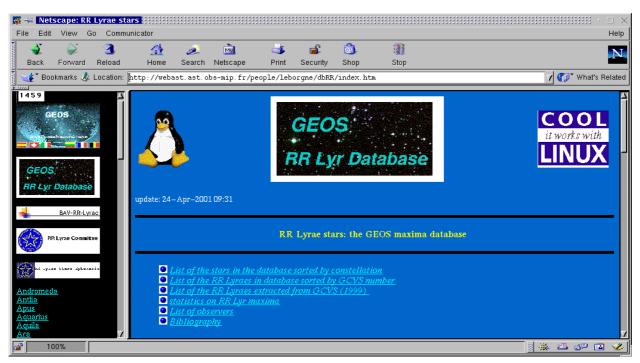
# The GEOS RR Lyr Database

### Massimiliano Martignoni, Francesco Acerbi (on behalf on GEOS)

maxmartignoni@inwind.it, acerbifr@tin.it

The GEOS RR Lyr database is a free access web database whose aim is to collect and make available data on RR Lyr stars. It presently contains close to 30000 times of maximum on 1700 different stars.



#### http://webast.ast.obs-mip.fr/people/leborgne/dbRR

Figure 1. Title screen of the webpage of RR Lyrae stars database.

The GEOS RR Lyr database is intended to help observations and studies on RR Lyr stars. The stars concerned are field RRab and RRc. The web site of the GEOS RR Lyrae stars database is maintained by Jean-Francois Le Borgne (leborgne@obs-mip.fr). The database is hosted by the web site of the Laboratoire d'Astrophysique de l'Observatoire Midi-Pyrenees (Toulouse, France). The work of collecting data and sorting them is mainly done by Anton Paschke (Anton@Paschke.com) and Massimiliano Martignoni (maxmartignoni@inwind.it). Scanning and digitalizing old publications to recover precious data is done by Francesco Acerbi (acerbifr@tin.it). Recent data from GEOS observers are collected by Jacqueline Vanderbroere (j.vandenbroere@skynet.be) (GEOS RR Lyrae stars coordinator).

The data, dating back to the end of century XIX when the first RR Lyraes were discovered, can display the period changes. The reason of these period changes of RR Lyr pulsators is still unknown. It is then important to monitor the period variations of RR Lyraes and to make a catalogue of their behaviour to help understanding the phenomenon as V.P. Tsesevich ("RR Lyrae stars", 1969) made in a first attempt some thirty years ago. Apart from the secular period variations, RR Lyraes exhibit another not fully explained phenomenon: the so-called Blazkho effect, named after the russian astronomer who discovered it in his observations of RW Dra in 1907. This periodic modulation of the RR Lyr pulsations (periods from 20 to 200 days) may be also study with the aid of the database.

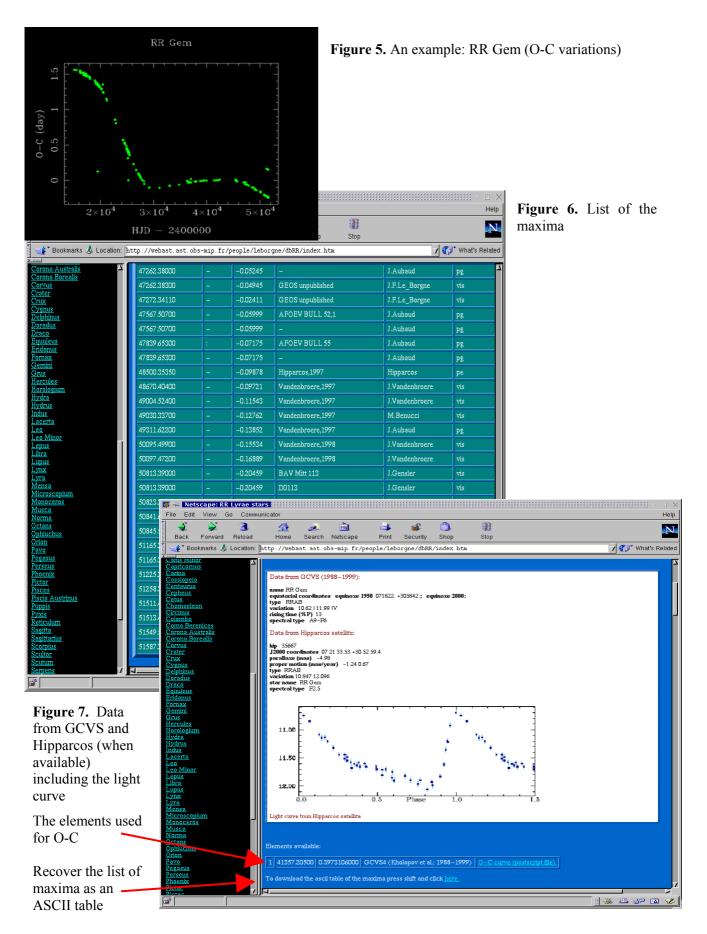
The data are collected in the literature or are submitted by the observers themselves.

