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ON THE VARIABILITY OF O4–B5 LUMINOSITY CLASS III–V STARS

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This paper considers the Hipparcos photometry (ESA 1997) of luminosity class III–V O4–B5 stars in the Bright Star Catalogue, 5th edition (Hoffleit & Warren 1991) and the Supplement of the 4th edition (Hoffleit et al. 1983). These stars include α^2 CVn variables, β Cep stars, eclipsing binaries including Algol and β Lyr types, rotating ellipsoidal variables, γ Cas variables, irregular and slow irregular variables, microvariables, slowly pulsating B stars, semi-regular variables, SX Ari stars, spurious variables due to duplicity, unresolved variables, and constant stars. Table 1 lists the mean amplitudes, which indicate the mean variability of those spectral types with at least 3 class members. We excluded stars with spurious variability due to duplicity. The Hipparcos photometry does not confirm the reported variability of some stars which might indicate a change in the stellar behavior or reflect the quality of the previous photometry. The mean amplitudes of the luminosity class III stars excluding the larger amplitude variables are equal to or greater than those of the corresponding supergiants (Adelman, Yüce & Engin 2000). The values in Table 1 are generally greater than those of cooler stars (see, e.g. Adelman, Gentry & Sudiana 2000) indicating that variability is greater among these stars than among cooler stars.

Table 2 (available electronically from the IBVS site as 5008-t2.tex and 5008-t2.txt) contains individual stars values including those which were not used in compiling the means. It gives for each star the HR number (if any), names (Bayer, Flamsteed, or variable star designation), the V magnitude from the Bright Star Catalog or its Supplement, the spectral type, the Hipparcos number, the standard error (mag), the amplitude (mag), and comments (type of variable and the NSV number if there was not space in the Names column). Table 3 presents selected stars with amplitudes of variability which are $\geq 0^m10$, which is significantly greater than the mean amplitude values. The majority of the well-known variables are γ Cas variables. A few others and many stars with amplitudes between 0^m05 and 0^m09 listed in Table 2 need further observations.

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Table 1: The mean amplitudes of various types of B6 through B9 stars

Sp. class	No.	Mean ampl.	Comment
07.5III	3	0.027 ± 0.006	
B0III	7	0.101 ± 0.198	0.027 ± 0.008 without HR 1260
B0.5III	15	0.034 ± 0.011	0.031 ± 0.005 without V1012 Sco
B1III	10	0.042 ± 0.013	
B1.5III	11	0.055 ± 0.064	0.030 ± 0.013 without MX Pup & LS Mus
B2III	19	0.096 ± 0.092	0.055 ± 0.034 without AX Mon, HP CMa, V767 Cen, & BW Vul
B3III	29	0.054 ± 0.082	0.036 ± 0.019 without NSV 4879 & V3792 Sgr
B4III	9	0.058 ± 0.054	0.033 ± 0.022 without ζ Tau & EW Lac
B5III	31	0.034 ± 0.015	0.032 ± 0.012 without V757 Mon
B2III/IV	3	0.020 ± 0.010	
B3III/IV	4	0.045 ± 0.017	0.037 ± 0.006 without MX CMa
B0IV	6	0.075 ± 0.088	0.025 ± 0.010 without V750 Mon and FY CMa
B0.5IV	8	0.079 ± 0.098	0.030 ± 0.013 without V1294 Aql & AH Cep
B1IV	6	0.033 ± 0.020	
B1.5IV	12	0.043 ± 0.046	0.024 ± 0.008 without κ CMa & NSV 6943
B2IV	44	0.049 ± 0.049	0.032 ± 0.020 without 6 G Cas stars & KP Per
B2.5IV	25	0.042 ± 0.056	0.027 ± 0.010 without FW CMa & NT Peg
B3IV	44	0.035 ± 0.033	0.028 ± 0.014 without V817 Cen, κ ¹ Aps, & 6 V382 Cep
B4IV	15	0.043 ± 0.039	0.030 ± 0.018 without V3894 Sgr & V2148 Cyg
B5IV	29	0.032 ± 0.019	0.030 ± 0.014 without HR 1772
B2IV–V	52	0.040 ± 0.051	0.028 ± 0.016 without V960 Tau, 28 o CMa, V955 Cen, & IN Peg
B2.5IV–V	3	0.027 ± 0.006	
O6.5V	4	0.030 ± 0.014	
O9V	5	0.042 ± 0.029	0.030 ± 0.014 without LZ Cep
O9.5V	4	0.060 ± 0.045	two stars constant, two variable
B0V	9	0.091 ± 0.170	0.035 ± 0.022 without SZ Cam
B0.5V	8	0.038 ± 0.030	0.027 ± 0.010 without EM Cep
B1V	30	0.063 ± 0.065	0.035 ± 0.020 without 6 stars with amplitudes of 0.10 or more
B1.5V	21	0.038 ± 0.046	0.029 ± 0.015 without V436 Per
B2V	77	0.050 ± 0.050	0.032 ± 0.016 without 11 stars with amplitudes of 0.10 or more
B2.5V	49	0.046 ± 0.040	0.030 ± 0.015 without 8 stars with amplitudes of 0.10 or more
B3V	107	0.039 ± 0.029	0.033 ± 0.016 without 6 stars with amplitudes of 0.10 or more
B4V	33	0.066 ± 0.063	0.038 ± 0.020 without 7 stars with amplitudes of 0.10 or more
B5V	110	0.043 ± 0.050	0.032 ± 0.016 without 8 stars with amplitudes of 0.10 or more

