

Middelbare scholieren onderzoeken veranderlijke sterren

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15 juni 2013

Werkgroep Veranderlijke Sterren KNVWS

Maaslandcollege



Vwo research

- *Fase 1*

- Wat is wetenschap?
- Wat is de wetenschappelijke methode
- Hoe doe je onderzoek?

- *Fase 2*

- Testen van betrouwbaarheid en validiteit
- Toetsen van onderzoeksvragen
- Reflectie op de wetenschap
- Grotere zelfstandigheid in het verrichten van onderzoek

Research module Stars & Discovery

- Gebaseerd op AAVSO's "*Variable Star Astronomy*(voorheen "*Hands On Astrophysics*")
 - Inleiding sterrenkunde: sterren, helderheid van sterren, posities van sterren, schatten van sterhelderheden, statistische concepten
 - Oefenen met het analyseren van een dataset: Lichtkrommen - Pogson's methode - opgevouwen lichtkrommen - O-C diagrammen - werken met VSTAR
 - Toepassen analyse op een dataset van een beperkt onderzochte veranderlijke ster

Research module Stars & Discovery

The International Variable Star Index

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Search VSX

Special searches: > Go

Select a Special search above, or enter information in the fields below, then click Search.

Name
 Examples: 05 Cyg, V455 Cyg, NSV 1009
 50 And, ASAS 16-%, Mr V5
 Search by AUID also available

Const.
 Filters search results by boundaries of selected constellation

Position Sexagesimal Decimal *
 Examples: 21 42 42.8 +43 35 10
 07:04 04 +03:00:51
 116.77167 +22.00139

Size Radius Box size

Max mag. between and
Min mag. between and

Period between d and
Epoch between HJD and
Rise dur. between % and
Nova year between and

Var. type
 Examples: M, DCP, H-AS
Spec. type
 Examples: K, M, pos(%)

Campaign or Program > View details

Include Variables Suspects
 Non-variables

Order by

Click [Less](#) to hide extended search options.

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The International Variable Star Index

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Search Results

Click Name to display Detail Sheet for star.

Save Search Results as CSV file:

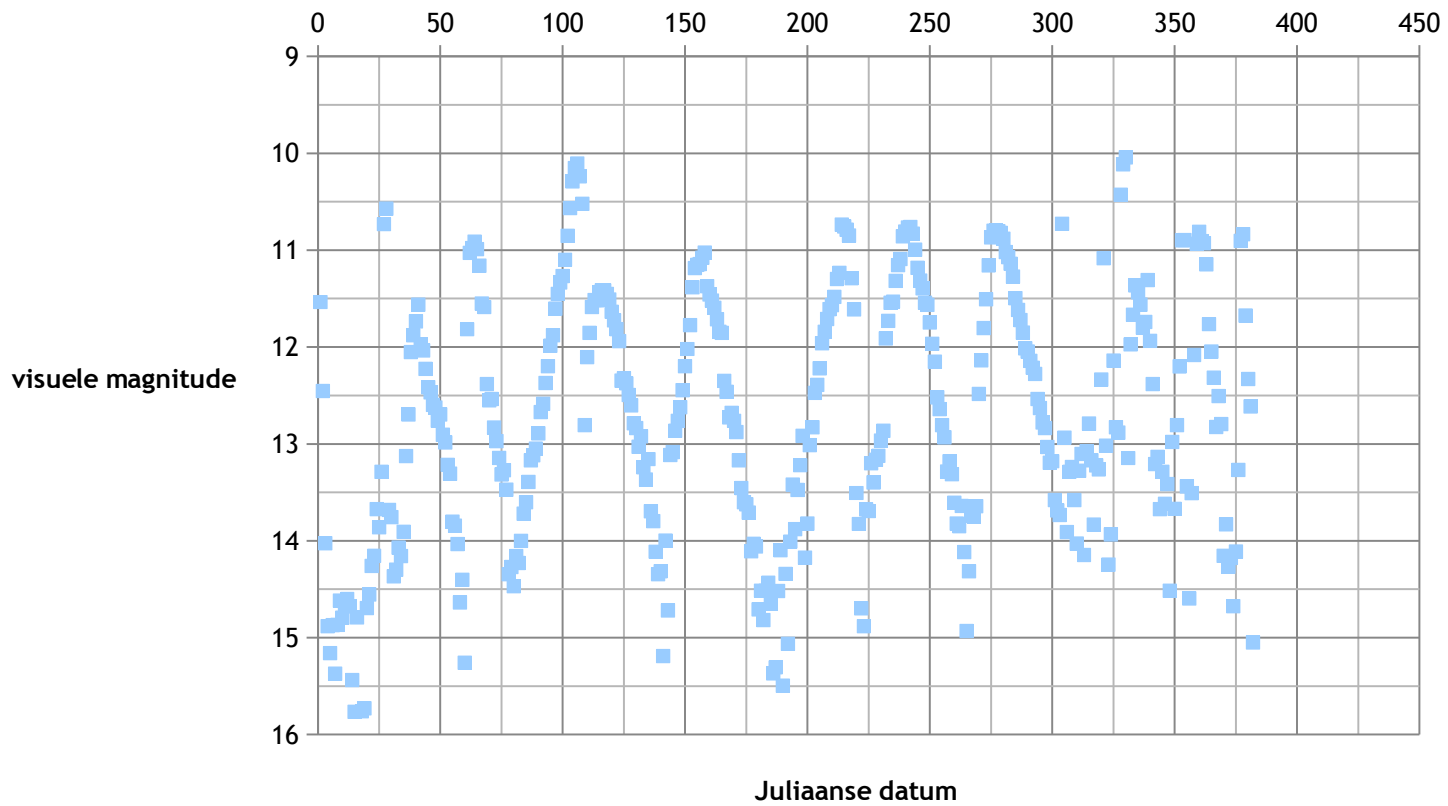
1816 records (70 ms)

Name	AUID	Coords (J2000)	Const.	Var. type	Period	Mag. range
<input checked="" type="checkbox"/> TX And	000-BDC-761	01 21 58.86 +38 41 42.9	And	SrE	233.4	10.4 - 13.6 V
<input checked="" type="checkbox"/> AW And	000-BDC-760	23 55 36.32 +45 20 35.1	And	SR	350.	12.4 - 13.2 p
<input checked="" type="checkbox"/> DP And	000-BDC-821	00 18 45.86 +44 40 30.8	And	SR	113	12.4 - 13.6 p
<input checked="" type="checkbox"/> EE And	000-BBS-812	00 33 07.89 +28 02 26.2	And	SR	285.	13.4 - 15.0 V
<input checked="" type="checkbox"/> IV And	000-BBC-247	00 55 27.08 +33 37 16.6	And	SR	305.	10.0 - 10.6 p
<input checked="" type="checkbox"/> KT And	000-BDC-803	23 48 08.94 +44 43 37.1	And	SrE	--	11.2 - 11.9 p
<input checked="" type="checkbox"/> QY And	000-HCY-806	02 11 06.50 +48 51 41.1	And	SrE	2200.	11.1 - 11.9 p
<input checked="" type="checkbox"/> V0431 And	000-BDC-024	01 42 22.72 +48 57 34.8	And	SR	--	11.1 - 12.1 V
<input checked="" type="checkbox"/> V0433 And	000-BDD-026	01 51 38.13 +39 15 43.7	And	SR	--	9.6 - 10.9 V
<input checked="" type="checkbox"/> Mis V1253	--	23 07 26.10 +51 18 21.9	And	SR	--	13.5 - 15 clear
<input checked="" type="checkbox"/> NSV 14393	--	23 01 62.90 +50 63 09.0	And	SR	--	14 - 14.6 p
<input checked="" type="checkbox"/> NSV 16404	--	01 54 63.80 +40 42 07.0	And	SR	--	6.24 - 6.7 V
<input checked="" type="checkbox"/> NSV 15412	--	01 58 36.30 +38 29 52.0	And	SrE	--	9.69 - 10.61 V
<input checked="" type="checkbox"/> NSV 656	--	01 54 19.36 +37 08 15.1	And	SR	--	11 - 11.5 p
<input checked="" type="checkbox"/> VSX J023602.0+473024	000-EK7-456	02 35 02.03 +47 30 24.6	And	SR	156.	9.4 - 9.75 R1
<input checked="" type="checkbox"/> F9 Aps	000-BDD-205	14 28 28.44 -70 34 20.7	Aps	SR	--	14.5 - 15.0 p
<input checked="" type="checkbox"/> FT Aps	000-BDD-266	14 35 29.21 -72 19 06.2	Aps	SR	--	16.2 - 16.6 p
<input checked="" type="checkbox"/> GW Aps	000-BDD-287	16 51 46.00 -83 10 14.9	Aps	SR	--	12.9 - 14.1 p
<input checked="" type="checkbox"/> KZ Aps	000-BDD-340	17 36 40.10 -74 27 47.2	Aps	SrE	--	14.2 - 15.2 p
<input checked="" type="checkbox"/> NSV 8774	--	17 31 18.10 -71 23 24.0	Aps	SR	--	13.5 - 14.5 p
<input checked="" type="checkbox"/> NSV 9926	--	18 01 22.80 -69 15 57.0	Aps	SR	--	11.5 - 12.5 p
<input checked="" type="checkbox"/> DN Aql	000-BDC-059	19 31 32.82 -10 47 48.0	Aql	SR	110.	11.7 - 12.8 p
<input checked="" type="checkbox"/> EQ Aql	000-BDD-861	19 04 44.67 +18 28 39.1	Aql	SR	165.4	13.5 - 15.6 p
<input checked="" type="checkbox"/> KV Aql	000-BDD-749	19 32 03.19 +11 43 31.5	Aql	SrE	372	15.5 - 15.8 p

