U MONOCEROTIS FROM 1982 TO 1992

abstract : visual photometry of U Mon for a period of ten years are presented.The study is based on visual observations obtained by GEOS and AFOEV observers,these last downloaded via anonymous-ftp from the related database.

Introduction : the class of RV Tauri stars comprises little more than hundreds of pulsating semiregular variable stars with unique characteristics of variability.Their light curve display two unequal minima (deep and shallow),with a fundamental period inclusive between 30 and 150 days,and,superposed,for the RVb (as U Mon),long-term periodicities of the order of 1000 days.Spectral types range from F5 to late K with peculiarities (TiO band and Ca II versus hydrogen lines).

The star : U Monocerotis is a RV Tauri (*subclass b*) variable star located at (2000):

$\alpha = 07^h\ 30^m\ 47^s$ $\delta = -09°\ 46'\ 30''$

Observable simply with a binoculars,the star show a light curve that rangesbetween magn. +6.1 and magn. +8.8,with a period around 92 days .GCVS 85 givesthe following ephemeris 2438496+91.32E.

The spectrum ranges from F8EVIB at the maximum of light curve and K0PIB at the minimum.

The theoretical Visual Absolute Magnitude M_V for a RV Tauri is given by the formula:

(1) $\langle M_V \rangle = -5.3 + 0.021P^d$

the period P is expressed in days.

The behaviour of the star is well know;purpose in fact of this study is to monitor the fundamental and the long-term periodes.

So I've collected visual observations obtained by GEOS members;members that has sent me your data after the "Appel de Mesures" appeared in NC 632 and 645.

To cover any gaps (small number of observations),I've downloaded via anonymous-ftp from the AFOEV Database at CDS the complete file regarding U Monocerotis[1] .

For details see tables 1 (observations per year) and 2 (number of observations per observer).

Fig. 1 shows a complete light curve of U Mon from 1982 to 1992;look at the two fundamental variations:the first seasonal with a period around 90 days,and the second with a period around 2500 days (the graph show two minima);the amplitude of range is decreasing versus the minimum and increasing after,a RV Tauri subclass b peculiarity well observable in the light curve of U Mon.

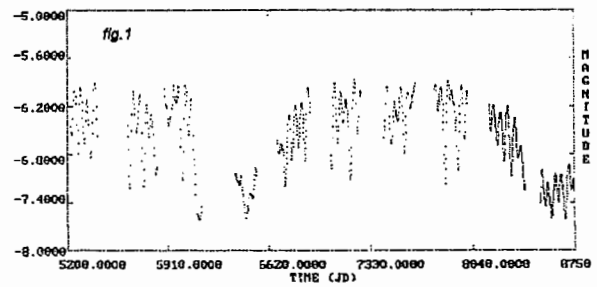
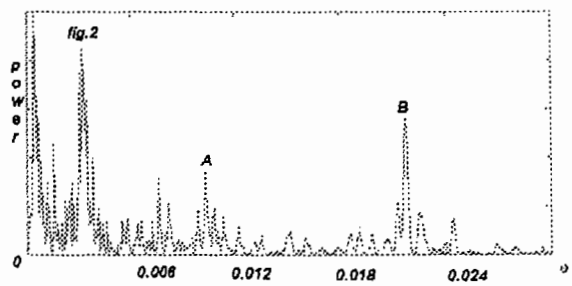


Fig. 2 show the result of a Time Serie Analysis,operated with the program HSH developed by Gaspani.



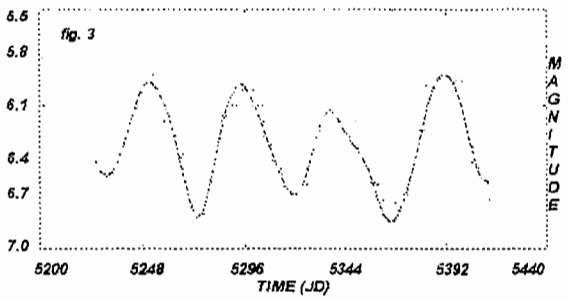
The two peaks signed with A and B at (respectly) ν=0.0103 and ν=0.0217 give the values for the period (ν_A) and the semi-period (ν_B);the first great peak at ν=0.0004 gives a value $\cong$ 2.500 days,corresponding to the long-term variation;others are assumed as noise.

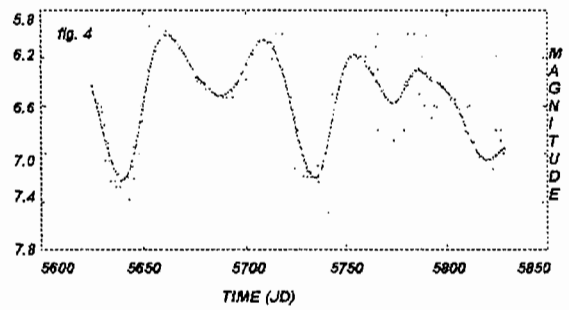
For ν_A the resulting period is 97.08 days;for ν_B 46.08 days.

