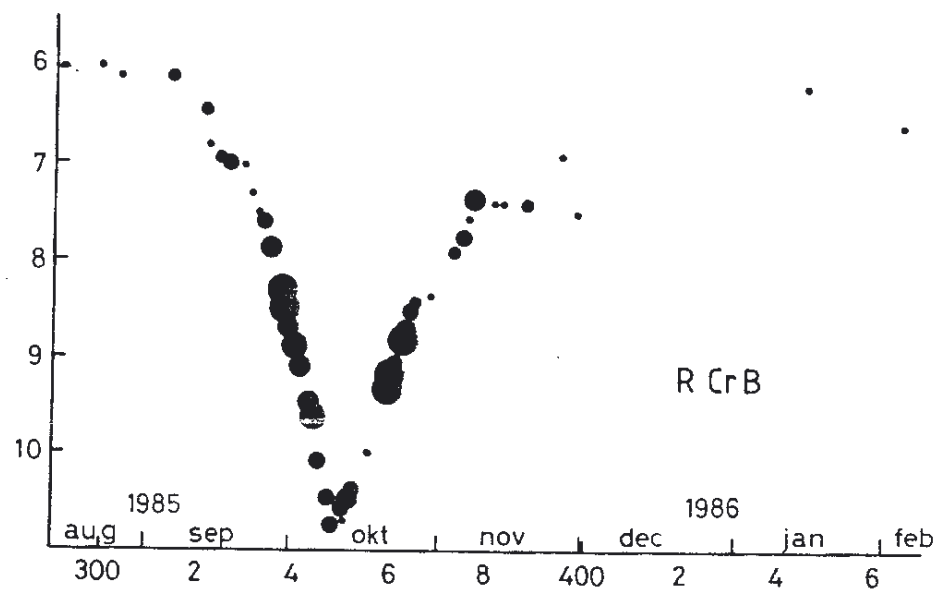


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 \* V A R I A B I L I A \*  
 \* ===== \*  
 \* nummer 13 april 1986 \*  
 \*  
 \* Redactie: H.Feijth, Der de Feart 7, 9084 BF Goutum \*  
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R CORONAE BOREALIS      Zoals bekend heeft deze ster in oktober van  
 -----                    het vorig jaar een scherp minimum ondergaan  
 en is tot op heden de toestand nog niet normaal. Omdat er veel  
 waarnemingen aan R CrB gedaan zijn kan de volgende grafiek gepre-  
 senteerd worden, die gebaseerd is op de daagse gemiddelden.



WAARNEMINGEN EERSTE KWARTAAL 1986

In de maanden januari t/m maart 1986 zijn in totaal 1276 waarnemingen verricht, waarvan 655 (iets meer dan de helft) in februari. De observaties werden gedaan door de volgende leden van de werkgroep:

		jan	feb	mrt	totaal
Boinck	BPK	49	57	3	109
van Ballegoy	BVE	82	104	52	238
Comello	CMG	1	12	36	49
Feijth	FJH	175	275	83	533
Geenen	GEJ	8	17	-	25
Kuipers	KPG	-	143	29	172
Luurs	LJD	11	9	14	34
Munsterman	MHN	-	14	-	14
Serre	SER	16	24	25	65
totaal		339	655	242	1236

000451 SS Gas Type: Mira Aantal waarnemingen 7  
 446.5 9.7 FJH : 466.3 12.1 CMG : 474.3 13.1 FJH : 485.5 13.0 FJH  
 466.3 11.6 KPG : 468.4 11.8 FJH : 474.3 12.1 KPG :

000928 UM And Type: Mira Aantal waarnemingen 1  
 474.3 14.6 FJH :

001046 X And Type: Mira Aantal waarnemingen 7  
 434.4 13.5 FJH : 457.3 11.9 FJH : 466.3 11.5 FJH : 475.3 10.5 FJH  
 447.3 12.6 FJH : 466.3 11.4 KPG : 474.3 10.0 KPG :

001726 T And Type: Mira Aantal waarnemingen 3  
 447.3 12.8 FJH : 459.2 13.3 FJH : 474.3 13.6 FJH :

001755 T Gas Type: Mira Aantal waarnemingen 6  
 439.4 9.1 FJH : 474.3 9.6 BFK : 485.3 10.7 FJH :  
 468.4 10.2 FJH : 475.3 10.8 FJH : 513.3 11.0 FJH :

001818 R And Type: Mira Aantal waarnemingen 13  
 434.4 6.3 BVE : 457.3 6.2 BFK : 473.3 6.4 BVE : 500.3 7.2 BVE  
 446.3 5.9 BVE : 466.3 6.3 BVE : 481.3 6.6 BVE :  
 446.3 6.2 BFK : 466.3 6.4 KPG : 485.3 5.5 BFK :  
 457.3 6.0 BVE : 469.3 6.2 BFK : 492.3 6.8 BVE :

002725A TU And Type: Mira Aantal waarnemingen 2  
 466.3 10.8 KPG : 475.3 11.4 FJH :

003179 Y Dec Type: Mira Aantal waarnemingen 1  
 466.3 11.1 CMG :

004047 U Gas Type: Mira Aantal waarnemingen 6  
 459.3 <14.8 FJH : 474.3 13.4 FJH : 513.4 11.5 SER :  
 466.3 14.2 FJH : 481.4 12.9 FJH : 519.3 11.1 SER :

004132 RW And Type: Mira Aantal waarnemingen 6  
 446.4 14.2 FJH : 466.3 13.3 FJH : 474.3 11.8 FJH :  
 459.3 13.9 FJH : 466.3 13.3 KPG : 488.3 9.8 FJH :

004435 V And Type: Mira Aantal waarnemingen 7  
 434.4 11.2 FJH : 459.3 12.2 FJH : 466.3 12.8 FJH : 488.3 13.9 FJH  
 446.4 11.8 FJH : 466.3 12.7 KPG : 474.3 13.2 FJH :

004513 RR And Type: Mira Aantal waarnemingen 5  
 434.4 12.7 FJH : 459.3 14.0 FJH : 474.3 14.5 FJH :  
 446.4 13.1 FJH : 466.3 14.4 FJH :

004746A RV Gas Type: Mira Aantal waarnemingen 6  
 439.4 12.9 FJH : 459.3 13.4 FJH : 466.3 14.5 KPG :  
 442.4 13.1 SER : 466.3 14.0 FJH : 474.3 : 14.2 FJH :

004746B IZ Gas Type: SR Aantal waarnemingen 11  
 487.3 10.7 BVE : 447.3 11.1 BVE : 474.3 10.5 SER : 513.4 : 10.7 SER  
 434.4 10.9 BVE : 454.4 10.9 BVE : 474.3 10.6 BVE : 519.4 10.6 SER  
 442.4 10.4 SER : 456.4 : 10.7 SER : 486.3 10.7 SER :

004958 W Gas Type: Mira Aantal waarnemingen 14  
 458.4 : 12.0 BVE : 457.3 11.9 FJH : 479.3 12.0 BVE : 499.3 11.4 BVE  
 439.4 11.9 FJH : 469.3 12.0 BVE : 485.3 11.7 FJH : 519.4 10.4 SER  
 442.4 11.9 BVE : 474.3 11.8 FJH : 486.3 11.4 SER :  
 442.4 11.9 SER : 474.3 11.8 SER : 487.3 11.7 BVE :

005840 RX And Type: U Gem (Z Cam) Aantal waarnemingen 17  
 434.39 11.5 FJH : 459.25 13.7 FJH : 474.29 11.4 FJH : 488.28 14.1 FJH  
 441.44 13.7 FJH : 466.27 13.4 KPG : 475.25 10.9 BFK : 489.27 13.6 KPG  
 446.26 11.3 BFK : 466.32 13.6 FJH : 475.26 10.8 FJH :  
 446.41 11.4 FJH : 474.26 11.1 BFK : 481.35 13.7 FJH :  
 447.33 10.9 BFK : 474.26 11.0 KPG : 487.31 13.6 FJH :

010621A X Psc Type: Mira Aantal waarnemingen 4  
 459.3 13.6 FJH : 466.3 13.5 FJH : 474.3 13.3 FJH : 488.3 12.3 FJH