Research module Stars & Discovery

Ster	Type	Rechte Klimming	Declinatie
TU Col	SR: / M	05h 50m 03,74s	-40° 24' 11,6"
OO CMa	M:	06h 46m 15,41s	-26° 20' 16,0"
V370 Hya	SR:	08h 37m 13,61s	-16° 21' 40,5"
V388 Hya	SR:	09h 33m 57,94s	-19° 55' 36,2"
MW Vel	SRB:	11h 04m 31,35s	-51° 13' 19,2"
RR Crt	SRB:	11h 31m 41,21s	-12° 22' 52,9"
BW Aps	RRAB	16h 24m 14,47s	-74° 16' 30,7"

TU Col

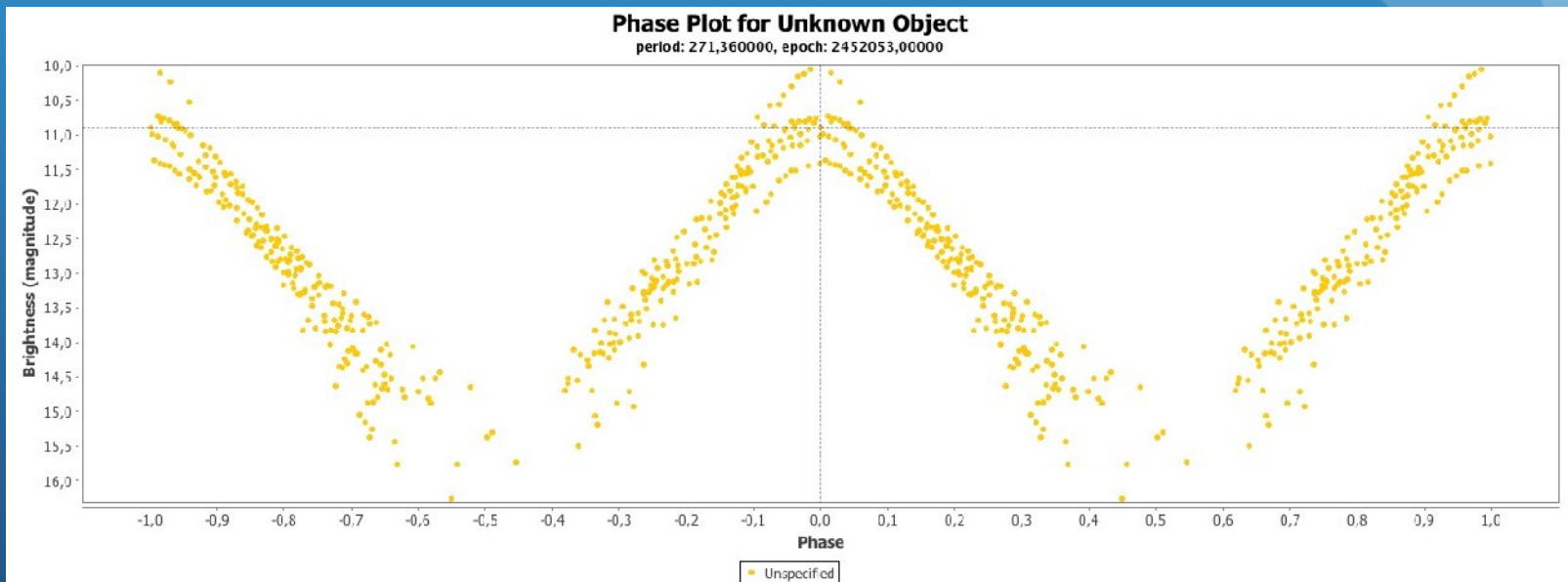


TU Col

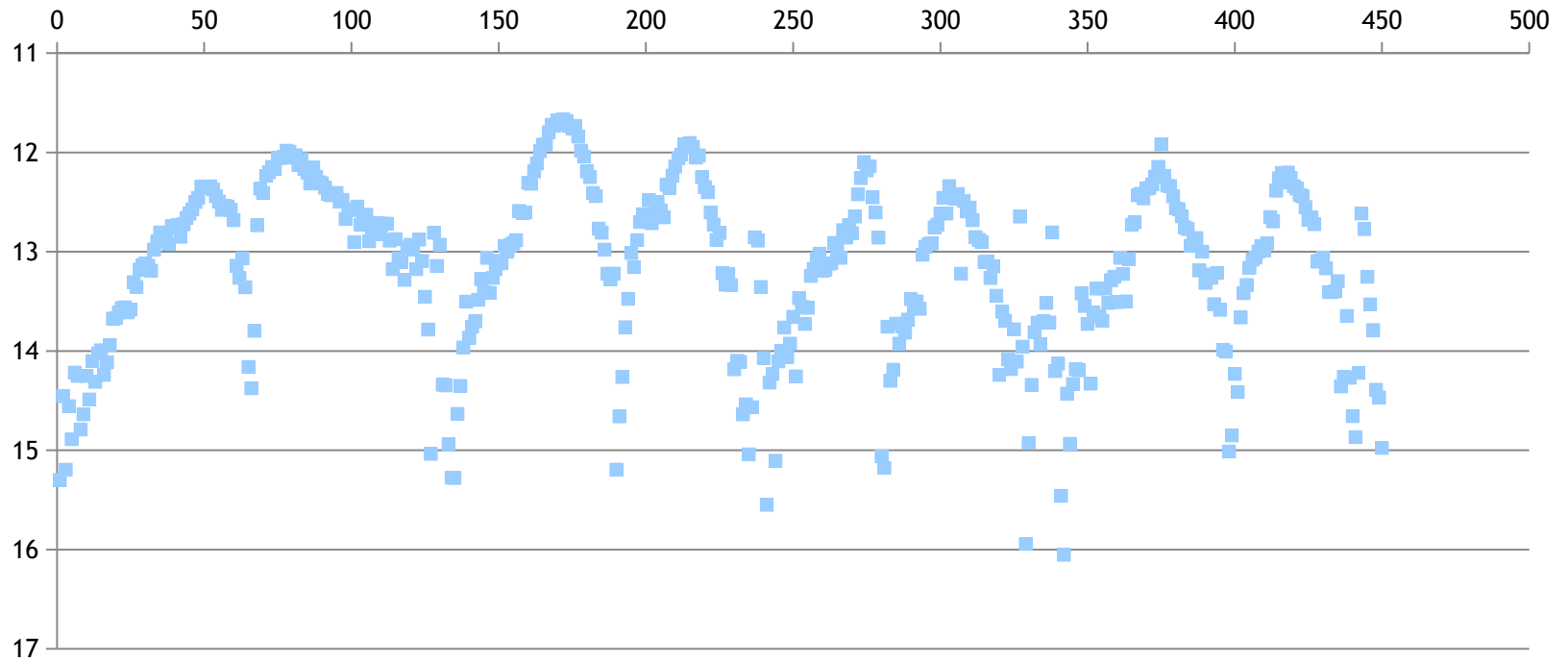
Piek nr.	JDmax	mv
1	2452053	10,2
2	2452583	10,2
3	2452858	10,9
4	2453137	10,1
5	2453407	11,4
6	2453680	11,0
7	2454224	10,7
8	2454755	10,8
9	2455038	10,8