3	1 2	100 TV31	i)	<b>S</b>	📽 🔕	1		
rd Reload	Home Sean		tscape		ecurity Shop	Stop		
					ne/db&R/index.htm		X	CF Wha
i i	To download the a	scii tablı	e of the max	ima press si	hift and click <u>here.</u>			
		14	e Ce i			Actor (		
						A		
	<u> </u>		20		_ ±1	12 14		
					12.00			
ese	S - 1/2		2		2	1		
		11						
t-Lyrac.		1				and the second s		
	Mr-(112	2.10	-d= -41	in the second	M+ 112	2 10" 44 8 2 110"		
	92.00							
awter			S103000			H17 (\$105696		
nuitre Accecie								
A	Maxima in the	GEOS	::1000g					
A	Maxima in the	GEOS	::1000g		Reference		Obs. method	
A	Maxima in the	GEOS ima	atc.095	į		Diserver	Obs. method P8	
A	Maxima in the RV GrB : 242 max HJD-2400000	GEOS ima	database	0-C2	Reference	D.: E15.000 Observer S.N.Bitschke		
	Maxima in the XV GrB : 242 mas HJJD=2400000 17823.33000	GEOS ima	database	0-0.2	Reference Tracevich, 1960, 1969	D. SIGAOS Observer S.N.Bishko S.N.Bishko	P8	
	Maxima in the V CrB : 242 mos HJD-2480000 17623:33000 18202:28000	GEOS ima	database	0-C2 0.57840 0.49611	Reference Tresevich, 1960, 1966 Tresevich, 1960, 1968	Dia 212-002 Observer S.M.Biotho S.N.Biotho S.N.Biotho	98 98	
	Maxima in the RV GrB : 242 mass HJD-2400000 17623:35000 18202:26000 1888:34000	GEOS ima	atabase 0.77684 0.41648 0.46850	0-0.2 0.57840 0.49611 0.45129	Raference Tresevich, 1960, 1966 Tresevich, 1960, 1966 Tresevich, 1960, 1966	Dia 212-002 Observer S.M.Biotho S.N.Biotho S.N.Biotho	P8 P8 P8 P8	
	Vaxima in the RV GrB : 242 max HJD - 2400000 17822 333000 18202 28000 18868 34000 19160 27000	GEOS ma Une: 1 1	atabase database 0.77684 0.41648 0.46950 0.18363	O-C 2 0.57840 0.49611 0.45129 0.45962	Reference Tesewich, 1960, 1960 Tesewich, 1960, 1960 Tesewich, 1960, 1960 Tesewich, 1960, 1960	III.3 21E-005 Observor S.M.Biozho 9 S.N.Biozho 9 S.N.Biozho 9 S.N.Biozho	P8 P8 P8 P8 P8	normai m
A	Viaxima in the EV GrB : 242 max HJD - 2400000 17 823 23000 18202 28000 18202 28000 19308 34000 19160 27000 19509 43100	GEOS Ima Une: 2 - 2	classe           database           dotabase           0.77684           0.41648           0.46850           0.18363           0.20669	0-C2 0.57840 0.49611 0.45129 0.45962 0.43339	Reference Tesewich, 1960, 1966 Tesewich, 1960, 1967 Tesewich, 1960, 1967 Tesewich, 1960, 1967 Tesewich, 1960	III.2 IE.cost Chicarver S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko	P8 P8 P8 P8 P8 Vik	normal m
A	Maxima in the AV CrB : 242 may H1D - 2400000 17823:33000 18808:24000 18968:24000 19140:27000 19309:43100 19661:23900	GEOS Ima Une: 2 - 2	Control         Control <t< td=""><td>O-C 2           0.57840           0.49611           0.45129           0.45129           0.45339           0.43339           0.40127</td><td>Reference           Tesewich, 1960, 1965           Tesewich, 1960, 1965           Tesewich, 1960, 1965           Tesewich, 1960, 1967           Tesewich, 1960, 1967           Tesewich, 1969</td><td>III.3 2E-095 Characteristics S.M.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko</td><td>PS PK PS PS Vic vis</td><td>normal m</td></t<>	O-C 2           0.57840           0.49611           0.45129           0.45129           0.45339           0.43339           0.40127	Reference           Tesewich, 1960, 1965           Tesewich, 1960, 1965           Tesewich, 1960, 1965           Tesewich, 1960, 1967           Tesewich, 1960, 1967           Tesewich, 1969	III.3 2E-095 Characteristics S.M.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko S.N.Biozhko	PS PK PS PS Vic vis	normal m
A	Maxima in the AV CrB : 242 max HJD - 2400900 17823:33000 18808:34000 19160:27000 19309:43100 19509:43100	GEOS Ima Une: 2 - 2	Council           database           0.77684           0.41648           0.46850           0.18333           0.20669           0.22422           0.43932	O-C 2 0.57840 0.49611 0.45129 0.45962 0.43339 0.40127 0.40127 0.49188	Reference           Tsesevich, 1950, 1963           Tsesevich, 1950, 1963           Tsesevich, 1960, 1963           Tsesevich, 1960, 1963           Tsesevich, 1969           Tsesevich, 1969           Tsesevich, 1969           Tsesevich, 1969	III. ICCON Observer S.M.Biazho S.M.Biazho S.M.Biazho S.M.Biazho S.M.Biazho S.M.Biazho S.M.Biazho S.M.Biazho S.M.Biazho	P8           P8           P8           P8           VIS           VIS           VIS	normal m
A	Maxima in the VV GrB : 242 max HJD - 2400000 17822 28000 18202 28000 19140 27000 19140 27000 19461 23900 20743 4700 20743 43400	GEOS Ima Une: 2 - 2	Correction       C	0.57%40 0.57%40 0.4511 0.45129 0.4592 0.4592 0.43339 0.40127 0.40127 0.40188 0.40569	Ratisense           Tsesevich, 1960, 1960           Tsesevich, 1960, 1960	<ul> <li>ID. IECON</li> <li>ID. IECON</li> <li>S.N. Biazho</li> </ul>	P8           P8           P8           P8           vis           vis           vis	normal m

**Figure 2.** Example of a page of the GEOS database: the variations of the O-C of the maxima of RV CrB are displayed for 2 different elements. The oldest observations date back to December 1907.