010940 U And Type: Mira Aantal waarnemingen 8  
 434.4 10.4 FJH : 466.3 10.5 KPG : 474.3 11.1 KPG : 485.3 11.5 FJH  
 457.3 10.5 FJH : 466.3 10.7 FJH : 475.3 11.4 FJH : 489.3 12.0 KPG

011041A UZ And Type: Mira Aantal waarnemingen 8  
 434.4 11.1 FJH : 466.3 10.9 KPG : 474.3 11.2 KPG : 485.3 12.1 FJH  
 457.3 10.7 FJH : 466.3 11.2 FJH : 475.3 12.0 FJH : 489.3 11.6 KPG

011055A VZ Gas Type: Mira Aantal waarnemingen 1  
 446.4 13.7 FJH :

011208 S Psc Type: Mira Aantal waarnemingen 2  
 466.3 10.2 FJH : 474.3 10.3 FJH :

011272 S Gas Type: Mira Aantal waarnemingen 5  
 439.4 12.7 FJH : 466.3 13.3 FJH : 481.4 13.5 FJH :  
 456.3 12.9 KPG : 474.3 13.5 FJH :

022150 RR Per Type: Mira Aantal waarnemingen 5  
 439.4 13.2 FJH : 466.3 13.1 FJH : 516.3 9.1 FJH :  
 466.3 12.5 KPG : 481.4 11.5 FJH :  
 022980 RR Dep Type: Mira Aantal waarnemingen 4  
 442.6 14.2 FJH : 466.5 :14.9 FJH : 489.3 14.9 FJH : 519.4 <14.6 FJH  
 023033 R Tri Type: Mira Aantal waarnemingen 15  
 439.4 10.9 FJH : 466.3 9.4 BVE : 473.3 9.2 BFK : 489.3 8.8 GEJ  
 446.3 10.7 BVE : 466.3 9.4 KPG : 475.3 9.2 GEJ : 492.3 8.6 BVE  
 456.3 10.0 BFK : 469.3 9.4 GEJ : 481.3 9.1 BVE : 500.3 8.5 BVE  
 457.3 10.0 BVE : 473.3 8.9 BVE : 485.3 8.8 BFK :  
 024217 T Ari Type: SRA Aantal waarnemingen 4  
 439.3 8.2 LJO : 446.3 8.3 BFK : 473.3 8.6 BFK : 485.3 8.8 BFK  
 030514 U Ari Type: Mira Aantal waarnemingen 3  
 446.4 14.8 FJH : 466.4 :14.9 FJH : 488.3 14.7 FJH :  
 032043 Y Per Type: Mira Aantal waarnemingen 13  
 438.4 9.3 BVE : 454.5 8.9 BVE : 481.3 8.8 BVE : 507.4 9.3 DMG  
 439.3 9.2 LJO : 466.3 8.9 BVE : 489.3 9.0 GEJ :  
 444.4 9.1 GEJ : 473.3 8.9 BVE : 492.3 8.8 BVE :  
 446.4 9.3 BVE : 475.3 8.9 GEJ : 500.3 9.0 BVE :  
 032335 R Per Type: Mira Aantal waarnemingen 12  
 434.4 10.2 BVE : 442.5 10.9 BVE : 474.3 13.4 FJH : 488.3 14.0 FJH  
 439.3 10.0 LJO : 466.3 12.9 KPG : 474.3 13.5 KPG : 489.3 13.9 KPG  
 439.4 10.6 FJH : 466.3 13.1 FJH : 481.4 13.9 FJH : 518.3 14.0 FJH  
 034532 RX Per Type: Mira Aantal waarnemingen 5  
 441.4 11.8 FJH : 474.3 13.5 FJH : 518.3 :14.8 FJH :  
 466.3 12.8 FJH : 487.3 13.8 FJH :  
 034711 IK Tau Type: Mira Aantal waarnemingen 1  
 466.3 13.4 KPG :  
 042209 R Tau Type: Mira Aantal waarnemingen 9  
 434.5 13.2 FJH : 466.4 12.7 FJH : 487.3 12.2 FJH :  
 446.5 12.9 FJH : 474.3 12.8 KPG : 486.3 11.9 KPG :  
 466.3 12.8 KPG : 475.3 12.4 FJH : 507.4 11.1 DMG :  
 042309 S Tau Type: Mira Aantal waarnemingen 9  
 434.5 10.1 FJH : 466.4 10.1 FJH : 482.4 10.8 FJH :  
 446.5 9.8 FJH : 474.3 10.6 KPG : 488.3 11.0 KPG :  
 466.3 10.1 KPG : 475.3 10.6 FJH : 507.4 12.1 DMG :

011712 U Psc Type: Mira Aantal waarnemingen 3  
 459.3 14.0 FJH : 474.3 13.6 FJH : 488.3 12.5 FJH :  
 012746 SX And Type: Mira Aantal waarnemingen 10  
 439.4 11.5 FJH : 466.3 11.6 KPG : 485.3 10.9 BFK : 513.3 9.6 FJH  
 457.3 11.5 FJH : 474.3 11.3 BFK : 485.3 11.3 FJH :  
 466.3 11.5 FJH : 475.3 11.5 FJH : 489.3 10.7 KPG :  
 013338 Y And Type: Mira Aantal waarnemingen 9  
 439.4 11.6 FJH : 466.3 13.4 FJH : 481.4 13.5 FJH :  
 457.3 12.9 FJH : 474.3 13.4 FJH : 488.3 13.9 FJH :  
 466.3 12.8 KPG : 474.3 13.4 KPG : 489.3 13.7 KPG :  
 015254 U Per Type: Mira Aantal waarnemingen 11  
 434.5 9.7 SER : 454.5 10.5 BVE : 479.4 :11.0 SER : 496.4 :11.3 SER  
 439.4 10.0 BVE : 457.5 10.3 SER : 483.4 11.0 SER : 519.4 11.2 SER  
 446.4 10.4 BVE : 469.3 10.9 BVE : 488.3 11.3 BVE :  
 015912 S Ari Type: Mira Aantal waarnemingen 4  
 446.4 12.8 FJH : 466.3 13.9 FJH : 474.3 14.0 FJH : 488.3 14.6 FJH  
 021024 R Ari Type: Mira Aantal waarnemingen 8  
 439.3 10.5 LJO : 457.3 12.4 FJH : 466.3 12.8 KPG : 474.3 12.9 KPG  
 439.4 11.0 FJH : 466.3 12.7 FJH : 474.3 12.7 FJH : 487.3 12.7 FJH  
 021434 W And Type: Mira Aantal waarnemingen 4  
 434.4 12.5 FJH : 442.5 12.4 FJH : 466.3 13.2 FJH : 488.3 13.8 FJH  
 021281 Z Dep Type: Mira Aantal waarnemingen 2  
 446.5 15.1 FJH : 466.5 :15.3 FJH :  
 0214-03 Omikron Det Type: Mira Aantal waarnemingen 11  
 434.3 8.3 BVE : 456.3 7.1 BFK : 469.3 6.5 BVE : 486.3 4.3 BVE  
 446.3 7.7 BVE : 457.3 7.0 BVE : 479.3 5.0 BVE : 499.3 4.5 BVE  
 446.3 8.1 BFK : 469.3 6.0 BFK : 482.3 4.8 BFK :  
 021558 S Per Type: SRC Aantal waarnemingen 2  
 444.4 9.4 GEJ : 469.3 9.2 GEJ :  
 0220-00 R Det Type: Mira Aantal waarnemingen 5  
 434.3 7.7 BVE : 446.3 8.6 BFK : 457.3 10.0 BVE :  
 446.3 8.5 BVE : 456.3 9.8 BFK :

043065 T Cam Type: Mira Aantal waarnemingen 20

434.4	8.2 BFK	454.5	8.8 BVE	473.3	9.3 BFK	487.3	9.9 BFK
438.5	8.3 BVE	466.3	9.1 KPG	473.3	9.5 BVE	488.3	10.0 KPG
439.5	8.5 FJH	466.3	9.4 CMG	474.3	9.4 KPG	482.3	9.8 BVE
446.4	8.6 BVE	466.4	9.2 BVE	481.3	9.6 BVE	500.3	10.5 BVE
447.4	8.4 BFK	468.4	9.2 FJH	485.5	10.1 FJH	513.3	11.1 FJH