TU Col

Efemeride: $C_n = 2452053,00 + (n \times 271,36)$



00 CMa

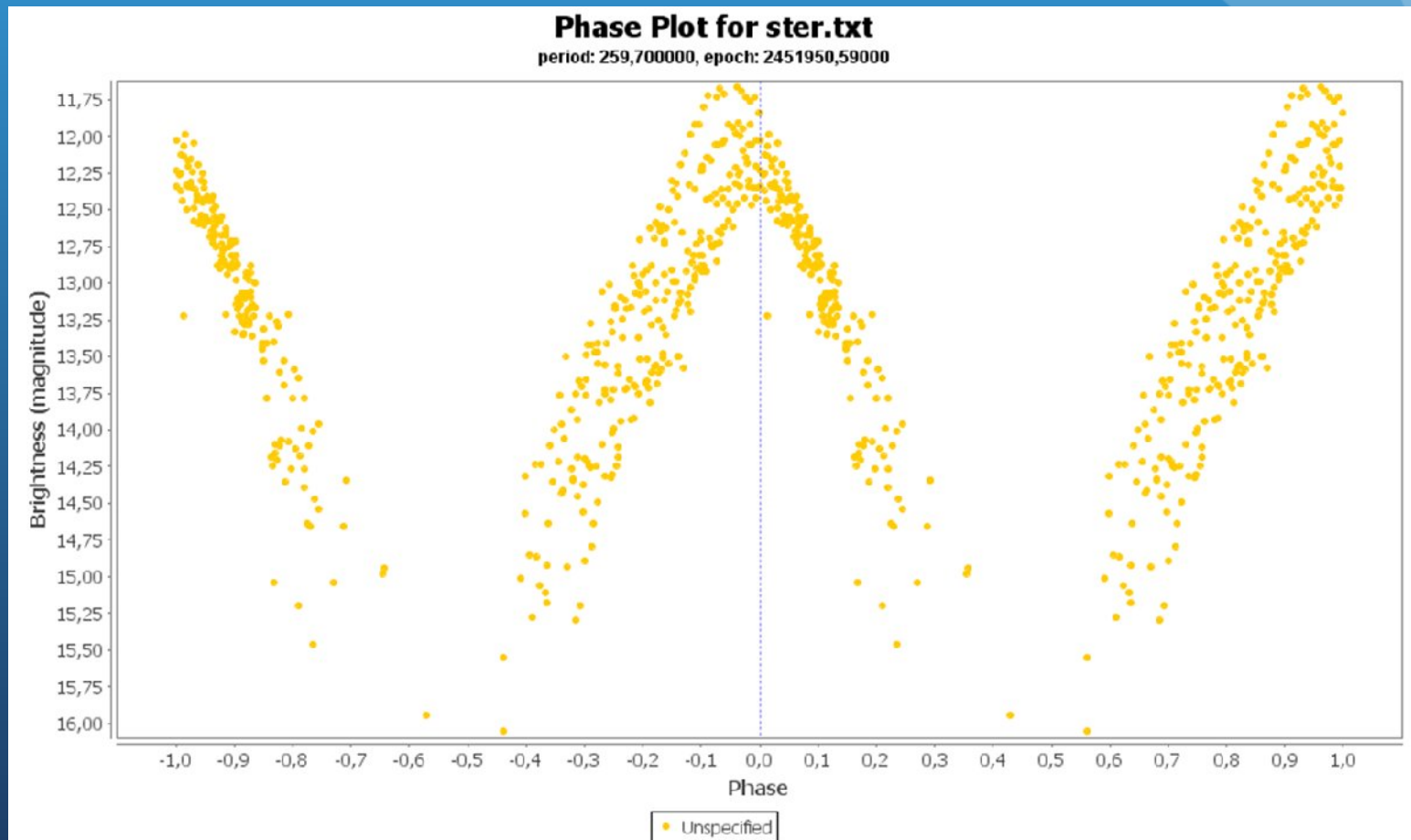


00 CMa

Piek nr.	JDmax	mv
1	2451950	12,4
2	2452201	12,0
3	2452719	11,7
4	2452978	12,0
5	2453550	12,1
6	2453800	12,5
7	2454542	12,2
8	2454807	12,3