🚽 🎽 🕄		۵ 🖻	3	s l	۵				N			
Forward Reload		earch Netscape		Security	Shop	Stop						
lookmarks 🔏 Locatio	n http://webast.	ast. obs-mip. fr/p	people/lebox	gne/dbRR	/index ht	h		🖌 🚺 * What's Rei	ated			
	A			_					-			
GEOS	star	mumber of m		scape: RR	Lvrae st	ars and the second					11010100000	
144	BX.Ed.	24	File Edit			unicator	*****			********		*******
	Star BX Eri BX Eri DN Eri	17	I 🗳	2	3	<u>a</u> .	ž 🖻	🏄 🛋 🔕				
	DN.Eri	11	Back	Forward	Reload		arch Netscape	Print Security Shop	Stop			
05	J.			kmarks 🉏	Location:	http://webast.a	st.obs-mip.fr/pe	ople/leborgne/dbRR/index.l	hta		7	What's
yr Database	ē		2			-						с.,
i Database	Construction of the	1	1459		Î.	update: 24-Apr	-2001 09:31					
BAY-RR-Lyrac	GRRdb	Fomax	CI.	05								
					-							
Ah Lyrse Committee						GEOS						
period locate and to be the						RR Lyr Da	105000		List of s	tars		
your times dylamouts	star	number of m	GEOS	The second		THE LY DA	labase					
	BX.For.	4	BBIW	Database								
eda	TU.Por.	14										
			and a set			the second states	which may be fo	und in the detension conted.	- In control parts and form	GCVS mah	edition 19	999.
				BAV-RR-Ly	rac	List of the sta	witten may be re	und in the database, sorted	as in GCVS. Data are from	. OC VD, Web		
£.				BAV-RR-Ly	rac							
£	CONDENS	1	RR	BAV-RR-Ly		number	name	RA/DEC (B1950)	RA/DEC (J2000)	type	max.	min.
<u>z</u> .	GRRdb	Gemini	RR			number 010023	name <u>SW And *</u>	RA/DEC (B1950) 002105.7+290727	RA/DEC (J2000) 002343.1+292404	type RRAB	max. 9.14	min. 10.09
<b>3</b> .	GRRdb	Gemini			Iee	number 010023 010049	name SW_And * XX_And *	RA/DEC (B1950) 002105.7+290727 011435.8+384117	RA/DEC (J2000) 002343.1+292404 011727.3+385703	type RRAB RRAB	max. 9.14 10.08	min. 10.09 11.13
s cordalis	GRRdb	Gemini		i Lyrae Commit	Iee	number 010023 010049 010050	name SW And * XX And * XY And *	RA/DEC (B1950) 002105.7+290727 011435.8+384117 012352.3+334834	RA/DEC (J2000) 002343.1+292404 011727.3+385703 012642.5+340408	type RRAB RRAB RRAB	max. 9.14 10.08 12.98	<b>min.</b> 10.09 11.13 14.65
pardalis.	GRRdb,	Gemini	Andromed:	Lyrae Commit • ttury sykes	Iee	number 010023 010049 010050 010054	name SW And * XX And * XY And * ZZ And	RA/DEC (B1950) 002105.7+290727 011435.8+384117 012352.3+334834 004654.0+264459	RA/DEC (J2000) 002343.1+292404 011727.3+385703 012642.5+340408 004934.9+270119	type RRAB RRAB RRAB RRAB RRAB	max. 9.14 10.08 12.98 12.7	<b>min.</b> 10.09 11.13 14.65 13.5
endalis Ienatici alio:	GRRdb,	Gemini number of a	er -yan	Lyrae Commit • ttury sykes	Iee	number 010023 010049 010050 010054 010073	name SW And * XX And * XY And * ZZ And AT And *	RA/DEC (B1950)           002105.7+290727           011435.8+384117           012352.3+334834           004654.0+264459           234002.2+424418	RA/DEC (J2000) 002343.1+292404 011727.3+385703 012642.5-340408 004934.9+270119 234230.9+430052	type RRAB RRAB RRAB RRAB RRAB RRAB	max.           9.14           10.08           12.98           12.7           10.42	min.           10.09           11.13           14.65           13.5           10.92
eordalis Ienotici Joior Inor	GRRdb stor 3R Gem		Andromeda Antlia Apus Aquarius	Lyrae Commit • ttury sykes	Iee	number 010023 010049 010050 010054 010073 010088	name           SW And *           XX And *           XY And *           ZZ And           AT And *           BK And	RA/DEC (B1950)           002105.7+290727           011435.8+384117           012352.3+334834           004654.0+264459           234002.2+424418           233227.8+404939	RA/DEC (J2000)           002343.1+292404           011727.3+385703           012642.5+340408           00934.9+270119           23432.0+430052           233506.0+410611	type RRAB RRAB RRAB RRAB RRAB RRAB RRAB RRA	max.           9.14           10.08           12.98           12.7           10.42           12.5	min.           10.09           11.13           14.65           13.5           10.92           13.7
endalis ienstici inor mus		number of n	Andromed: Antlia Apus Aquarius Aquala Ara	Lyrae Commit • ttury sykes	Iee	number 010023 010049 010050 010054 010073 010088 010110	name SW And * XX And * XY And * ZZ And AT And * BK And CL And	RA/DEC (B1950)           002105.7+290727           011435.8+384117           012352.3+334834           004654.0+264459           234002.2+424418           232375.8404939           015204.2+433115	RA/DEC (J2000)           002343.1+292404           011727.3+385703           012642.5+340408           00493.9+270119           234203.9+430052           233506.0+4106111           015508.3+434557	type RRAB RRAB RRAB RRAB RRAB RRAB RRAB	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.6	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5
eordalis Ienotici Joior Inor	RR.Gem.	number of n 201	Andromed: Antlia Apus Aquarius Aquarius Aquarius Aria Aria	Lyrae Commit • ttury sykes	Iee	number 010023 010049 010050 010054 010073 010073 010058 010110 010128	name SW And * XX And * XY And * ZZ And AT And * BK And CL And DE And	RA/DEC (B1950) 002105.7+290727 011435.8+384117 012352.2+324834 004654.0+264459 234002.2+424418 23327.8+404939 015202.4+42415 015202.4+43115 231506.7+481644	RA/DEC (J2000) 002343.1+292404 011727.3+385703 012642.5+340408 004923.9+270119 234230.9+430052 233506.0+410611 015508.5+443557 231726.2+4435308	type RRAB RRAB RRAB RRAB RRAB RRAB RRAB RRA	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.6           13.4	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           14.5
eardalis (enatici jajar iaor mus eia	RR Gem <u>ER Gem</u> GI Gem	number of n 201 10	Andromedi Antila Apus Aquarius Aquarius Ara Aria Aria Aria Auriga Bootes	Lyrae Commit • ttury sykes	Iee	number           010023           010042           010050           010054           010054           010058           010103           010128           010132	name           SW And *           SW And *           XX And *           ZZ And           AT And *           BK And           CL And           DE And           DK And *	RA/DEC (B1950)           002105.7+290727           011435.8+384117           012352.3+334834           004654.0+264459           234022.424418           233237.8+404939           015004.2+433115           231505.7+481644           232623.5+501757	RA/DEC (J2000) 002343.1+292404 011727.3+385703 012642.5+340408 004934.9+270119 234320.9+430052 233506.0+410611 01550.3+434557 231726.2483308 2322845.9+503429	type RRAB RAAB RAAB RAAB RAAB RAAB RAAB RAA	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.6           13.4           12.5	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           14.5           13.1
eardalis ienstici jag jag cia cia s s t ieon	RR Gem. ER.Gem. GI.Gem. HS.Gem.	number of n 201 10 47 1	Andromed: Antlia Apus Aquaria Aquaria	i Lyrae Commit 19 Mars dykada	Iee	number           010023           010049           010050           010051           010052           010053           010054           010023           010023           010128           010135	name SW And * XX And * XY And * ZZ And AT And * BK And CL And DE And	RA/DEC (B1950) 002105.7+290727 011435.8+384117 012352.2+324834 004654.0+264459 234002.2+424418 23327.8+404939 015202.4+42415 015202.4+43115 231506.7+481644	RA/DEC (J2000) 002343.1+292404 011727.3+385703 012642.5+340408 004923.9+270119 234230.9+430052 233506.0+410611 015508.5+443557 231726.2+4435308	type RRAB RRAB RRAB RRAB RRAB RRAB RRAB RRA	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.6           13.4	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           14.5
eardalis Ienatici Iolar Iiaor Imus ela Iss I	RR Gem. ER Gem. GI Gem. HS Gem. I <u>Y Gem.</u>	number of n 201 10 47 1 14	Andromedi Antila Apus Aquarius Aquarius Aquarius Aquarius Aras Aries Auriça Bootes Caelum Camelopar Camelopar Cancer	I Lyrae Commit I Lyrae Commit I Lyrae cykur I Lyrae Commit I Lyrae Commit	Iee	number           010023           010042           010050           010054           010054           010058           010103           010128           010132	Name           SW And *           XX And *           XX And *           ZZ And           AT And *           BK And           DE And           DK And *           DM And	RA/DEC (B1950) 002105.7+290727 011495.8+384117 012352.3+334834 004654.0+264459 236207.8+404939 015204.2+433115 231506.7+481644 232623.5+501757 232926.8+345514	RA/DEC (12000) 002343.1+292404 0112727.3+385703 012642.5+340408 004953.9+270119 234320.5+432052 233506.0+410611 015503.2+434557 231724.2+483308 2328457.9430429 2332007+351148	type       RRAB	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.6           13.4           12.5           12.4	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           14.5           13.7           12.5           13.1           13.2