043208 RX Tau Type: Mira Aantal waarnemingen 7

434.5	13.7 FJH	466.3	14.3 KPG	488.3	14.1 KPG	507.4	13.4 CMG
446.4	13.8 FJH	466.4	14.5 FJH	488.3	14.5 FJH		

043274 X Cam Type: Mira Aantal waarnemingen 15

434.4	9.8 BFK	447.4	11.4 BFK	474.3	12.8 KPG	489.3	12.6 FJH
439.5	10.9 BVE	466.3	12.6 CMG	474.4	12.7 FJH	492.3	12.2 BVE
439.5	10.9 FJH	466.3	12.7 KPG	481.4	12.9 FJH	513.3	9.9 FJH
446.4	11.5 BVE	466.4	12.6 FJH	488.3	12.8 KPG		

044617 V Tau Type: Mira Aantal waarnemingen 10

434.4	14.0 FJH	466.4	12.6 FJH	482.4	11.0 FJH	513.3	9.1 FJH
441.5	14.0 FJH	474.3	12.0 KPG	488.3	10.5 KPG		
466.3	12.7 KPG	475.3	12.0 FJH	507.4	9.7 CMG		

045207 R Ori Type: Mira Aantal waarnemingen 3

466.3	11.1 KPG	488.3	11.6 KPG	507.4	12.2 CMG		
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050953 R Aur Type: Mira Aantal waarnemingen 10

439.4	12.2 FJH	474.3	12.9 KPG	481.4	13.3 FJH	518.3	13.7 FJH
466.2	12.6 MHN	474.4	13.1 FJH	488.3	13.2 KPG		
466.4	13.1 FJH	475.4	12.8 GEJ	489.3	12.8 GEJ		

052036 W Aur Type: Mira Aantal waarnemingen 9

439.4	9.3 FJH	466.4	10.5 FJH	482.4	10.5 FJH		
446.2	9.9 MHN	474.4	10.2 KPG	488.3	10.9 KPG		
466.4	9.9 KPG	474.4	10.6 FJH	513.3	11.9 FJH		

052404 S Ori Type: Mira Aantal waarnemingen 1

507.4	10.4 CMG						
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052607 BK Ori Type: Mira Aantal waarnemingen 3

466.4	10.6 KPG	474.4	10.8 KPG	488.3	11.0 KPG		
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053326 RR Tau Type: INMS Aantal waarnemingen 3

466.34	11.0 KPG	474.26	10.6 KPG	488.28	11.0 KPG		
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053337 RU Aur Type: Mira Aantal waarnemingen 9

434.4	11.6 FJH	466.4	12.5 FJH	487.3	13.0 FJH		
442.5	11.6 FJH	474.4	12.7 FJH	488.3	12.8 FJH		
466.4	12.4 KPG	474.4	13.2 KPG	518.3	13.7 FJH		

053531 U Aur Type: Mira Aantal waarnemingen 7

439.4	10.1 FJH	466.4	9.5 FJH	482.4	9.7 FJH	513.3	10.3 FJH
466.4	9.3 KPG	474.4	9.3 FJH	488.3	9.5 KPG		

053538 S2 Aur Type: Mira Aantal waarnemingen 7

434.4	13.5 FJH	466.4	14.1 FJH	474.4	14.2 FJH	518.3	15.1 FJH
442.5	13.8 FJH	466.4	14.3 KPG	488.3	14.5 FJH		

054319 SU Tau Type: RCB Aantal waarnemingen 14

434.4	9.5 BVE	466.3	9.3 BVE	475.5	9.3 GEJ	500.3	9.4 BVE
442.5	9.3 BVE	466.4	9.4 KPG	481.4	9.4 BVE	507.4	
454.5	9.4 BVE	473.3	9.3 BVE	488.3	9.3 KPG		
457.3	9.6 BFK	473.36	9.5 BFK	492.3	9.5 BVE		

054615A Z Tau Type: Mira Aantal waarnemingen 6

434.5	13.7 FJH	466.4	13.6 KPG	488.3	13.7 FJH		
442.5	13.3 FJH	466.4	13.7 FJH	507.4	13.3 CMG		

054615C RU Tau Type: Mira Aantal waarnemingen 6

434.5	12.0 FJH	466.4	11.8 KPG	487.3	12.4 FJH		
442.5	11.6 FJH	466.4	12.2 FJH	507.4	12.0 CMG		

054920A U Ori Type: Mira Aantal waarnemingen 19

434.4	7.0 BVE	454.5	8.0 BVE	473.4	8.7 BFK	492.3	8.8 BVE
434.4	7.4 BFK	457.3	8.5 BFK	475.5	8.9 GEJ	500.3	9.4 BVE
442.5	7.8 BVE	466.3	8.5 BVE	481.4	8.7 BVE	507.4	10.5 CMG
444.4	7.8 GEJ	466.4	8.5 KPG	487.3	8.8 BFK	519.3	10.2 BFK
446.3	7.9 BFK	473.3	8.7 BVE	488.3	9.3 KPG		

054974 V Cam Type: Mira Aantal waarnemingen 7

434.5	13.4 FJH	466.3	13.3 CMG	481.4	12.9 FJH	513.3	9.4 FJH
441.4	13.1 FJH	468.4	13.0 FJH	489.3	12.5 FJH		

055439 AZ Aur Type: Mira Aantal waarnemingen 4

442.5	12.9 FJH	466.4	12.8 FJH	487.3	13.1 FJH	516.4	12.4 FJH
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055716 RR Ori Type: Mira Aantal waarnemingen 2

466.4	12.2 KPG	488.3	10.9 KPG				
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064030 X Gem	Type: Mira	Aantal waarnemingen 25		
434.4	9.0 BFK : 466.3	7.8 BVE : 475.4	7.9 GEJ : 499.3	8.9 LJO
439.5	8.4 BVE : 466.3	7.8 MHN : 485.4	8.2 BVE : 500.9	9.2 BVE
444.4	8.0 GEJ : 466.3	8.0 LJO : 487.3	8.4 BFK : 507.4	10.1 CMG
447.3	8.1 BVE : 466.4	7.7 KPG : 488.3	8.3 KPG : 516.3	10.7 FJH
447.4	8.0 BFK : 467.5	7.6 FJH : 489.4	8.0 GEJ :	
457.3	7.8 BVE : 473.3	7.8 BFK : 492.3	8.4 BVE :	
457.3	8.2 LJO : 473.3	7.8 BVE : 497.3	8.3 LJO :	
064128 IR Gem Type: U Gem Aantal waarnemingen 3				
446.49	<14.7 FJH : 466.44	<14.5 FJH : 489.35	15.0 FJH :	
065111 Y Mon Type: Mira Aantal waarnemingen 2				
466.4	13.8 KPG : 489.4	14.0 KPG :		
065355 R Lyn Type: Mira Aantal waarnemingen 7				
442.6	10.3 FJH : 466.4	12.5 KPG : 474.4	13.1 FJH : 519.4	14.3 FJH
466.3	12.7 MHN : 467.5	12.9 FJH : 492.4	13.1 KPG :	
070109 V CMI Type: Mira Aantal waarnemingen 10				
439.5	10.0 FJH : 466.4	11.2 LJO : 489.3	12.4 KPG : 518.3	13.9 FJH
466.3	11.1 MHN : 467.5	11.3 FJH : 492.3	12.1 LJO :	
466.4	11.0 KPG : 485.5	12.4 FJH : 507.4	13.7 CMG :	
070122A R Gem Type: Mira Aantal waarnemingen 14				
439.4	11.4 FJH : 466.4	12.0 KPG : 487.3	12.7 FJH : 507.4	13.2 CMG
444.4	12.0 GEJ : 466.4	12.5 FJH : 488.3	12.4 KPG : 518.3	13.6 FJH
446.5	11.7 FJH : 474.4	12.5 FJH : 489.4	13.0 GEJ :	
466.3	12.4 LJO : 475.4	13.0 GEJ : 497.3	13.0 LJO :	
070310 R CMI Type: Mira Aantal waarnemingen 6				
466.3	8.6 LJO : 489.3	9.7 KPG : 499.2	9.5 LJO :	
466.4	9.4 KPG : 492.3	9.3 LJO : 507.4	9.5 CMG :	
071026 WZ Gem Type: Mira Aantal waarnemingen 7				
434.5	12.7 FJH : 466.4	14.1 FJH : 474.4	14.3 FJH : 518.3	<14.5 FJH
446.5	13.6 FJH : 466.4	14.4 KPG : 489.4	15.0 FJH :	
071713 V Gem Type: Mira Aantal waarnemingen 9				
434.5	14.1 FJH : 488.3	11.9 MHN : 489.4	11.1 KPG :	
466.4	12.2 KPG : 474.4	11.6 FJH : 497.3	11.0 LJO :	
466.4	12.3 FJH : 485.3	10.9 FJH : 507.4	10.2 CMG :	
072708 S CMI Type: Mira Aantal waarnemingen 11				
434.6	11.4 FJH : 467.5	10.1 FJH : 487.3	9.4 BFK : 492.3	10.3 LJO
466.4	9.5 KPG : 474.3	9.5 BFK : 488.3	9.3 KPG : 507.4	9.2 CMG
466.4	10.0 LJO : 475.4	9.5 GEJ : 489.4	9.2 GEJ :	