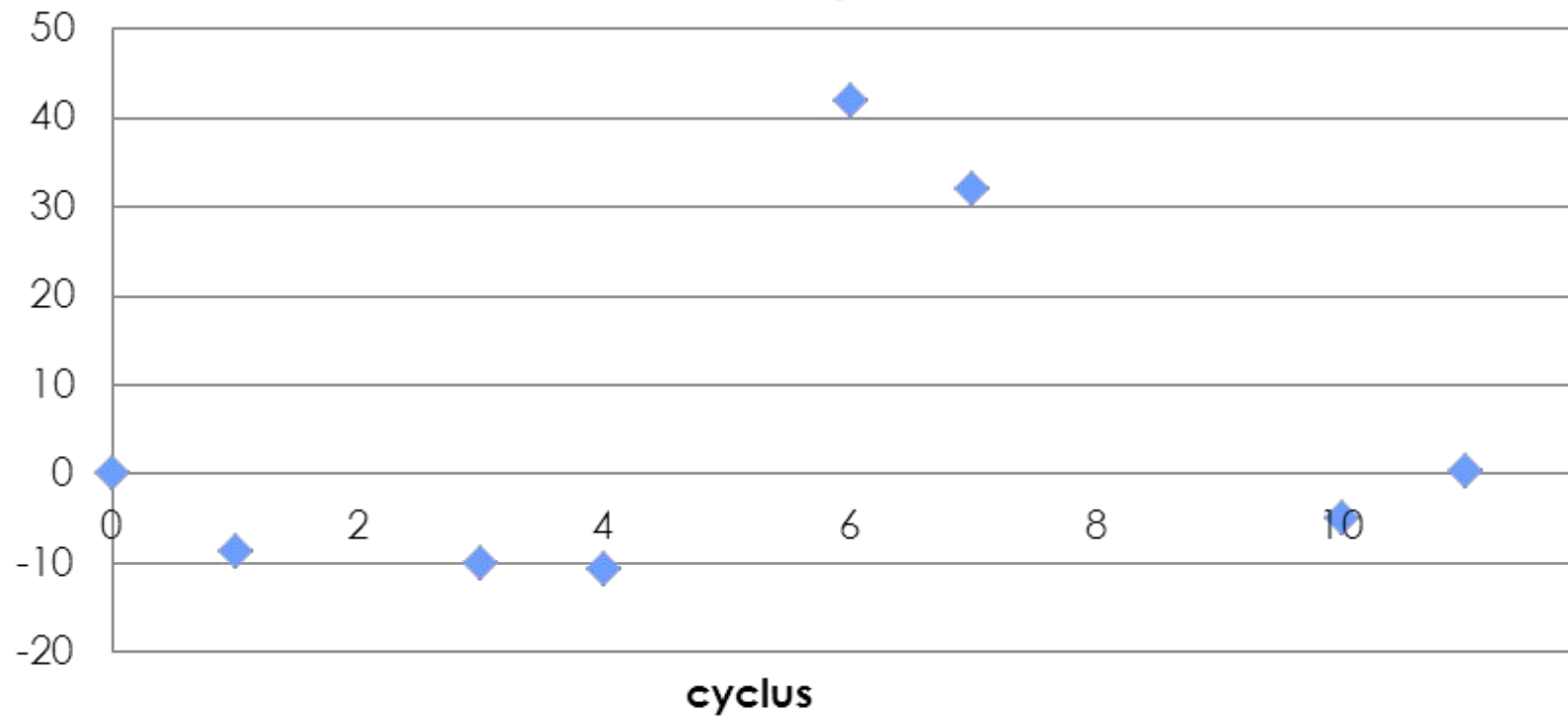
00 CMa

Efemeride: $C_n = 2451950,59 + (n \times 259,7)$



00 CMa

o-c diagram



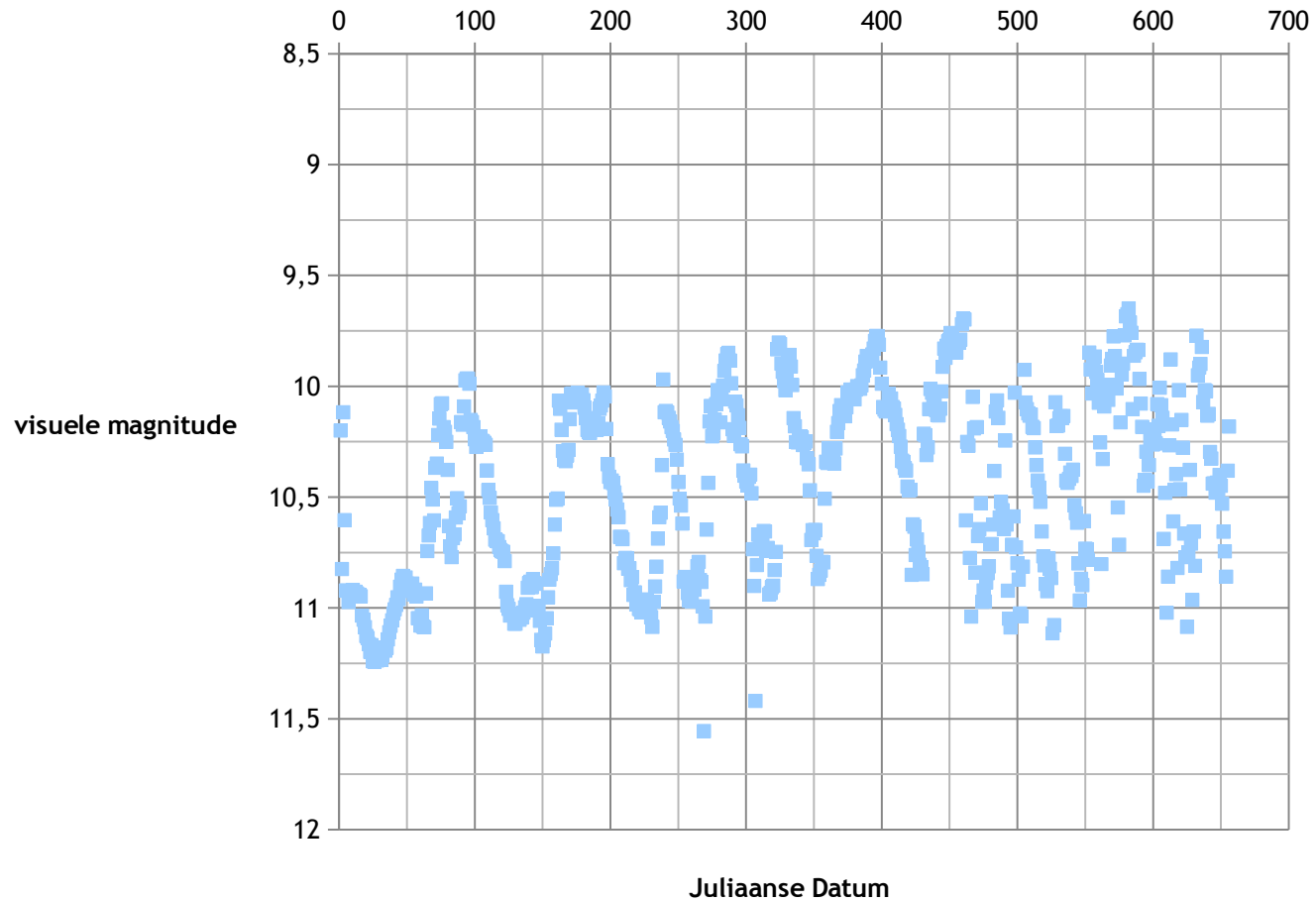
00 CMa

Conclusie

- Range maxima: 11,7- 12,5
- Amplitude: > 2,5 magnitudes
- Gemiddelde periode: 259,7 dagen

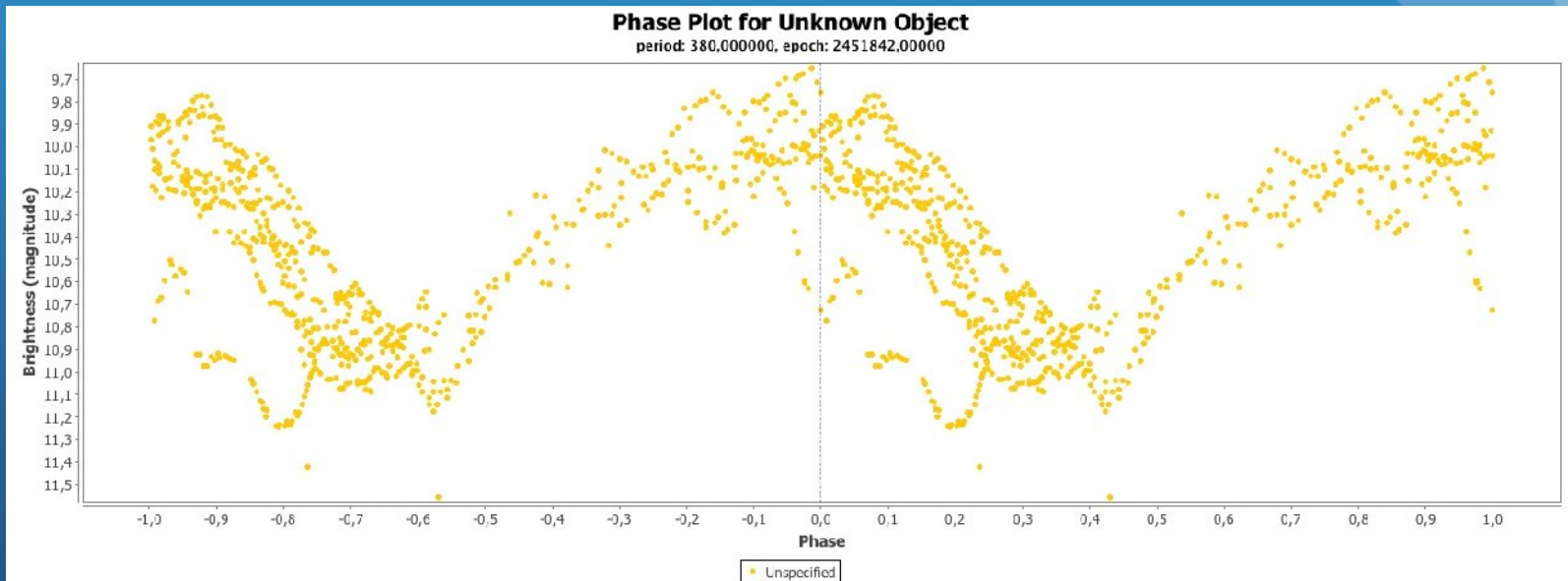
Conclusie: 00 CMa is een Mira-veranderlijke

