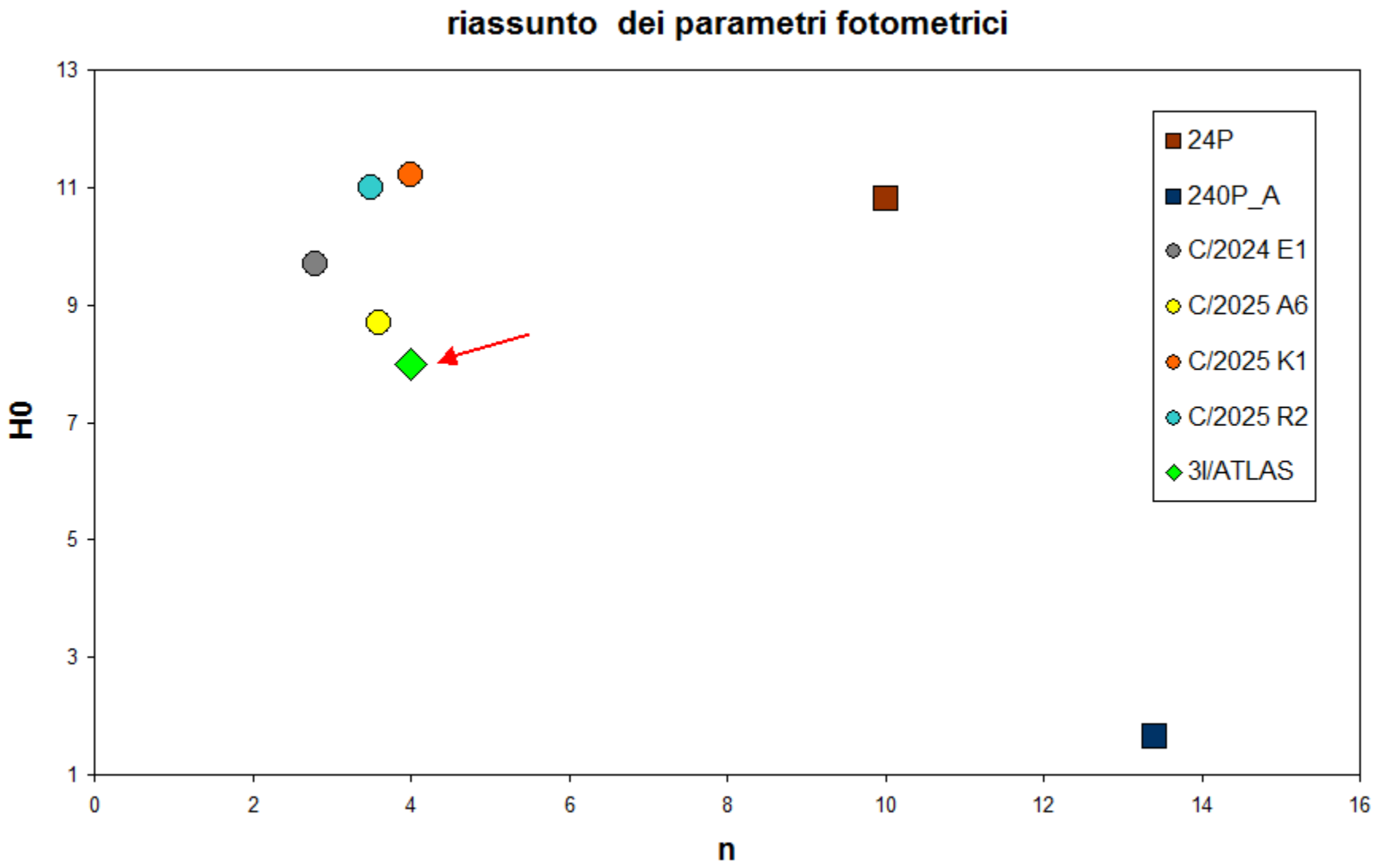



3I/ATLAS
8
9
10
11
12
13
14
15
16
mΔ(0)
-140
-120
-100
-80
-60
-40
-20
0
20
40
60
80
100
120
140
t-T
masimo con circa 10 giorni di ritardo
(effetto stagionale)



L’asimmetria è più evidente con Afρ in funzione di Rh


3I/ATLAS
PRE T
POST T
mΔ(0) = 10.63 log Rh + 7.40
R2 = 0.96
mΔ(0) = 9.88 log Rh + 8.56
R2 = 0.96
N = 4
mΔ(0)
log Rh
8
9
10
11
12
13
14
15
16
0.1
0.2
0.3
0.4
0.5
0.6
0.7



H0 = magnitudine “assoluta” a 1 ua

n = pendenza della curva di luce in funzione di Rh

Finalmente svelato il nucleo della cometa 3I/ATLAS!