060443 RR Aur	Type: Mira	Aantal waarnemingen 6		
439.4	11.6 FJH : 467.5	11.2 FJH : 488.3	11.2 KPG :	
466.4	11.1 KPG : 482.4	11.0 FJH : 513.3	12.2 FJH :	
060450 X Aur Type: Mira Aantal waarnemingen 5				
446.3	10.0 BFK : 466.3	11.1 MHN : 488.3	11.2 KPG :	
456.3	10.6 BFK : 466.4	10.7 KPG :		
060547 SS Aur Type: U Gem (SS Dvg) Aantal waarnemingen 13				
442.53	14.6 FJH : 466.42	14.2 FJH : 474.40	14.7 FJH : 519.36	14.9 FJH
446.45	14.9 FJH : 467.44	10.7 FJH : 488.28	14.9 FJH :	
466.3	14.1 MHN : 468.37	10.7 FJH : 489.32	14.9 FJH :	
466.4	14.1 KPG : 469.34	10.9 BFK : 518.33	15.0 FJH :	
060746A ST Aur Type: Mira Aantal waarnemingen 5				
442.5	13.1 FJH : 474.4	11.6 FJH : 513.3	12.3 FJH :	
466.4	11.8 FJH : 489.3	11.7 FJH :		
061647 V Aur Type: Mira Aantal waarnemingen 3				
466.4	11.4 KPG : 474.4	11.3 FJH : 488.3	11.2 KPG :	
0617-02 V Mon Type: Mira Aantal waarnemingen 1				
489.3	12.7 KPG :			
062564 RT Cam Type: Mira Aantal waarnemingen 2				
466.4	12.4 KPG : 492.4	12.8 KPG :		
062574 SU Cam Type: Mira Aantal waarnemingen 4				
446.5	13.4 FJH : 468.4	12.3 FJH : 489.3	11.7 FJH : 516.4	10.6 FJH
063159 U Lyn Type: Mira Aantal waarnemingen 7				
442.6	11.6 FJH : 467.5	12.6 FJH : 485.5	13.1 FJH : 518.3	13.7 FJH
466.4	12.3 KPG : 474.4	12.8 FJH : 492.4	13.4 KPG :	
063444A AA Aur Type: Mira Aantal waarnemingen 7				
434.4	13.0 FJH : 466.4	14.6 FJH : 488.3	14.7 KPG : 518.3	15.2 FJH
442.5	13.2 FJH : 466.4	14.6 KPG : 488.3	15.2 FJH :	
063558 S Lyn Type: Mira Aantal waarnemingen 7				
442.6	10.0 FJH : 466.4	10.0 KPG : 485.5	10.7 FJH : 516.3	12.5 FJH
466.3	10.1 MHN : 467.5	10.1 FJH : 492.4	11.0 KPG :	

072811 T CMI Type: Mira Aantal waarnemingen: 2n 7  
 439.4 11.6 FJH : 467.5 10.7 FJH : 489.3 11.0 KPG : 518.3 11.9 FJH  
 466.4 10.8 KPG : 485.3 11.1 FJH : 507.4 11.3 CMG :

073234 SI Gem Type: Mira Aantal waarnemingen 6  
 434.5 :14.6 FJH : 466.4 14.2 FJH : 488.3 13.7 FJH :  
 446.5 14.7 FJH : 474.4 14.1 FJH : 516.3 12.0 FJH :

073508 U CMI Type: Mira Aantal waarnemingen 9  
 434.6 9.6 FJH : 475.4 9.5 FJH : 497.3 9.1 LJO :  
 466.4 9.7 KPG : 488.3 9.3 MHN : 507.4 9.4 CMG :  
 467.5 9.5 FJH : 489.3 9.6 KPG : 513.3 9.4 FJH :

073723 S Gem Type: Mira Aantal waarnemingen 13  
 434.5 13.9 FJH : 468.3 11.8 MHN : 488.3 9.8 MHN : 513.3 9.7 FJH  
 466.4 11.8 KPG : 474.4 11.3 FJH : 489.4 9.6 GEJ :  
 466.4 11.9 FJH : 485.3 9.9 FJH : 497.3 9.7 LJO :  
 466.4 12.0 LJO : 488.3 9.7 KPG : 507.4 9.6 CMG :

074323 T Gem Type: Mira Aantal waarnemingen 10  
 439.4 8.9 FJH : 466.4 11.0 LJO : 487.3 12.7 FJH : 518.3 13.8 FJH  
 457.3 9.5 LJO : 467.5 11.1 FJH : 488.3 12.5 KPG :  
 466.4 10.7 KPG : 474.4 11.4 FJH : 507.4 13.4 CMG :

074922 U Gem Type: U Gem Aantal waarnemingen 14  
 434.5 11.2 FJH : 466.4 14.2 KPG : 474.40 13.9 FJH : 518.31 13.9 FJH  
 439.41 12.9 FJH : 466.43 14.1 FJH : 488.29 14.0 FJH : 519.39 13.6 FJH  
 442.55 14.0 FJH : 467.46 13.9 FJH : 489.32 13.7 FJH :  
 446.42 13.9 FJH : 468.37 14.0 FJH : 507.4 13.6 CMG :

080562 SU UMa Type: U Gem (SU UMa) Aantal waarnemingen 9  
 434.54 12.9 FJH : 446.42 14.2 FJH : 474.54 :14.8 FJH :  
 441.44 13.8 FJH : 466.45 :14.6 FJH : 489.32 14.2 FJH :  
 442.60 14.2 FJH : 468.37 14.5 FJH : 519.37 13.5 FJH :

080428 YZ Cnc Type: U Gem (SU UMa) Aantal waarnemingen 12  
 434.53 14.4 FJH : 446.46 14.7 FJH : 468.37 11.9 FJH : 489.32 11.4 FJH  
 439.44 11.9 FJH : 466.44 14.6 FJH : 474.42 14.7 FJH : 518.33 12.9 FJH  
 442.53 14.0 FJH : 467.46 12.4 FJH : 487.34 11.3 FJH : 519.36 12.4 FJH

080523 RR Cnc Type: Mira Aantal waarnemingen 6  
 439.5 11.0 FJH : 467.5 9.2 FJH : 489.4 9.2 KPG :  
 466.4 9.1 KPG : 475.4 9.2 FJH : 516.3 11.0 FJH :  
 080837 RT Lyn Type: Mira Aantal waarnemingen 4  
 442.6 9.7 FJH : 467.5 9.7 FJH : 475.4 10.3 FJH : 516.3 11.1 FJH

081040 W Lyn Type: Mira Aantal waarnemingen 5  
 442.6 9.6 FJH : 475.4 10.4 FJH : 518.3 12.3 FJH :  
 467.5 10.3 FJH : 485.5 11.1 FJH :

081112 R Cnc Type: Mira Aantal waarnemingen 8  
 441.4 7.7 LJO : 457.3 8.0 BFK : 467.5 8.5 LJO : 487.3 8.7 BFK  
 447.5 7.5 BFK : 457.4 8.1 LJO : 473.3 8.5 BFK : 499.3 9.0 LJO