V370 Hya



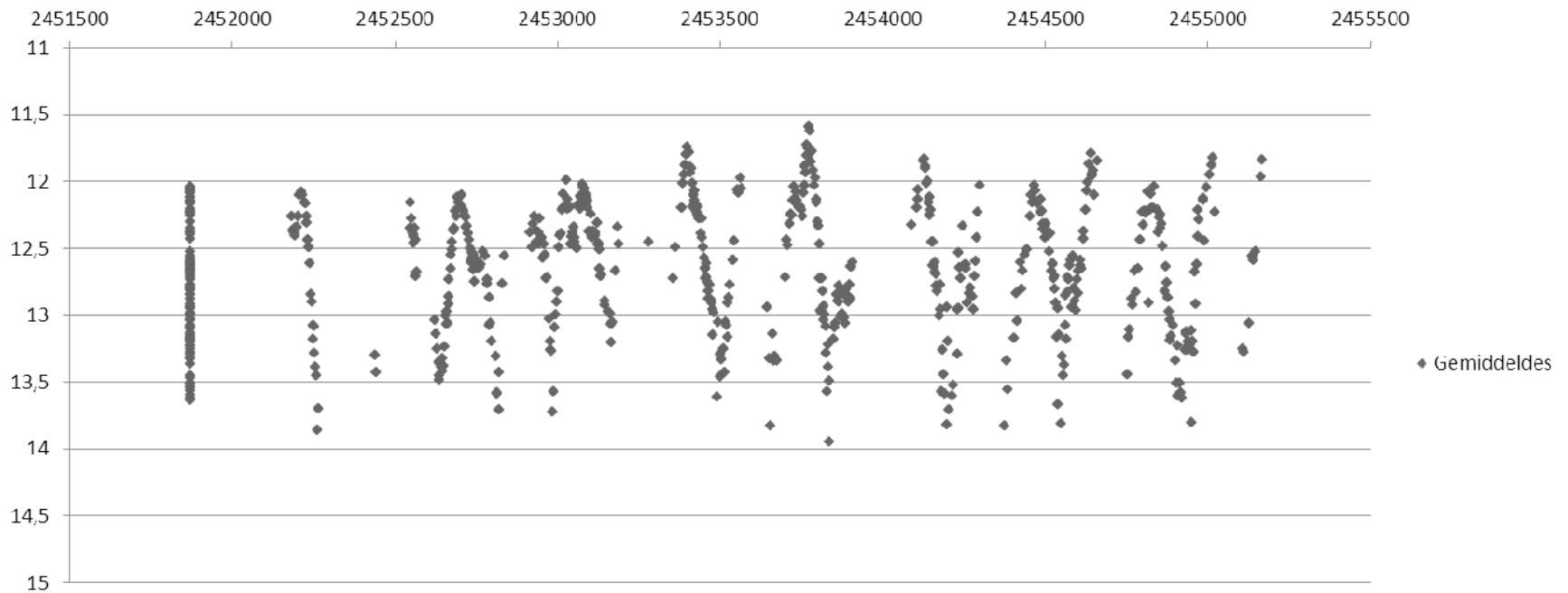
V370 Hya

Efemeride: $C_n = 2451842 + (n \times 380)$



V388 Hya

Lichtkromme V388Hya



V388 Hya

Piek nr.	JDmax	mv
1	2452018,527	12,0
2	2452212,858	12,1
3	2452545,887	12,2
4	2452705,659	12,1
5	2453399,748	11,7
6	2453561,454	12,0
7	2453773,771	11,6
8	2454127,748	11,8
9	2454464,776	12,0
10	2454639,460	11,8
11	2454835,757	12,0
12	2455014,469	11,8

V388 Hya

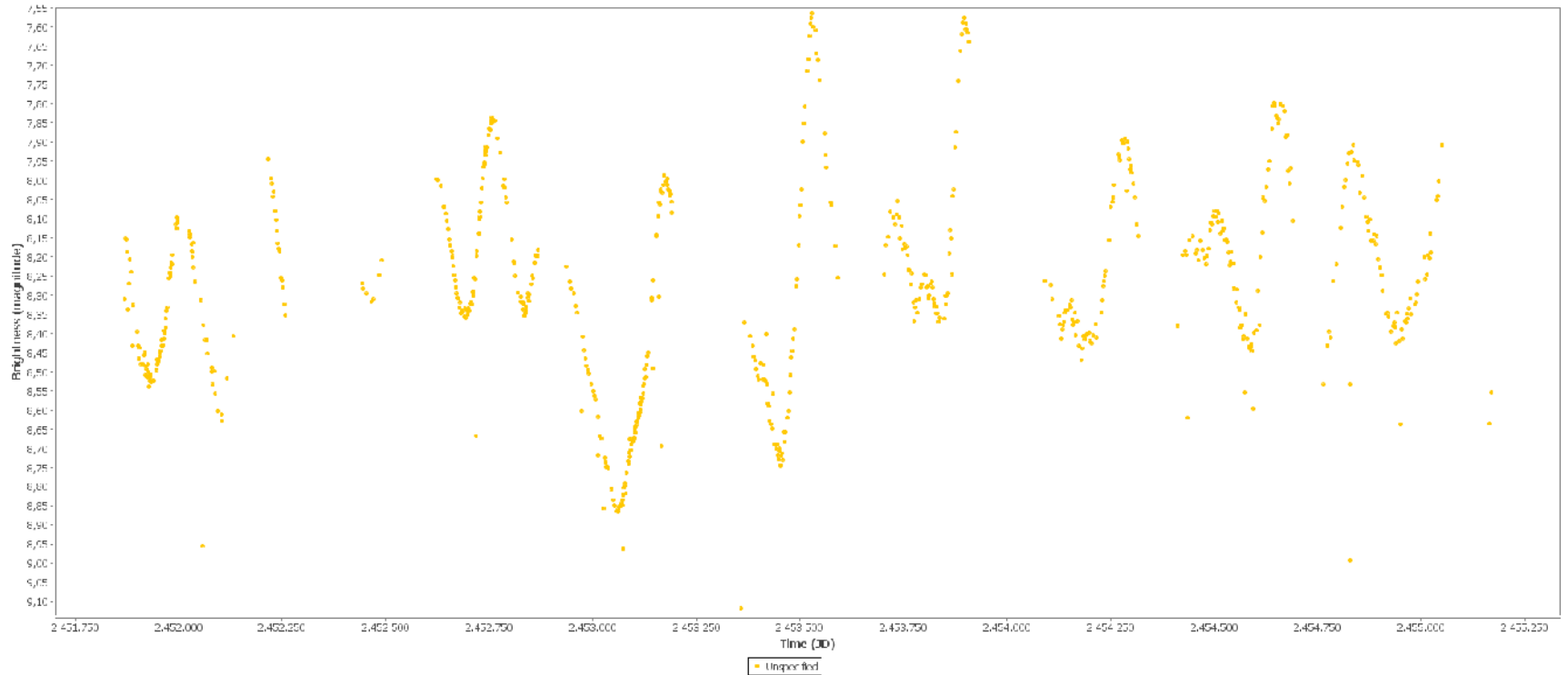
Conclusie

- Range maxima: 11,6- 12,2
- Amplitude: < 2,5 magnitudes
- Gemiddelde periode: ?

Conclusie: V388 Hya is een SRD veranderlijke (?)