eardalis lenstici laiot linot mus elo seco secon secon secon	RR Gem. ER.Gem. GI.Gem. HS.Gem.	number of n 201 10 47 1	Andromedi Antila Apus Aquarius	a Llara Commit a Llara delana 3 dallis atici 22	Iee	number           010023           010049           010050           010054           010073           010010           010128           010133           010135           010140	Name           SW And *           SXX And *           XX And *           ZZ And           AT And *           BK And           CLAnd           DE And           DK And *           DK And *           DK And *           DM And           DR And *	RA/DEC (B1950) 002105.7+250727 011435.8+384117 012552.3+334834 004654.0+264459 234002.2+424418 233237.8+404939 015202.4+433115 231506.7+481644 232623.8+501757 232929.2+345144 010224.4+335703	RA/DEC (J2000) 002343.1+252404 011727.3+385703 012642.5+340408 004932.9+270119 234230.9+430052 233506.0+410611 015508.2+43057 231726.2+483308 232845.9+303429 2332007.+351148 0105107.+341307	type RRAB RRAB RRAB RRAB RRAB RRAB RRAB RRA	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.6           13.4           12.5           12.4           12.5           11.6           12.4	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           13.1           14.5           13.7           12.5           13.1           13.2           13.2           13.2
eordalis ienatici ianor ianor mus ela s s s s s s s s a	RR Gem. ER Gem. GI Gem. HS Gem. I <u>Y Gem.</u>	number of n 201 10 47 1 14	Andromedi Antila Apus Aquarius Cancer Cancer Ven	t Lyrae Commit a these sphere a <u>dallis</u> <u>atici</u> D D	Iee	number           010023           010049           010050           010054           010055           010058           01010           010128           010135           010135           010140           010143	Name           SW And *           XX And *           XX And *           ZZ And           AT And *           BK And *           DK And *           DK And *           DM And           DR And *           DU And	RA/DEC (B1950)           002105.7+290727           011435.8+294117           01235.2+294834           004654.0+264459           234002.2+424418           232327.8+404939           015204.2+433115           231505.7+481644           232623.5+501757           23292.8+3481644           010224.4=35703           010224.4=35703           01222.8+403716	RA/DEC (J2000)           002343.1+392404           011727.3+385703           012442.5+340408           004934.9+270119           2343205.9+430052           233506.0+410611           015508.3+434557           231276.2+4363308           232845.9+503429           232200.7+351148           010510.7+341307           023031.4+405034	type       RRAB	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.5	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           14.5           13.1           14.2           12.5           13.1           13.2           13.2           13.3           13.4           13.2           13.3
eardalis inor mus tia tia tia tia tia tia tia tia tia tia	RR Gem. ER Gem. GI Gem. HS Gem. I <u>Y Gem.</u>	number of n 201 10 47 1 14	Andromed Antila Apula Aquartus Aqualus Aqualus Aqualus Aqualus Aqualus Aqualus Aqualus Aqualus Aqualus Aqualus Aqualus Castus Ca	t Lyrae Commit a these sphere a <u>dallis</u> <u>atici</u> D D	Iee	number           010023           010042           010054           010054           010073           010128           010128           010133           010134           010135           010136	Name SW And * XX And * XX And * XX And * ZZ And * ZZ And * BK And * DE And * DK And * DM And * DM And * ELAnd *	RA/DEC (B1950) 002105.7+290727 011435.8+534117 012352.3+334834 004654.0+264459 234002.2+424418 233237.8+404939 015204.2+433115 231505.7+481644 232523.3+501757 232592.8+345514 010224.4+335703 022722.8+345514 010224.4+335703	RA/DEC (12000) 002343.1+292404 011727.2+385703 01242.5+304008 004953.9+370119 234320.9+430052 233506.0+410611 015508.3+434557 231726.2+483308 232845.9+503429 232807.4551148 010510.7+351148 010510.7+341307 023031.4+40524 005433.9+4571.548	type       RRAB	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.4           13.4           12.5           12.5           12.5           13.4           12.5           12.4           12.5           12.4           12.5           12.5           12.5           12.5           12.5           12.5           13.5	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           13.1           14.5           13.1           13.2           14.5           13.1           13.2           14.4           13.1           13.2           14.8           13.4           13.5           14.4
nardalis enstitui jojos minor mus tis tis tis tis tis tis tis tis tis turnices Autrolis	RR Gem. ER Gem. GI Gem. HS Gem. I <u>Y Gem.</u>	number of n 201 10 47 1 14	Andromed Antila Apuis Aquartus Aqualus Aqualus Aqualus Aqualus Castus Ca	t Lyrae Commit a these sphere a <u>dallis</u> <u>atici</u> D D	Iee	number           010023           010049           010050           010054           010073           010128           010128           010133           010135           010143           010143           010173           010173           010173	Name           SW And *           XX And *           XX And *           ZZ And           AT And *           BK And           Cl And           DE And *           DK And *           DM And           DR And *           DU And           EL And           EL And	RA/DEC (B1950) 002105.7+250727 011435.8+384117 012352.3+334834 004654.0+264459 234002.2+424418 233237.8+404939 015202.4+42415 231506.7+481644 232623.8+501757 232929.2+43514 010224.4+335703 002722.8+403716 005554.1+265925 010555.7+362125	RA/DEC (J2000)           002343.1+252404           011727.3+385703           011427.3+345403           011727.3+230408           00493.4+270119           234230.9+430052           233506.0+410611           015508.2+430308           231726.2+483308           233207.9+351148           010510.7+341307           020331.4+408034           005429.971548           010846.8+235724	type RRAB RRAB RRAB RRAB RRAB RRAB RRAB RRA	max.           9.14           10.08           12.98           12.7           10.42           12.7           10.42           12.5           11.6           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.4           12.5           12.4           12.5           12.4           12.5           13.4           12.5           13.4	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           13.7           12.5           13.1           12.8           13.5           13.5           14.5           14.45
eardalis inor mus tia tia tia tia tia tia tia tia tia tia	RR Gem. ER Gem. GI Gem. HS Gem. I <u>Y Gem.</u>	number of n 201 10 47 1 14	Andromed Andia Apuis Aquarius Caelum Cancer Canes Ven Canes Ven Canes Ven Castis Mino Castis Mino Castis Mino Castis Mino Castis Aquarius Castis Mino Castis Aquarius Castis Mino Castis Aquarius Castis Aquarius	t Lyrae Commit a these sphere a <u>dallis</u> <u>atici</u> D D	Iee	number           010023           010049           010050           010054           010073           010013           010110           010133           010135           010142           010173           010142           010173           010173           010173           010173           010173           010174           010173	Name           SW And *           XX And *           XX And *           ZZ And           AT And *           BK And *           DK And *           DM And           DR And *           DU And           ELAnd           FL And           FL And           FL And	RA/DEC (B1950)           002105.7+290727           011435.8+394117           01235.2+324834           004654.0+264459           234002.2+424418           232327.8+404939           015204.2+433115           231505.7+481644           232623.5+501757           23292.8+34514           010224.4:35703           012224.2:35716           010224.2:850125           010224.2:850125           010224.2:850125           010224.2:85025           010224.2:85035           010224.2:85035           010224.2:85035           010224.2:85035           012272.8+403716           00558.1:8502125           012558.7:850125           02274.5.5-380144	RA/DEC (J2000)           002243.1+392404           011727.3+385703           01242.5+340408           004934.9+270119           2342309.430052           233506.0+410611           015508.3+434557           231726.2+435308           23020.7+351148           0105107.9×31307           023031.4+405034           0163639.9×371548           01048639.9×371548           0104863724           023051.1+381501	type           RRAB	max.           9.14           10.08           12.98           12.7           10.42           12.7           11.6           12.7           11.6           12.7           11.6           12.7           12.7           12.7           12.7           12.7           12.4           12.5           13.4           12.5           13.4           12.5	min.           10.09           11.13           14.65           13.7           12.5           13.7           12.5           13.1           13.2           13.3           13.4           13.1           13.2           13.5           14.5           13.5           14.5           16.5