081473 Z Cam Type: U Gem (Z Cam) Aantal waarnemingen 13  
 434.54 11.7 FJH : 459.27 :11.9 BFK : 475.27 11.4 BFK : 516.36 11.5 FJH  
 439.44 11.5 FJH : 467.49 11.5 FJH : 481.37 11.8 FJH :  
 441.44 11.6 FJH : 472.3 11.5 BFK : 485.45 11.7 FJH :  
 447.34 11.4 BFK : 474.54 11.4 FJH : 492.4 11.5 KPG :

081617 V Cnc Type: Mira Aantal waarnemingen 12  
 439.5 9.2 FJH : 466.4 8.8 KPG : 474.3 8.7 MHN : 489.4 8.8 KPG  
 447.5 8.9 BFK : 467.5 8.6 FJH : 475.4 8.9 FJH : 499.3 9.0 LJO  
 457.4 8.0 LJO : 473.3 8.5 BFK : 487.3 8.6 BFK : 516.3 9.2 FJH

081633 T Lyn Type: Mira Aantal waarnemingen 5  
 466.5 9.5 KPG : 475.4 9.5 FJH : 516.3 9.7 FJH :  
 467.5 9.6 FJH : 492.4 9.4 KPG :

081935 X Lyn Type: Mira Aantal waarnemingen 2  
 442.6 :14.5 FJH : 488.3 <14.5 FJH :  
 083013 UV Cnc Type: Mira Aantal waarnemingen 1  
 492.4 14.8 KPG :

083019 U Cnc Type: Mira Aantal waarnemingen 7  
 434.6 9.8 FJH : 467.5 9.4 FJH : 475.4 9.5 FJH : 516.3 11.7 FJH  
 466.5 9.3 KPG : 474.3 9.6 MHN : 489.4 10.0 KPG :

083350 X UMa Type: Mira Aantal waarnemingen 3  
 466.5 9.5 KPG : 492.4 10.3 KPG : 507.4 11.1 CMG :  
 084803 S Hya Type: Mira Aantal waarnemingen 1  
 507.4 12.9 CMG :

0850-08 T Hya Type: Mira Aantal waarnemingen 1  
 507.4 12.1 CMG :

095518 SY Cnc Type: U Gem (Z Cam) Aantal waarnemingen 13			
474.53	11.7 FJH	467.46	12.5 FJH : 489.34 12.8 FJH : 519.36 12.8 FJH
442.54	13.1 FJH	468.39	12.8 FJH : 489.36 12.8 KPG :
446.46	13.4 FJH	474.44	13.3 FJH : 492.4 12.9 KPG :
466.48	12.6 KPG	481.37	11.7 FJH : 518.33 12.8 FJH :
090425 W Cnc Type: Mira Aantal waarnemingen 6			
434.5	14.6 FJH	466.5	15.3 FJH : 492.4 : 15.0 KPG :
442.6	14.7 FJH	489.3	15.5 FJH : 518.3 14.6 FJH :
093178 Y Dra Type: Mira Aantal waarnemingen 3			
439.5	9.3 FJH	485.5	11.1 FJH : 516.4 : 11.7 FJH :
093720 RS Leo Type: Mira Aantal waarnemingen 5			
442.6	12.3 FJH	489.3	11.4 FJH : 519.4 12.9 FJH :
468.4	11.0 FJH	492.5	11.3 KPG :
093934 R Lmi Type: Mira Aantal waarnemingen 7			
474.5	13.4 FJH	466.5	13.3 KPG : 489.3 12.2 FJH : 516.3 11.8 FJH
442.4	12.8 LJO	468.4	13.0 FJH : 489.4 12.1 KPG :
094211 R Leo Type: Mira Aantal waarnemingen 19			
434.5	7.0 BFK	454.5	7.4 BVE : 474.3 8.4 BVE : 499.3 8.9 LJO
438.5	6.8 BVE	466.4	7.9 BVE : 481.4 8.7 BVE : 500.5 9.1 BVE
442.4	7.9 LJO	466.5	8.3 KPG : 482.3 8.5 BFK : 507.4 9.5 CMG
447.4	7.4 BFK	467.5	8.1 LJO : 489.4 8.6 KPG : 508.5 9.3 BVE
447.4	7.4 BVE	469.4	8.3 BFK : 492.3 8.9 BVE :
094512 X Leo Type: U Gem (SS Cyg) Aantal waarnemingen 7			
434.53	14.5 FJH	442.52	12.9 FJH : 482.40 12.2 FJH : 519.36 12.4 FJH
441.47	12.7 FJH	446.49	<15.3 FJH : 518.33 13.0 FJH :
094735 S Lmi Type: Mira Aantal waarnemingen 7			
434.4	8.6 BFK	466.5	8.8 KPG : 475.4 9.0 FJH : 516.3 10.9 FJH
439.5	8.9 FJH	474.3	8.7 BFK : 489.4 9.1 KPG :
095421 V Leo Type: Mira Aantal waarnemingen 10			
434.5	14.7 FJH	466.5	13.2 KPG : 489.4 12.3 KPG : 516.3 9.1 FJH
442.5	14.0 FJH	474.4	13.5 FJH : 499.3 10.8 LJO :
466.4	13.6 FJH	489.3	12.6 FJH : 507.4 9.7 CMG :
095968 CH Uma Type: U Gem (SS Cyg) Aantal waarnemingen 1			
489.35	14.9 FJH		

103769 R Uma Type: Mira Aantal waarnemingen 19			
446.5	10.9 FJH	466.4	8.3 BVE : 481.3 7.4 BVE : 500.5 7.6 BVE
447.4	10.7 BFK	466.5	8.0 KPG : 487.3 7.3 BFK : 507.4 7.8 CMG
447.4	10.8 BVE	473.3	7.5 BFK : 489.4 7.6 KPG : 508.4 : 7.4 SER
454.5	10.0 BVE	473.3	7.6 BVE : 492.3 7.4 BVE : 508.5 7.8 BVE
457.3	9.1 BFK	479.4	7.0 SER : 492.5 7.5 SER :
104814 W Leo Type: Mira Aantal waarnemingen 4			
442.6	11.9 FJH	466.5	12.1 KPG : 474.5 12.5 FJH : 492.5 13.1 KPG
110506 S Leo Type: Mira Aantal waarnemingen 3			
466.5	11.3 KPG	492.5	12.6 KPG : 507.4 13.6 CMG :
113639 RU Uma Type: Mira Aantal waarnemingen 2			
447.4	9.3 BFK	469.4	9.3 BFK :
115158 Z Uma Type: SRb Aantal waarnemingen 8			
434.5	6.9 BFK	474.4	7.4 SER : 479.4 7.5 SER : 507.4 8.7 CMG
457.4	7.4 SER	475.3	7.6 BFK : 499.4 8.1 SER : 508.4 8.6 SER
115919 R Com Type: Mira Aantal waarnemingen 2			
492.5	11.2 KPG	507.4	12.3 CMG :
120012 SU Vir Type: Mira Aantal waarnemingen 1			
492.5	14.6 KPG		
122332 T Cvn Type: Mira Aantal waarnemingen 2			
474.4	9.8 BFK	492.5	9.5 KPG :
1228-03 Y Vir Type: Mira Aantal waarnemingen 1			
492.5	10.1 KPG		
123160 T Uma Type: Mira Aantal waarnemingen 18			
434.4	8.6 BVE	454.4	9.5 BVE : 474.3 10.6 BVE : 492.4 11.6 BVE
434.4	8.6 SER	457.4	9.7 SER : 474.4 10.8 SER : 507.4 12.3 CMG
439.5	8.6 FJH	466.4	: 10.2 BVE : 481.4 10.9 BVE : 519.4 12.4 FJH
442.4	9.1 BVE	466.5	9.8 KPG : 485.5 11.3 FJH :
447.4	9.1 BFK	468.4	10.6 FJH : 489.4 10.9 KPG :
123307 R Vir Type: Mira Aantal waarnemingen 1			
492.5	8.0 KPG		