MW Vel

Light Curve for Mw Vel

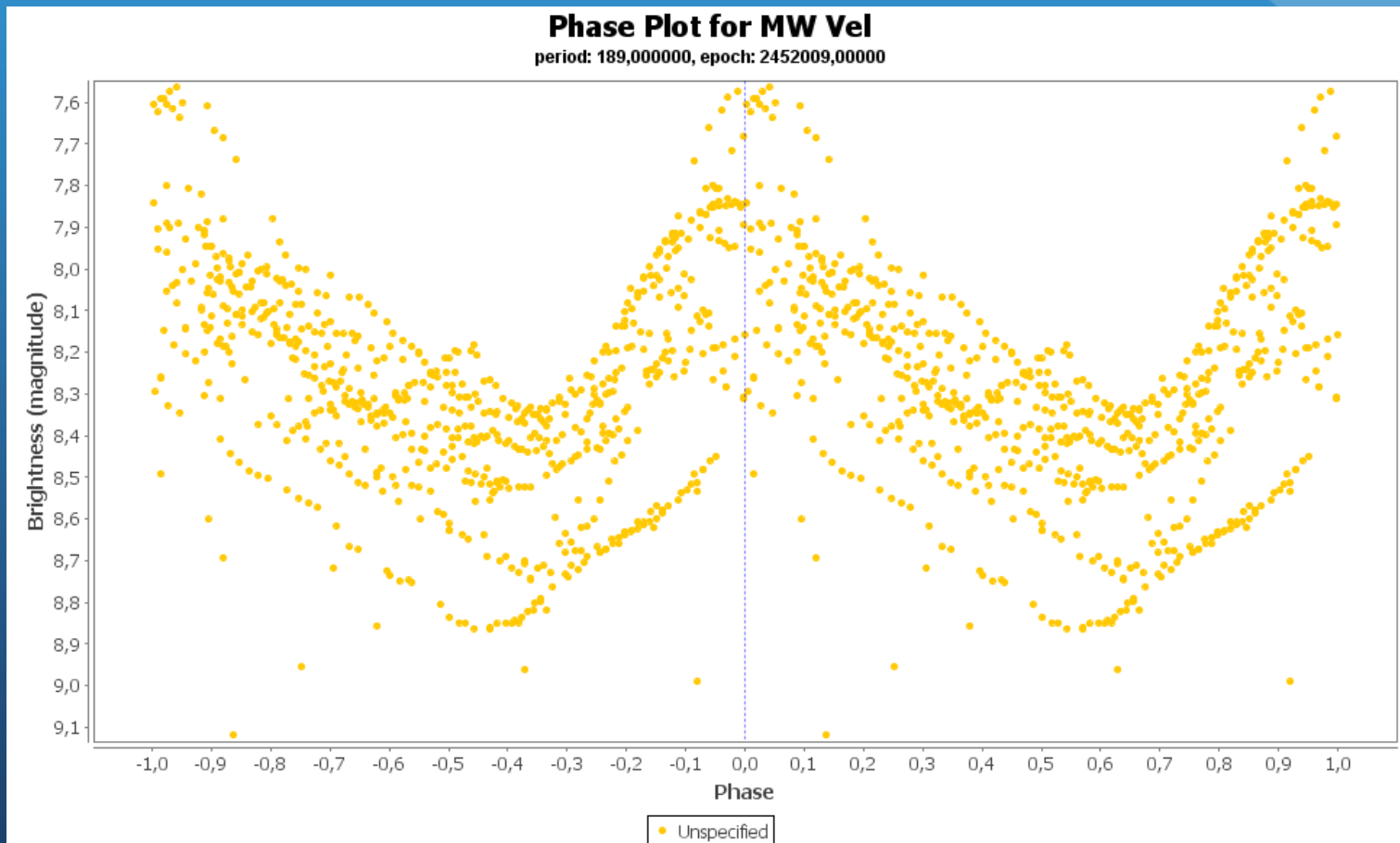


MW Vel

Piek nummer	JDmax	mV	Dal nummer	JDmin	mV
1	2452461,2	8,06	1	2451932,0	8,51
2	2452756,0	7,85	2	2452461,8	8,31
3	2453530,0	7,58	3	2452691,0	8,37
4	2454281,0	7,91	4	2452834,5	8,33
5	2454506,0	8,09	5	2453057,0	8,86
6	2454656,0	7,81	6	2453454,0	8,73
7	2454833,0	7,92	7	2454587,0	8,46
			8	2454947,0	8,39