eardalis inor mus tia tia tia tia tia tia tia tia tia tia	RR Gem. ER Gem. GI Gem. HS Gem. I <u>Y Gem.</u>	number of n 201 10 47 1 14	Andromed Andra Andra Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Caneer	e Lyrae Commit a Liare Aptendi a a <u>edalis</u> a <u>stici</u> 27 25 25	Iee	number           010023           010042           010050           010073           010073           010133           010133           010142           010143           010133           010143           010143           010143           010143           010173           010173           010173           010183           010183	Name           SW And *           XX And *           XX And *           ZZ And           ZZ And           DIX And *           DK And           DE And           DK And *           DM And           DU And           FIA And           FIA And           FI And           FI And           FU And           FU And	RA/DEC (B1950) 002105.7+290727 011425.8+534117 012352.3+324834 004654.0+264459 230202.8+424418 233237.8+404939 015204.2+434115 231505.7+481644 232623.3+501757 232922.8+32514 010224.4+335703 022722.8+403716 005554.1+265935 010555.7+362125 022745.5+380144 220132.1+531238	RA/DEC (12000)           002343.1+292404           011727.2+285703           01242.5+240408           011727.2+285703           01242.5+240408           004952.9+270119           233506.0+410611           015808.2+424557           231726.2+483308           232845.9+530429           232845.9+530429           232804.7+231137           023031.4+405024           005639.9+271548           010546.8+353724           023051.1+381501           23044.4+52249	type RRAB RRAB RRAB RRAB RRAB RRAB RRAB RRA	max.           9.14           10.08           12.98           12.7           10.42           12.5           11.6           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.6           12.5           12.6           12.5           12.6           12.5           12.5           12.5           12.6           12.5           14.           15.5           16.	min.           10.09           11.13           1465           13.7           12.8           13.1           13.2           14.5           14.5           14.5           14.5           15.7           14.5           16.5           17.
eardalis inor mus tia tia tia tia tia tia tia tia tia tia	RR Gem. ER Gem. GI Gem. HS Gem. I <u>Y Gem.</u>	number of n 201 10 47 1 14	Andromed Antila Apuis Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Aquartus Canto Maio Canto Maio Cant	e Lyrae Commit a Liare Aptendi a a <u>edalis</u> a <u>stici</u> 27 25 25	Iee	number           010023           010049           010050           010054           010073           010110           010128           010133           010143           010173           010143           010176           010173           010173           010173           010173           010173           010173           010173           010174	Name           SW And *           XX And *           XX And *           ZZ And           AT And *           BK And *           DI And           DK And *           DM And           DM And           DI And           DY And           E1 And           FT And           FY And           GT And	RA/DEC (B1950) 002105.7+250727 011435.8+384117 012532.3+334834 004654.0+264459 234002.2+424418 233237.8+404939 01520.2+424418 233526.7+481644 233623.8+801757 239528.2+43115 010224.4+335703 002722.8+405716 00558.1+635925 010558.7+362125 012558.7+362125 02274.5+380144 230122.1+531238 00422.2+5411407	RA/DEC (J2000)           002343.1+252404           011727.3+385703           011427.3+385703           011424.2+340408           00493.4+270119           234230.9+430052           233506.0+410611           01508.2+430352           231726.2+483308           233207.9+351148           010510.7+341307           020331.4+408034           005492.9+77548           010846.8+253724           023051.1+381501           233202.8+21331	type           RRAB           RRAB	max.           9.14           10.08           12.98           12.7           11.6           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.7           12.5           12.7           12.5           12.5           13.4           15.5           16.7	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           14.5           13.5           13.7           12.5           14.5           13.5           14.5           14.5           16.5           17.           17.5
eardalis inor mus tia tia tia tia tia tia tia tia tia tia	RR Gem. ER Gem. GI Gem. HS Gem. I <u>Y Gem.</u>	number of n 201 10 47 1 14	Androned Appla Appla Aquatisa Aquatisa Aquatisa Aquatisa Aritas Baotes Canceloga Cance	t Lyrae Commit a These Aphanet a dalls atici b c c c c c c c c c c c c c	Iee	number           010023           010042           010050           010054           010073           010135           010133           010135           010135           010137           010138           010137           010138           010137           010138           010173           010176           010183           010183           010184           010185           010202           010204	Name           SW And *           XX And *           XX And *           ZZ And           AT And *           BK And *           DE And           DK And *           DM And           DR And *           DU And           FL And           FL And           FT And           GT And           GT And           GT And	RA/DEC (B1950)           002105.7+290727           011435.8+394117           01235.2+324834           024654.0+264459           234002.2+424418           233237.8+404939           015204.2+433115           231505.7+481644           232623.5+501757           23292.8+345514           010224.2+33703           012224.2-835703           012224.2-835735           012254.1+365935           012558.7+8380144           230103.1+581238           042242.9+41407           231012.1+581238	RA/DEC (J2000)           002243.1+322404           011727.3+385703           01242.5+340408           014924.5+340408           024923.9+420052           233506.0+410611           015508.3+434557           231726.2+485308           232300.7+351148           010510.7+341307           023031.4+405034           005639.9+371548           013051.2+341307           023031.4+405034           005637.4+405034           003051.1+381501           23044.4+522849           004509.8+10301           2312.6+255404	type RRAB RRAB RRAB RRAB RRAB RRAB RRAB RRA	max.           9.14           10.08           12.9           12.7           10.42           12.7           11.6           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.4           12.5           12.5           12.5           12.5           12.5           12.5           13.4           15.5           16.7           13.0	min.           10.09           11.13           14.65           13.5           10.92           13.7           12.5           14.5           13.7           13.2           13.45           13.1           13.2           14.5           14.5           16.5           17.           17.5           14.4