123366 RV Dra Type: Mira Aantal waarnemingen 6  
 457.4 :11.0 SER : 479.5 11.2 SER : 492.4 11.4 SER :  
 468.4 11.2 FJH : 489.3 11.7 FJH : 519.4 12.6 FJH :

123459 RS Uma Type: Mira Aantal waarnemingen 21  
 442.6 14.0 FJH : 479.4 11.1 SER : 489.4 10.9 KPG : 508.5 10.0 EVE  
 446.5 13.9 SER : 481.4 11.2 BVE : 492.4 10.7 SER : 513.3 10.1 FJH  
 466.5 11.2 KPG : 485.5 10.8 FJH : 487.4 10.4 SER : 519.3 9.4 BFK  
 468.4 11.6 FJH : 486.4 10.9 SER : 496.4 10.5 BVE :  
 474.4 11.6 BVE : 487.4 10.7 BFK : 507.4 9.5 CMG :  
 474.4 11.6 SER : 489.3 10.7 BVE : 508.4 9.9 SER :

12361 S Uma Type: Mira Aantal waarnemingen 28  
 434.4 8.3 BVE : 457.4 : 8.0 SER : 483.4 8.6 SER : 496.4 9.1 SER  
 434.4 8.1 SER : 456.4 8.3 BVE : 485.5 9.0 FJH : 500.5 9.4 EVE  
 439.5 8.4 FJH : 466.5 8.1 KPG : 487.4 8.8 BFK : 507.4 9.1 CMG  
 442.5 8.4 BVE : 473.3 8.1 BFK : 488.4 8.7 SER : 508.4 9.6 SER  
 447.4 8.0 BFK : 473.3 8.4 BVE : 489.4 9.1 KPG : 508.5 10.0 EVE  
 454.4 8.2 BVE : 474.4 : 8.1 SER : 492.3 9.0 BVE : 513.3 9.6 FJH  
 457.3 8.1 BFK : 481.3 8.7 BVE : 492.4 9.0 SER : 519.3 9.9 BFK

12404 RU Vir Type: Mira Aantal waarnemingen 2  
 442.6 9.5 FJH : 492.5 9.7 KPG :

12438 U Cvn Type: Mira Aantal waarnemingen 1  
 492.5 14.4 KPG :

12406 U Vir Type: Mira Aantal waarnemingen 1  
 492.5 12.8 KPG :

13262 RR Uma Type: Mira Aantal waarnemingen 2  
 468.4 12.2 FJH : 519.4 14.1 FJH :

13373 T Umi Type: Mira Aantal waarnemingen 2  
 446.5 13.1 FJH : 466.3 14.0 CMG :

13434 RT Cvn Type: Mira Aantal waarnemingen 1  
 492.5 :14.4 KPG :

13440 R Cvn Type: Mira Aantal waarnemingen 10  
 459.7 9.4 BVE : 474.4 9.0 BVE : 492.4 8.6 BVE : 508.5 8.2 BVE  
 466.7 9.0 BVE : 481.4 8.8 BVE : 492.5 8.3 KPG :  
 474.4 8.8 BFK : 489.5 8.6 BFK : 500.5 8.2 BVE :

1353-04 SV Vir Type: Mira Aantal waarnemingen 1  
 492.5 9.4 KPG :

14013 I Boo Type: Mira Aantal waarnemingen 4  
 442.6 9.3 FJH : 474.5 10.9 FJH : 492.5 12.0 KPG : 519.4 13.5 FJH

14157 U Umi Type: Mira Aantal waarnemingen 5  
 434.4 8.8 BFK : 466.3 10.6 CMG : 513.3 11.7 FJH :  
 447.4 9.3 BFK : 474.3 10.7 BFK :

14194 S Boo Type: Mira Aantal waarnemingen 5  
 442.6 13.2 FJH : 492.5 11.5 BVE : 508.5 10.4 BVE :  
 474.5 12.3 FJH : 492.5 11.7 KPG :

14239 V Boo Type: Sra Aantal waarnemingen 10  
 459.7 8.9 BVE : 474.4 9.1 BFK : 489.5 9.1 BFK : 508.5 8.9 BVE  
 446.8 8.7 BVE : 481.4 9.1 BVE : 496.4 8.9 BVE :  
 466.7 8.9 BVE : 488.5 8.8 BVE : 496.4 9.4 SER :

14284 R Cam Type: Mira Aantal waarnemingen 7  
 434.4 9.3 BFK : 447.4 9.8 BFK : 466.3 10.4 CMG : 519.4 13.1 FJH  
 439.5 9.4 FJH : 459.3 10.8 BFK : 489.3 12.9 FJH :

14327 R Boo Type: Mira Aantal waarnemingen 9  
 442.6 12.5 FJH : 481.4 9.6 BVE : 492.5 8.7 KPG :  
 466.7 11.0 BVE : 488.5 9.0 BVE : 496.4 8.2 BVE :  
 474.5 10.4 FJH : 489.5 8.9 BFK : 508.5 7.3 BVE :

14339 RR Boo Type: Mira Aantal waarnemingen 4  
 442.6 13.3 FJH : 474.5 14.0 FJH : 492.5 13.2 KPG : 519.4 11.1 FJH

151731 S C-B Type: Mira Aantal waarnemingen 10  
 459.7 7.9 BVE : 481.4 8.2 BVE : 489.5 8.4 BFK : 519.5 9.8 FJH  
 466.7 8.1 BVE : 488.5 8.2 BVE : 497.5 8.8 BVE :  
 475.5 8.1 BFK : 488.5 8.3 FJH : 508.5 9.2 BVE :

153378A S Umi Type: Mira Aantal waarnemingen 8  
 439.5 12.7 FJH : 446.5 12.6 FJH : 474.4 :11.9 SER : 496.4 10.9 SER  
 442.5 :13.0 SER : 466.3 12.3 CMG : 483.4 :11.5 SER : 513.3 10.5 FJH

154428A R C-B Type: RCB Aantal waarnemingen 18  
 459.7 6.6 BVE : 487.65 7.4 BVE : 492.46 7.6 BVE : 506.6 7.4 CMG  
 446.8 6.2 BVE : 488.46 7.5 BVE : 492.5 6.6 KPG : 508.5 7.0 BVE  
 466.7 6.6 BVE : 488.5 7.3 FJH : 497.54 7.4 BVE : 513.6 7.1 CMG  
 482.68 6.9 BVE : 489.47 7.0 BFK : 499.51 7.4 BVE :  
 483.6 7.1 BVE : 489.67 7.6 BVE : 500.5 7.3 BVE :

154536 X C-B Type: Mira Aantal waarnemingen 3  
 442.6 13.2 FJH : 474.5 13.2 FJH : 519.5 11.6 FJH :



154615 R Ser Type: Mira Aantal waarnemingen 1  
 519.5 11.0 FJH ;  
 154639 V CrB Type: Mira Aantal waarnemingen 2  
 442.6 11.2 FJH ; 519.5 11.8 FJH ;  
 155229 Z CrB Type: Mira Aantal waarnemingen 3  
 442.6 13.9 FJH ; 474.5 12.1 FJH ; 519.5 9.9 FJH ;  
 160625 RU Her Type: Mira Aantal waarnemingen 1  
 519.5 13.1 FJH ;  
 161138 W CrB Type: Mira Aantal waarnemingen 3  
 442.6 14.0 FJH ; 474.5 13.5 FJH ; 519.5 11.4 FJH ;  
 162119 U Her Type: Mira Aantal waarnemingen 1  
 519.5 11.7 FJH ;  
 163137 W Her Type: Mira Aantal waarnemingen 6  
 459.7 8.8 BVE ; 482.7 9.6 BVE ; 497.5 10.5 BVE ;  
 466.7 9.1 BVE ; 489.7 9.9 BVE ; 519.5 11.7 FJH ;  
 163266 R Dra Type: Mira Aantal waarnemingen 12  
 447.3 10.9 BVE ; 474.4 8.6 BVE ; 488.5 7.6 SER ; 499.5 7.0 BVE  
 457.4 9.9 BVE ; 474.4 8.8 BFK ; 492.3 6.9 BVE ; 508.4 7.5 SER  
 466.7 9.2 BVE ; 481.4 8.1 BVE ; 496.4 7.3 SER ; 508.5 7.0 BVE  
 164715 S Her Type: Mira Aantal waarnemingen 1  
 519.5 10.1 FJH ;  
 165722 SY Her Type: Mira Aantal waarnemingen 1  
 519.5 8.4 FJH ;  
 171723 RS Her Type: Mira Aantal waarnemingen 5  
 466.7 9.0 BVE ; 489.7 7.9 BVE ; 519.5 7.8 FJH ;  
 482.7 8.2 BVE ; 497.6 7.4 BVE ;  
 175654 V Dra Type: Mira Aantal waarnemingen 2  
 442.6 11.0 FJH ; 474.5 12.2 FJH ;