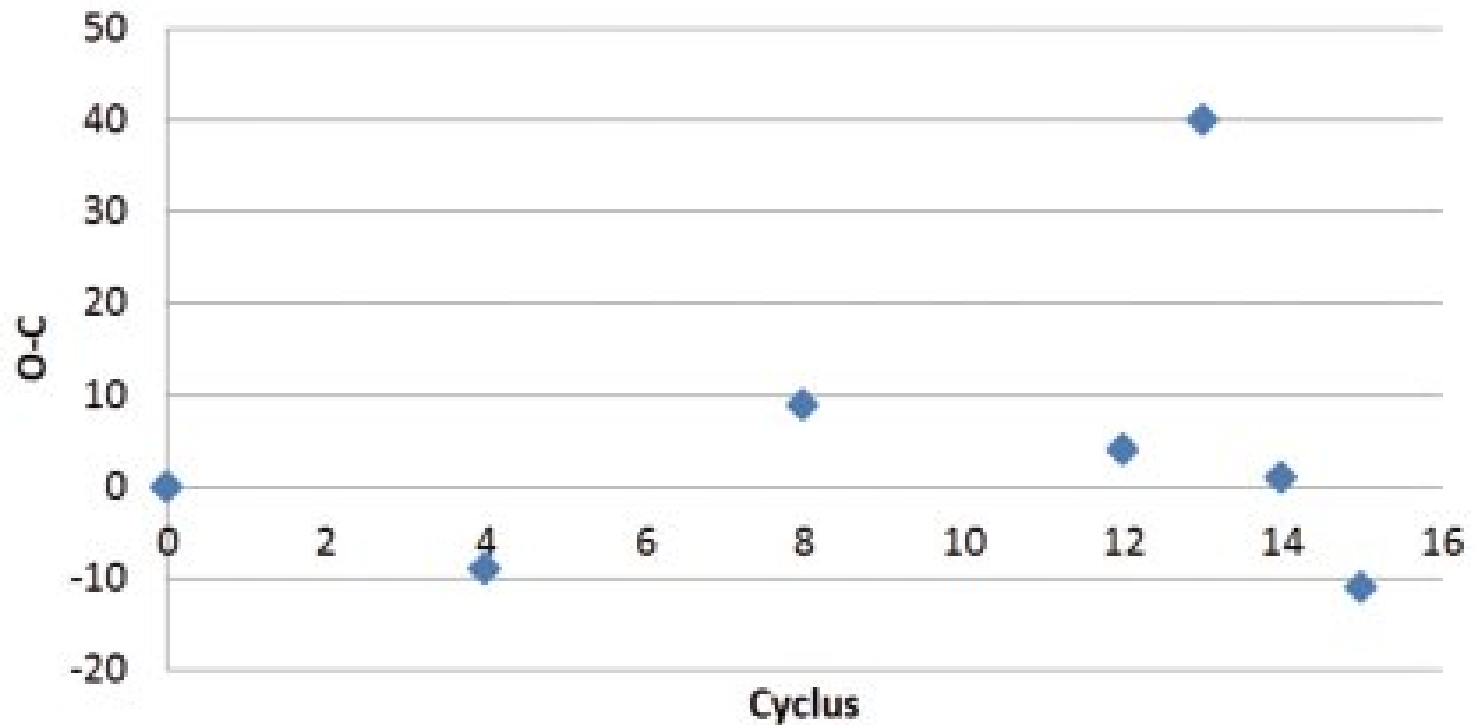
MW Vel

Efemeride: $C_n = 2452009 + (n \times 189)$



MW Vel

O-C Diagram MW Vel

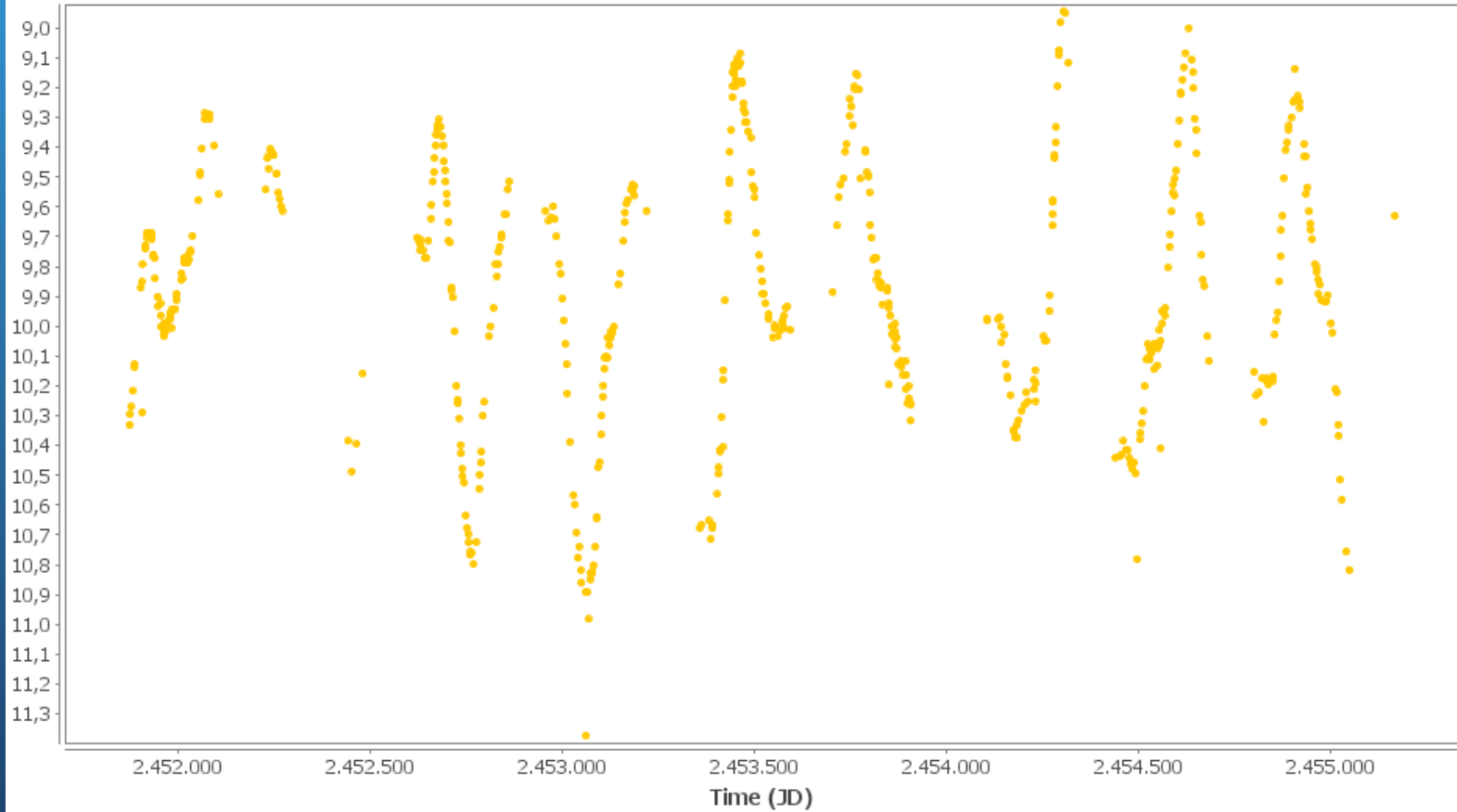


MW Vel

- » Gem. max. helderheid: 7,89
- » Bereik: 7,58 - 8,09
- » Gem. min. helderheid: 8,50
- » Bereik: 8,31- 8,86
- » Soort veranderlijke: SRB? (of toch SRA?)

RR Crt

Light Curve for Unknown Object



RR Crt

juliaanse datum

helderheid (magnitude)