Figure 3, 4. Access to the data is done star by star from lists where stars are sorted by constellations, either with the number of maxima or characteristics from the GCVS.



😹 📲 Netscape: RR Lyrae star								
File Edit View Go Communi		<u>ž</u> 🖻		6	 ©,		Help	
Back Forward Reload	🚮 Home S	🧀 🕅 Search Nets		💕 Security	Shop	Stop	N	
, 🌿 Bookmarks 🤳 Location: 🌆	ttp://webast	. ast. obs-mi	p.fr/people/le	borgne/dbRF	·····		V 🕼 What's Related	
	GEOS RR Lyr	Database		RR Lyrae	e database:	: statistics	×	
GEOS RR Lyr Database	n	umber of maxi	ima according th	e method use	d			
	me	ethod	num	ber of maxin	ıa			
BAV-RR-Lyrac	visual		7155					
	photograph ccd	10	15932 612					
	photoelectr	ric	1379					
at lyine there dybeneric	_		4766					
Andromeda Antiia Antiia Apus Aquarius Aquila Aquila Ara Ara Arics Aurisa Bootes Canelopardalis Canelopardalis Canelopardalis Canelopardalis Canelopardalis Canes Venatici Canis Minor Canis Minor Canis Minor Canis Minor Canis Minor Canis Minor Canis Minor Canis Minor Canis Minor Carina Castina Castina Contaurus Cepheus Cetus Chamaeleon Circinus Corona Berenices Corona Borealis Corvus Y			ate of RR Lyr	1950 year maxima obs	ervation ov		ry y	Hel Stop