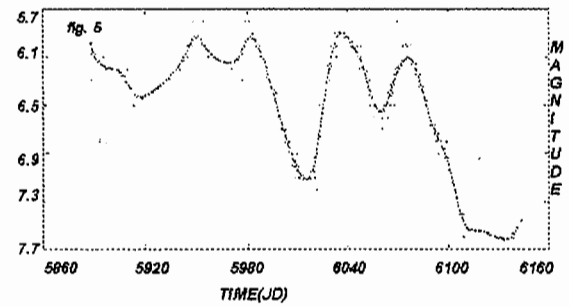
Figures 3,4,5,6,7,8,9,10,11,12 show the light curve of U Mon at every season,respectly

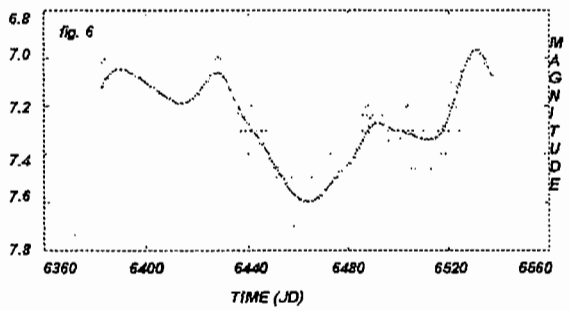
[1] Ftp.cdsarc.u-strasbg.fr/pub/afoev/u

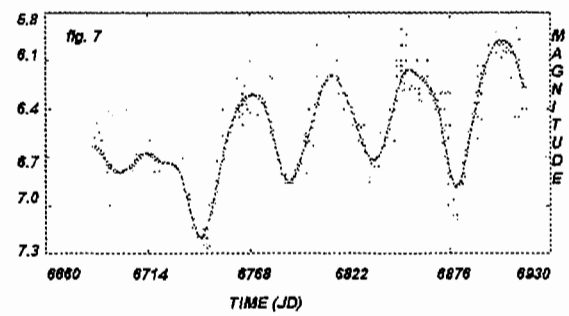
from 1982/83 to 1991/92;the points are the single observations,the line represents the best fit.

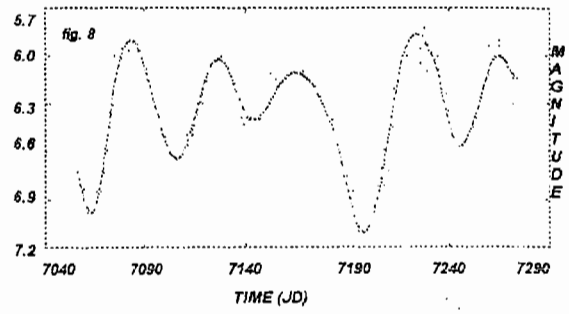


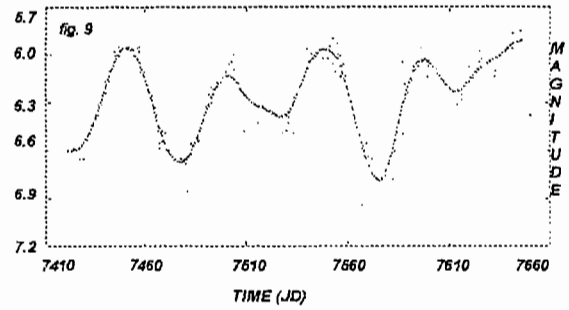


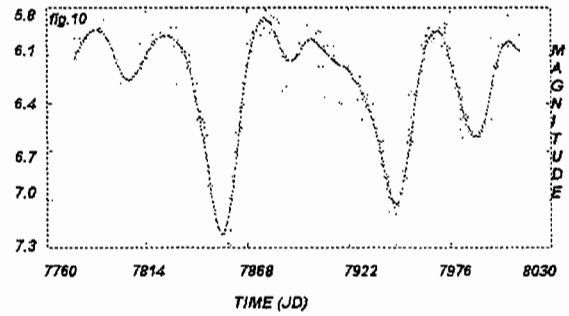


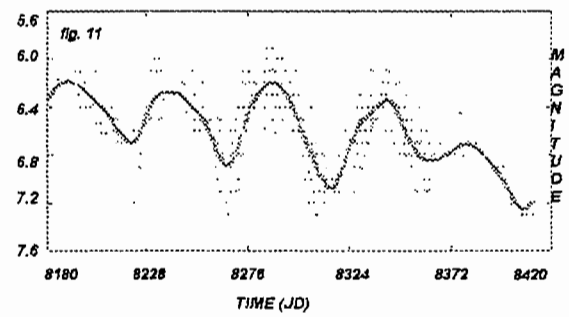


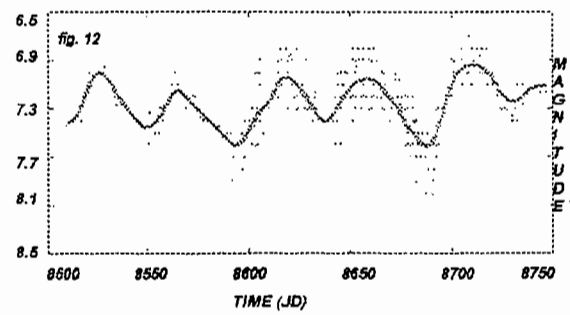












Conclusion : observing figure 2, we can infer that the period of U Mon is increasing.
More observations are necessary to monitor and to determine the period,above all for the long-term variation.

Using formula (1),we can obtain the Visual Absolute Magnitude too : $\langle M_V \rangle \sim -3.30$,a considerable value!!

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Table 1

season	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	90/91	91
n. obs	72	88	121	85	190	140	126	169	518	3

Table 2

AFOEV	PVH	CHC	DMT	BGN	FRL	BAR	IELO	FDD
1020	105	335	138	137	68	30	23	9

Bibliography

1. M. Bignotti-GEOS NC 788
2. DuPUY-Astroph. J. 185
3. Gehrz-Astroph. J. 178