2451922,82

9,7

2452070,47

9,3

2452240,83

9,4

2452678,76

9,3

2452861,47

9,5

2453183,53

9,5

2453462,68

9,1

2453765,78

9,2

2454308,47

9

2454632,55

9

2454908,66

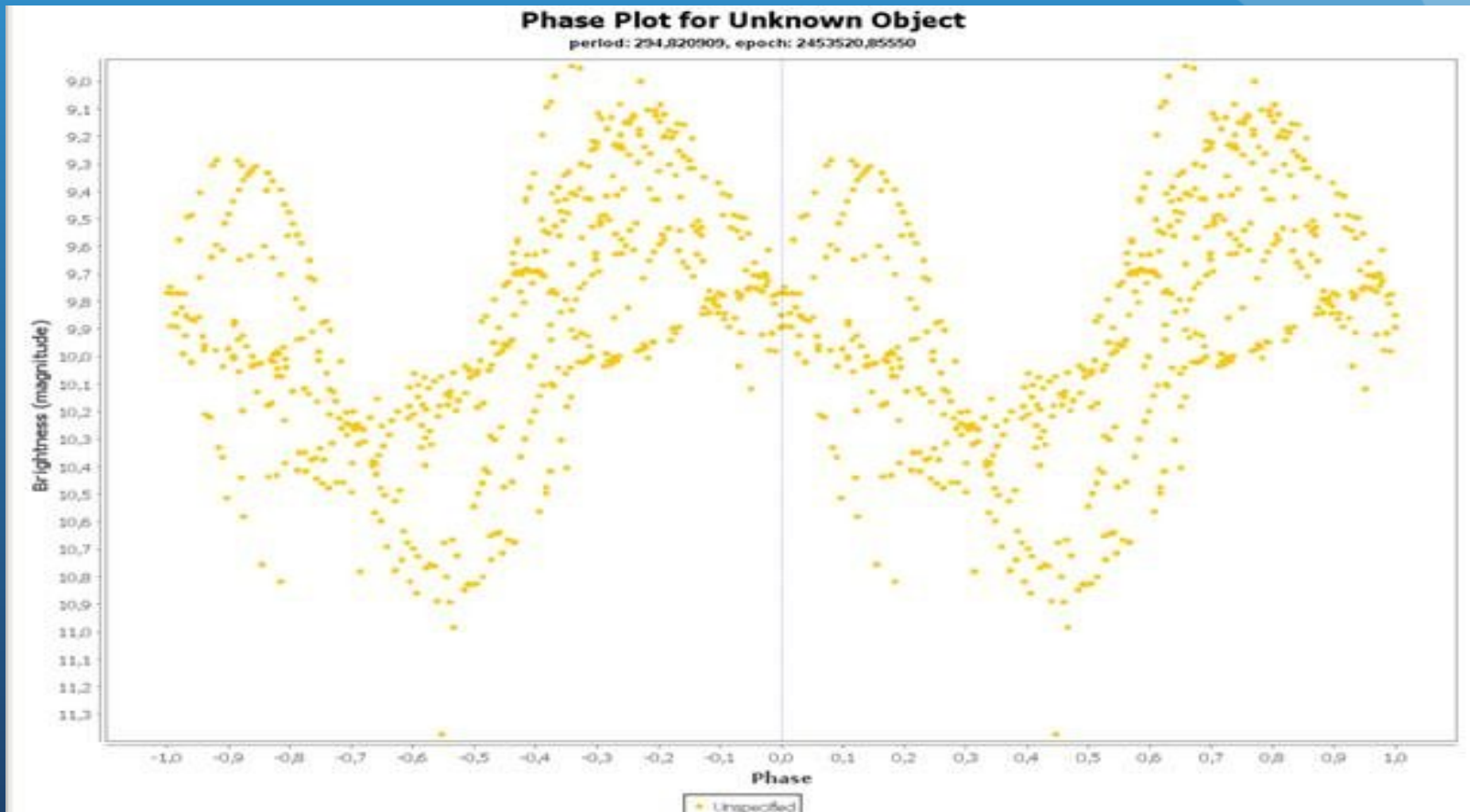
9,1

2455167,85

9,6

RR Crt

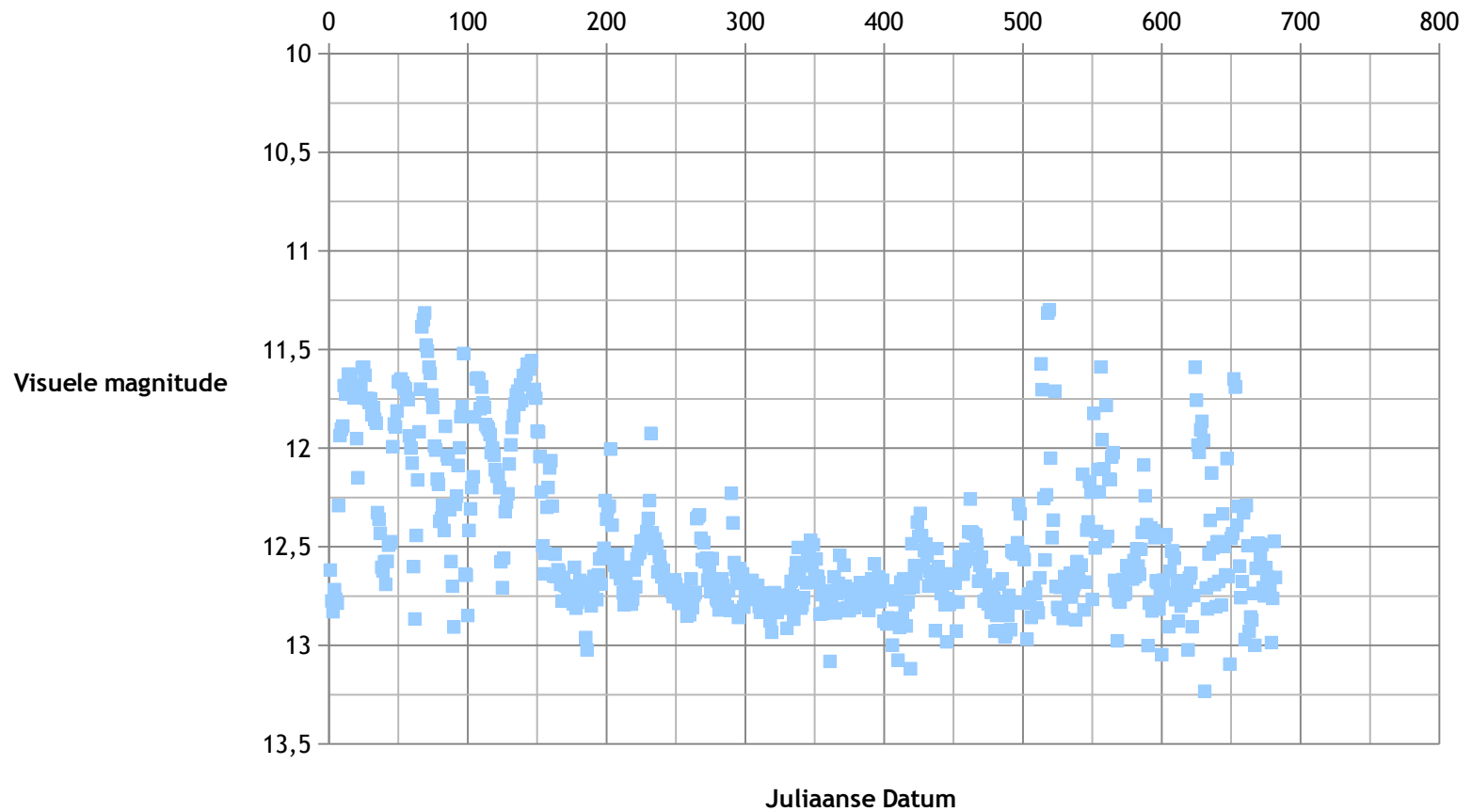
Efemeride: $C_n = 2451922,82 + (n \times 294,82)$



RR Crt

- mV, max = 9,0
- mV, min = 9,0
- Soort veranderlijke: SRB?

BW Aps

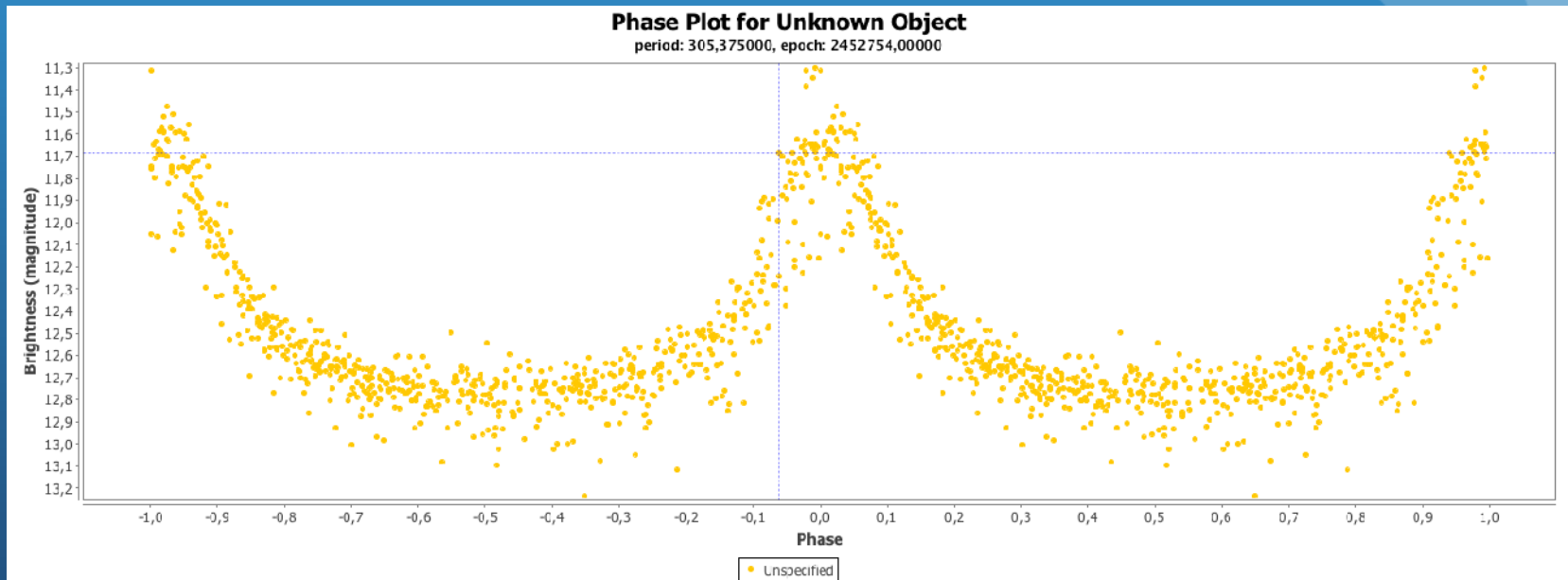


BW Aps

Piek nr.	JDmax	mv
1	2452133,0	11,62
2	2452453,7	11,57
3	2452754,0	11,64
4	2453056,7	11,34
5	2454276,6	11,62
6	2454603,7	11,53

BW Aps

Efemeride: $C_n = 2452754,000 + (n \times 305,375)$



BW Aps

- GEEN RRAB ster!