180531 T Her Type: Mira Aantal waarnemingen 5  
 459.7 7.7 BVE ; 482.7 8.8 BVE ; 519.5 12.0 FJH ;  
 466.7 8.2 BVE ; 489.7 9.2 BVE ;  
 180565 W Dra Type: Mira Aantal waarnemingen 1  
 474.5 13.3 FJH ;  
 180666 X Dra Type: Mira Aantal waarnemingen 2  
 474.5 11.7 FJH ; 519.5 12.2 FJH ;  
 181031 TV Her Type: Mira Aantal waarnemingen 5  
 459.7 10.4 BVE ; 482.7 9.6 BVE ; 519.5 10.7 FJH ;  
 466.7 10.1 BVE ; 489.7 9.6 BVE ;  
 181136 W Lyr Type: Mira Aantal waarnemingen 5  
 459.7 9.0 BVE ; 466.7 9.0 BVE ; 489.7 7.9 BVE ;  
 446.2 9.0 BVE ; 482.7 8.3 BVE ;  
 192150 CH Cyg Type: Z And Aantal waarnemingen 4  
 446.2 7.6 BVE ; 457.3 7.6 BVE ; 466.7 7.8 BVE ; 482.7 7.5 BVE  
 193449 R Cyg Type: Mira Aantal waarnemingen 3  
 446.2 11.2 BVE ; 466.7 11.7 BVE ; 519.5 12.9 FJH ;  
 194048 RT Cyg Type: Mira Aantal waarnemingen 5  
 446.2 9.9 BVE ; 466.7 7.6 BVE ; 489.7 7.2 BVE ;  
 457.3 8.5 BVE ; 482.7 7.3 BVE ;  
 202962 BF Cep Type: Mira Aantal waarnemingen 1  
 459.3 13.8 FJH ;  
 210382 X Cep Type: Mira Aantal waarnemingen 4  
 446.5 14.9 FJH ; 466.4 15.0 FJH ; 488.3 14.2 FJH ; 516.4 11.2 FJH  
 210869 T Cep Type: Mira Aantal waarnemingen 11  
 434.4 8.2 BVE ; 456.3 7.9 BFK ; 474.3 8.0 BFK ; 497.6 7.4 BVE  
 442.4 8.0 BVE ; 466.3 8.0 CMG ; 479.3 8.0 BVE ; 508.5 6.8 BVE  
 454.4 8.0 BVE ; 469.3 7.8 BVE ; 486.3 7.9 BVE ;  
 213678 S Cep Type: Mira Aantal waarnemingen 1  
 466.3 12.1 CMG ;

213753 RU Cyg Type: SR Aantal waarnemingen 4  
 457.4 8.9 SER : 474.4 : 9.2 SER : 488.4 8.9 SER : 496.3 8.7 SER

213843 SS Cyg Type: U Gem (SS Cyg) Aantal waarnemingen 14  
 459.4 11.9 BVE : 459.24 12.2 FJH : 474.26 8.2 FJH : 481.26 9.8 BVE  
 434.30 11.1 BVE : 466.25 12.0 FJH : 475.25 8.6 BVE : 482.26 10.3 BVE  
 446.2 11.9 BVE : 469.27 8.4 BVE : 475.25 8.3 BFK :  
 447.32 12.2 FJH : 474.25 8.6 BVE : 479.27 9.1 BVE :

215934 RT Peg Type: Mira Aantal waarnemingen 1  
 459.2 11.5 FJH : : : :

220133B RZ Peg Type: Mira Aantal waarnemingen 2  
 447.3 11.7 FJH : 459.2 11.5 FJH : : :

222439 S Lac Type: Mira Aantal waarnemingen 1  
 475.3 8.8 FJH : : : :

222924 SS Peg Type: Mira Aantal waarnemingen 1  
 459.2 9.0 FJH : : : :

223841 R Lac Type: Mira Aantal waarnemingen 1  
 475.3 13.0 FJH : : : :

225914 RW Peg Type: Mira Aantal waarnemingen 1  
 459.2 13.3 FJH : : : :

230110 R Peg Type: Mira Aantal waarnemingen 1  
 459.2 11.4 FJH : : : :

230759 V Cas Type: Mira Aantal waarnemingen 17  
 434.4 8.0 BVE : 457.4 8.3 SER : 479.3 9.6 BVE : 496.4 10.6 SER  
 439.4 8.2 FJH : 468.4 8.8 FJH : 479.4 9.6 SER : 519.4 11.7 SER  
 442.4 7.7 BVE : 469.3 9.2 BVE : 486.3 9.9 BVE :  
 447.3 8.3 BFK : 474.3 9.3 BFK : 487.3 10.1 BFK :  
 454.2 8.2 BVE : 475.3 9.6 FJH : 488.4 10.2 SER :

231425 W Peg Type: Mira Aantal waarnemingen 2  
 459.2 12.1 FJH : 466.3 12.1 FJH : : :

231508 S Peg Type: Mira Aantal waarnemingen 1  
 459.2 13.3 FJH : : : :

231839 BU And Type: Mira Aantal waarnemingen 3  
 457.3 11.3 FJH : 466.3 11.0 FJH : 475.3 11.3 FJH :

232442 BG And Type: SRA Aantal waarnemingen 2  
 466.3 10.5 FJH : 475.3 10.3 FJH : : :

232848 Z And Type: Z And Aantal waarnemingen 12  
 434.3 9.3 BVE : 457.3 9.2 BVE : 473.26 9.4 BFK : 479.3 9.4 BVE  
 446.3 : 8.7 BVE : 459.25 9.2 BFK : 475.26 9.4 BFK : 485.28 9.5 BFK  
 457.3 9.2 BFK : 469.3 9.5 BVE : 475.3 9.5 FJH : 486.3 9.4 BVE

2338-15 R Agr Type: Mira Aantal waarnemingen 1  
 440.3 10.6 CMG : : : :

233956 Z Cas Type: Mira Aantal waarnemingen 6  
 446.4 13.2 FJH : 466.3 13.5 KPG : 474.3 13.8 FJH :  
 459.3 13.4 FJH : 466.3 13.7 FJH : 488.3 13.9 FJH :

235053 RR Cas Type: Mira Aantal waarnemingen 4  
 441.5 12.4 FJH : 457.3 12.1 FJH : 466.3 11.8 FJH : 475.3 11.8 FJH

235255 WY Cas Type: Mira Aantal waarnemingen 5  
 446.4 13.8 FJH : 466.3 14.5 FJH : 488.3 14.6 FJH :  
 459.3 14.3 FJH : 474.3 14.5 FJH : : :

235350 R Cas Type: Mira Aantal waarnemingen 5  
 439.4 12.7 FJH : 466.3 13.2 FJH : 487.3 13.0 FJH :  
 466.3 13.0 CMG : 474.3 13.1 FJH : : :

235525 Z Peg Type: Mira Aantal waarnemingen 8  
 434.3 8.9 BVE : 446.3 9.4 BFK : 456.3 9.8 BFK : 469.3 10.3 BVE  
 435.3 9.1 BFK : 446.3 9.4 BVE : 457.3 10.2 BVE : 474.3 10.4 FJH

235855A V Cas Type: Mira Aantal waarnemingen 5  
 446.4 14.7 FJH : 466.3 13.8 FJH : 488.3 13.8 FJH :  
 459.3 14.2 FJH : 474.3 13.8 FJH : : :

235939 SV And Type: Mira Aantal waarnemingen 3  
 434.4 14.0 FJH : 466.3 14.2 FJH : 474.3 14.4 FJH :

## THE OBSERVATION OF RED VARIABLES

HENK FEIJTH  
Oer de Feart 7  
9084 BP Goutum  
Netherlands

Abstract

The accuracy of the estimates of the brightness of red variables may be improved by using observational techniques which are defined as accurately as possible and which are used by all observers. In this article an attempt to achieve this goal is made by reviewing the possible sources that enhance the spread.