**Figure 8.** The Bibliographic database contains about 1000 references with links to the original paper when available in external sites like ADS and IBVS site at Konkoly Observatory, or locally to scanned papers. Some statistics are computed automatically.

	Bohlin K., 1924, AN 5292			
	Bohlin K., 1925, AN 5375			
BAV-RR-Lyrac	Borichuk A.S., 1990, AC 1546, 27			
	Born F., Sofronievitsch H., 1953, AN 281, 116			
	Born F., Sofronievitsch H., 1955, AN 282, 235			
	Bottlinger K., Graff K., 1913, AN 4867			
	Bovce E.H., 1939, HB 911			
	Brather S., 1972, MVS 6, 3, 60			
00071020	Braune W., BAV Rundbrief 3/2000			
to your there dynamic	Braune W., Hubscher J., 1967, AN, 290,105			
1.5055	Braune W., Hubscher J., Mundry E., 1970, AN 292,185			
Andromeda	Braune W., Hubscher J., Mundry E., 1978, AN 292,105			
Antlia	Braune W., Hubscher J., Mundry E., 1972, AN 294,125			
Apus	Braune W., Hubscher J., Multify E., 1977, AN 220,121 Braune W., Hubscher J., Mundry E., 1979, AN 300,165			
Aquarius	Braune W., Hubscher J., Mundry E., 1979, AN 300,105			
Aquila	Braune W., Hubscher J., Mundry E., 1983, BAV Mitt. 36			
Ara	Braune W., Mundry E., 1973, AN 294,225			
Aries	Braune W., Munday E., 1973, RNV 294,223			
Auriga	Braune W., Mundry E., 1981, BAV Mitt. 32 Braune W., Mundry E., 1982, BAV Mitt. 34			
Bootes	Broglia P., Conconi P., 1992, IBVS 3748			
Caelum	Bugoslawski N., 1926, AN 5484			
Camelopardalis	Burchi R., De Santis R., Di Paolantonio A., Piersimoni A.M., 1993, A&AS 97, 827			
Cancer	Busch H., Barthel J., Haussler K., 1959, MVS 429			
Canes Venatici	Busch H., 1968, Mitt. Harta 2			
Canis Major	Busch H., 1972, Mitt. Harta 5			
Canis Minor	Busch H., 1973a, IBVS 754			
Capricornus	Busch H., 1973b, Mitt. Harta 6			
Carina	Busch H., 1978. Mitt. Harta 12			
Cassiopeia	Busch H., Haussler K., 1970, IBVS 417			
Centaurus	Busch H., Haussler K., 1971 Mitt. Harta 4			
Cepheus	Busch H., Haussler K., 1972a, IBVS 638			
Cetus	Busch H., Haussler K., 1972b, IBVS 639			
Chamaeleon	Busch H., Haussler K., Thanert C., 1974, VSS 8,4, XVI			
Circinus	Butler D., Manduca A., Deming D., Bell R.A., 1982, AJ 87, 640			
<u>Colomba</u>	Carney B.W., Latham D.W., 1984, ApJ 278, 241			
Coma Berenices	Cester B., Todoran I., 1975, IBVS 1047			
Corona Australis	Chekanikhina O.A., 1973a, VS supp. 1, 481			
Corona Borealis	Chekanikhina O.A., 1973b, AC 748, 8			
Corvus /	Chicherov A.V., 1990, AC 1543, 15			Z
		8 -86	25 dP (	🛪 🧭

### The GEOS-BAV RR Lyr 2000 campaign

The first RR Lyrae stars were discovered in the 1890'th and in july 1899 Williamina Fleming found RR Lyr itself. Astronomers observe these stars since one century and yet, despite a continuous effort on theory and modelling, the reasons of period changes of RR Lyr pulsators is still unknown. A few of them, if any, show constant period on a long time interval. The Blazhko effect, the periodic modulation of the period and/or the amplitude discovered in RW Dra in 1907, is still unexplained as well.

Merieme Chadid (ESO, Chile) and Denis Gillet (OHP, France) planned high spectral resolution and spectropolarimetric observations of RR Lyr itself in summer 2000 at Haute Provence Observatory and Pic du Midi Observatory, with the intention to study the Blazhko effect. They asked GEOS for collaboration in order to ensure a photometric follow up of the star. GEOS had to provide visual maximum timings and possibly CCD photometry of RR Lyr in the time interval June - August 2000. The campaign management was conducted by Anton Paschke.

Though it is difficult to look for the Blazhko effect in the amplitude of visually observed maxima, it is conceivable to seek it in the timings of the maxima: the uncertainty on well observed visual maxima is about 15mn=0.01day=0.018 P (RR Lyr) and the amplitude of O-C variations during the Blazhko cycle may reach up to 0.08 days, close to 2 hours.

GEOS and BAV observers joined the campaign. Unfortunately, summer 2000 had unfavourable weather in Europe. Furthermore, the elements assumed at the beginning of the campaign (42923.4193 + 0.56684E) were not correct. Despite these difficulties, 15 observers made about 1000 visual and CCD observations of RR Lyr which made this study possible.

Observer	HJD	Е	O-C	Phase	Е	Phase
	Maximum (days)	Maximum		(Blazhko cycle)		
M. Dumont	51697.471	-104	-0.035	-0.061	-1	0.591
D. Dalmazio	51705.401	-90	-0.040	-0.071	-1	0.785
D. Dalmazio	51709.378	-83	-0.031	-0.055	-1	0.882
M. Dumont	51710.509	-81	-0.034	-0.059	-1	0.910
A. Paschke	51713.369	-76	-0.008	-0.014	-1	0.980
G. Maintz	51714.490	-74	-0.020	-0.036	-1	0.008
M. Dumont	51714.490	-74	-0.020	-0.036	-1	0.008
P. Jacquet	51714.505	-74	-0.005	-0.010	-1	0.008
M. Dumont	51722.415	-59	-0.031	-0.054	-1	0.202
A. Paschke	51722.434	-59	-0.012	-0.021	-1	0.202
S. Kuchto	51726.388	-53	-0.026	-0.045	-1	0.299
D. Dalmazio	51747.347	-16	-0.039	-0.069	0	0.813
D. Dalmazio	51751.329	-9	-0.025	-0.043	0	0.910
D. Dalmazio	51756.455	0	0.000	0.000	0	0.036
JF. Le Borgne	51756.457	0	0.002	0.004	0	0.036
A. Paschke	51757.576	2	-0.013	-0.022	0	0.063
D. Dalmazio	51764.366	14	-0.024	-0.043	0	0.229
D. Dalmazio	51768.320	21	-0.038	-0.067	0	0.326
G. Zepter	51773.420	29	-0.040	-0.070	0	0.451
A. Paschke	51782.501	46	-0.028	-0.049	1	0.674
K. Tikkanen	51798.377	74	-0.023	-0.040	1	0.063
M. Dumont	51798.397	74	-0.003	-0.005	1	0.063
K. Tikkanen	51803.475	83	-0.026	-0.046	1	0.187
M. Dumont	51803.481	83	-0.020	-0.035	1	0.188
K. Tikkanen	51807.432	90	-0.037	-0.065	1	0.284
M. Dumont	51849.382	164	-0.031	-0.055	2	0.312
K. Tikkanen	51943.477	330	-0.028	-0.050	5	0.617
K. Tikkanen	51964.443	367	-0.035	-0.061	5	0.131

**Table 1.** 28 well definedmaxima of RR Lyr resultedfrom the observations.

\* CCD observations

The O-C of the maxima are computed with the following elements for the main pulsation cycle, deduced from the 2000 observations:

while the Blazhko phase was determined with the following elements:

The origin of the main pulsation cycle elements has been adjusted so that phase=0 corresponds to the most late maxima (maximum O-C). The Blazhko phase has been fixed to 0 for those maxima as well. The Blazhko effect period used here is the one used by Preston et al. (1965) in their classical work on RR Lyr Blazhko effect and determined by Fringant (1961).

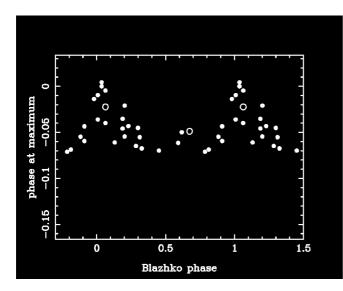


Figure 9. RR Lyr – Blazhko effect

## Conclusion

Since 1965, RR Lyr has not been observed seriously. Preston et al.'s paper seems to have put an end to the hope to understand the complex behaviour of the pulsations of the RR Lyrae stars. The use of modern techniques, either for the observations and theory, might allow to progress in the field. In this context, the photometric monitoring of RR Lyr itself is important since it is, by far, the brightest star of its kind, allowing unique high resolution spectroscopic observations. The Blazhko effect has a behaviour which change from cycle to cycle so that RR Lyr deserves to be observed continuously either visually or with CCD on small telescopes.

## References

Fringant, A.-M., 1961, J. des Obs., 44, 165 Preston, G.W., Smak, J., Paczynski, B., 1965, ApJS, 12, 99

A way to estimate the strength of the Blazhko effect of RR Lyr in 2000 is to compare our data to the classical observations by Preston et al. (1965) whose 1962 data showed the Blazhko effect at its maximum. For this, we adjusted Preston et al.'s main pulsational phase zero and Blazhko phase zero on ours. The result is shown on the figure below where Preston et al's data are plotted as green plus signs . The amplitude of the Blazhko effect of RR Lyr in 2000 seems to have been about half the amplitude it had in 1962. Note that in the Blazhko phases from 0 to about 0.4, the rate of period decrease seems to have been the same that in 1962