\* \* \* \* \*

### 1. Introduction

When looking through the pages of AAVSO Report No. 28 one sees that in the case of well-observed variables the spread is one to two magnitudes. The spread seems to be maximal with C-type variables such as U Cyg, S Cep, R Lep, X Cas, etc. Yet my experience as recorder of the Werkgroep Veranderlijke Sterren (Variable Star Section) of the Nederlandse Vereniging voor Weer- en Sterrenkunde (Netherlands Association for Meteorology and Astronomy) is that the spread can be reduced by instructing the observers how to observe as accurately as possible. Before 1981 the Werkgroep published its observations in reports that were published by the Kapteyn Astronomical Laboratory of Groningen University. Now they are sent to AAVSO. It is striking that observers improve the quality of the observations when they know that their estimates are compared (with the possibility of rejection) before they are published.

There are several factors that influence the accuracy of the estimates. They concern both the eye and the telescope and charts used, and are dealt with in this article.

### 2. Averted Vision

As it is well-known (Landolt-Bornstein 1965; Sidgwick 1979) the retina is composed of cones that are sensitive to color and the rods that are sensitive to light only. The spectral sensitivity of the cones and the rods differ; the rods have maximal sensitivity at  $\lambda = 515\text{nm}$  and the cones at  $\lambda = 555\text{nm}$ . That is the reason that an observer always has to use the same part of the retina when making the estimates. Since the macula lutea only contains cones (these are less sensitive to light than the rods) we must use a part of the retina either left or right of it, otherwise it is not possible to make faint estimates. In practice this condition can be met in the following way. Bring the brighter comparison star into the center of the field, then look about 1/5 field diameter left or right of it. Do the same thing successively with the variable and the fainter comparison star. Repeat this procedure until a reliable estimate is obtained. It is important to move the telescope quickly. In other words, avoid staring. Don't glance longer than a second at a star. When the variable is faint one can leave the telescope at rest and successively glance at the brighter comparison star, the variable, and the fainter comparison star in the same way as in the case of a brighter variable. This procedure is allowed whenever the stars are not too far from the center of the field (in other words: when the stars are not subject to differential extinction because of vignetting). It is not allowed to look at the variable and the comparison stars simultaneously since in that case the

condition that the same part of the retina is used is not met. It is not advisable to use a part of the retina under or above the macula lutea since the density of the rods and the sensitivity to light is less there.

### 3. Purkinje Effect

A blue and a red star that have the same brightness are not estimated as equal in small and large telescopes. In small telescopes the blue star seems brighter whereas the reverse is true in large telescopes. The reason is that the cones are more sensitive to red light than to blue light than are the rods. In small telescopes only the rods are excited. Hence the greater apparent brightness of the blue star. In the larger telescope, however, the cones that are present in the part of the retina that one uses are also excited when observing the red star. As a result, the color of a red variable is visible even when using averted vision if the star is sufficiently bright. Because the cones are more sensitive to red light than to blue light the red star seems the brighter one.

As a result of this Purkinje effect a systematic error can be introduced when a red variable is bright. To avoid this systematic error it is in my opinion important to prevent the cones from being excited. This can be achieved in two ways. Either de-focus the stars until no color is visible before making the estimate; or when a variable shows its color even when de-focused (as is the case with variables such as V CrB and U Cyg at maximum when using a 150 mm telescope) use a smaller telescope or the finder.

### 4. Sky Background and Magnification

Another factor that influences the estimate is the sky background. Our experience is that in the case of twilight or moonlight a more reliable estimate is obtained when a higher power is used than when the sky is dark. The reason is that as a result of the higher magnification the contrast between the stars and the sky background is increased.

When a variable is faint a magnification of at least 1 D (aperture in mm) (exit pupil 51 mm) is necessary to obtain a good estimate. One should bear in mind that at a power of 1.5 D one gains no less than 2.5 magnitudes than when using a power of 0.17 D (exit pupil 6 mm) (Bowen 1947; Feijth 1983). This greater gain, however, is achievable only when the stars may be regarded as point sources, i.e. when the seeing is such that diffraction disks are visible. When the seeing is poor the gain at higher magnification is less.

### 5. Position Angle Error

Position angle error is an effect that may increase the spread considerably. The rule is that during the estimate the head is held such that the line connecting the comparison star(s) and the variable is parallel to that connecting the eyes (Mayall 1967; Mattei et al. 1980). If possible use those comparison stars that are approximately in line with the variable. An error of no less than  $0.5^{\circ}$  may result when the head is not turned such as described above, even when using the same telescope.

Problems may arise even taking the position angle error into account when the variable passes the meridian when the comparison stars are north or south of the variable. Namely, one encounters a reversal of the image after passage of the meridian. My experience is that in such a case differences up to  $0.5^{\circ}$  may result. And one cannot tell which estimate is best! In such a case I take the average. This problem does not exist when the variable and the comparison stars

approximately have the same declination. In such a case the stars can be observed with the same field orientation without the head twisting excessively provided that in the case of a Newtonian the tube is rotatable (in my opinion a Newtonian that cannot be rotated is unusable for variable star observations when mounted equatorially). Sometimes comparison star magnitudes seem erroneous when seen in a certain field orientation whereas the same magnitudes seem correct when the field orientation is different. This is also a consequence of position angle error. Therefore comparison stars are preferred that approximately have the same declination as the variable.

#### 6. Misidentification

It may happen that an observer estimates the wrong star (Mayall 1967; Mattei et al. 1980). There are several cases that can be discerned.

##### a) Misreading the chart

This can be overcome by carefully comparing the field of the telescope and the chart. It is essential to use charts that show all stars above a visual threshold value. Only the (a) and (b) charts meet this condition. This is not the case with charts made after photographic sources. It may happen that stars are omitted when drawing the charts.

Inexperienced observers are advised to add a new variable to their program when the variable is at maximum. As the star grows fainter one becomes more accustomed to the field, therefore decreasing the chance of misidentification.

##### b) Suggestion

When a variable is faint it sometimes happens that an observer "sees" the variable while it is well below his threshold value. Therefore I'd like to advise estimating a star only when it is easily visible (about half a magnitude above the limiting magnitude).

##### c) Close companions

When a variable has a close companion (e.g. R Cas, SV Dra, S Lyn, RU Peg) it can be easily mistaken for the variable when the brightnesses are about the same. Checking the chart immediately after having made the estimate is essential. Never trust to memory!

##### d) Errors in the chart

It may happen (especially with "preliminary charts") that a close field star is mistaken for the variable and that the nearby faint field stars are plotted only approximately. Regular observation is necessary to reveal such errors. It is also necessary to have access to a photographic star atlas (preferably the Palomar Sky Survey or Venhemborg's Atlas Stellarium) that can be consulted in case of doubt.

This problem, however, holds only for those observers who can see stars fainter than thirteenth magnitude.

#### REFERENCES

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Landolt-Bornstein. 1965, Astron. Astrophys., Band 1.

Mattei, J. A., Mayer, E. H., and Baldwin, M. E. 1980, Sky and Telescope 60, 285.

Mayall, M. W. 1967, Manual for Observing Variable Stars, Cambridge, MA, AAVSO.

Sidgwick, J. B. 1979, Amateur Astronomer's Handbook, 4th Edition, London, Pelham Books, Ltd., 420.

#### AGENDA JAARVERGADERING WERKGROEP VERANDERLIJKE STERREN

*Wednesday 26 April, 11.00 h, in de Kapteynsterrenwacht  
Roden.*

1. Opening
2. Vaststelling Agenda
3. Mededelingen
4. Verslag vorige vergadering
5. Jaarverslag secretaris
6. Jaarverslag penningmeester
7. Begroting 1986
- 8.
9. Verslag kascommissie
10. Verkiezing kascommissie
11. Verkiezing afgevaardigde Verenigingsraad
12. W.v.t.t.k
13. Rondvraag
14. Sluiting