Table 3: O4–B5 III–V stars with amplitudes ≥ 0^m10

Name	HD	Sp. type	HIP	SE	Amp.	Comment
AO Cas	1337	O9IIIInn	1415	0.0101	0.18	ELL
HR 1260	25638	B0III	19272	0.0420	0.55	U
MX Pup	68980	B1.5IIIe	40274	0.0079	0.23	GCAS
LS Mus	113120	B1.5IIIe	63688	0.0040	0.11	GCAS
48 ν Eri	29248	B2III	21444	0.0064	0.12	BCEP
AX Mon	45910	B2IIIpeShell	31019	0.0077	0.16	I
10 FT CMa	48917	B2IIIe	32292	0.0043	0.11	GCAS
HP CMa	49131	B2III	32385	0.0140	0.35	GCAS
V767 Cen	120991	B2IIIe	67861	0.0085	0.26	GCAS
BW Vul	199140	B2IIIe	103191	0.0091	0.22	BCEP
DD Lac	214993	B2III	112031	0.0049	0.11	BCEP
NSV 4879	91188	B3IIIe	51444	0.0066	0.12	EB
V3792 Sgr	165814	B3III	88905	0.0241	0.46	EB
123 ζ Tau	37202	B4IIIpe	26451	0.0118	0.13	E:

Table 3 (cont.)

Name	HD	Sp. type	HIP	SE	Amp.	Comment
EW Lac	217050	B4IIIep	113327	0.0023	0.16	GCAS
CC Cas	19820	O9IV	15063	0.0033	0.12	EB/DM
V750 Mon	53367	B0IVe	34116	0.0094	0.24	GCAS
FY CMa	58978	B0IV:pe	36168	0.0034	0.11	GCAS
V1294 Aql	184279	B0.5IVe	96196	0.0106	0.25	GCAS
AH Cep	216014	B0.5IV*	112562	0.0082	0.25	EW
13 κ CMa	50013	B1.5IVne	32759	0.0037	0.15	GCAS
NSV 6943	133738	B1.5IV*	74147	0.0046	0.13	GCAS
KP Per	21803	B2IV	16516	0.0029	0.11	BCEP
FV CMa	54309	B2IVe	34360	0.0035	0.27	GCAS
V374 Car	66194	B2IVpne	38994	0.0042	0.11	GCAS
V345 Car	78764	B2IVe	44626	0.0041	0.10	GCAS
QY Car	88661	B2IVpne	49934	0.0042	0.11	GCAS
δ Cen	105435	B2IVne	59196	0.0067	0.13	GCAS
7 χ Oph	148184	B2IV:pe	80569	0.0033	0.15	GCAS
FW CMa	58343	B2.5IVe	35951	0.0079	0.28	GCAS
NT Peg	203699	B2.5IVne	105623	0.0071	0.15	GCAS
V817 Cen	105521	B3IV	59232	0.0097	0.15	GCAS
κ^1 Aps	137387	B3IVe	76013	0.0031	0.10	GCAS
6 V382 Cep	203467	B3IVe	105268	0.0016	0.17	GCAS
V3894 Sqr	161756	B4IVe	87163	0.0072	0.15	EB
V2148 Cyg	201733	B4IVpe	104483	0.0015	0.10	EA
HR 1772	35165	B5IVnpe	25007	0.0031	0.10	EW:
120 V960 Tau	36576	B2IV-Ve	26064	0.0052	0.10	GCAS
28 o CMa	56139	B2IV-Ve	35037	0.0011	0.25	GCAS
V955 Cen	114800	B2IV-Vnep	64578	0.0036	0.11	U
31 IN Peg	212076	B2IV-Ve	110386	0.0094	0.29	GCAS
δ Cir	135240	O8.5V	74778	0.0016	0.15	EA
V1081 Sco	158186	O9.5V	85569	0.0012	0.12	EA
SZ Cam	25639	B0V	19270	0.0393	0.54	EA/DM
EM Cep	208392	B0.5V*	108073	0.0055	0.11	EW
V801 Cas	19243	B1Ve	14626	0.0036	0.10	I
25 ψ^1 Ori	35439	B1Vpe	25302	0.0048	0.15	GCAS
W Ori	36695	B1V	26063	0.0086	0.27	EB
FR CMa	44458	B1Vpe	30214	0.0020	0.13	GCAS
NN CMa	58011	B1Ve	35769	0.0143	0.25	GCAS
V357 Lac	212044	B1Vpnne	110287	0.0043	0.13	GCAS
1 V436 Per	11241	B1.5V	8704	0.0008	0.23	EA/D
ϕ Per	10516	B2Vep	8068	0.0031	0.11	GCAS
V777 Cas	11606	B2Vne	8980	0.0066	0.17	SR
56 DX Eri	30076	B2Ve	22024	0.0041	0.10	GCAS
105 V1155 Tau	32991	B2Ve	23883	0.0074	0.14	U
V434 Aur	37657	B2Vne	26872	0.0051	0.14	I
GU CMa	52721	B2Vne	33868	0.0064	0.22	EB
OT Gem	58050	B2Ve	35933	0.0022	0.19	GCAS
V387 Pup	62753	B2Vne	37675	0.0055	0.12	GCAS

Table 3 (cont.)

Name	HD	Sp. type	HIP	SE	Amp.	Comment
66 V2048 Oph	164284	B2Ve	88149	0.0067	0.17	GCAS
V2119 Cyg	194335	B2Ven	100574	0.0025	0.10	GCAS
66 <i>v</i> Cyg	202904	B2Vne	105138	0.0037	0.27	GCAS
11 BV Cam	32343	B2.5Ve	23734	0.0033	0.12	GCAS
V695 Mon	65875	B2.5Ve	39172	0.0029	0.12	GCAS
V375 Car	67536	B2.5Vn	39530	0.0042	0.11	BCEP
CO Cir	129954	B2.5Ve	72438	0.0021	0.13	GCAS
CX Dra	174237	B2.5Ve	92133	0.0086	0.17	GCAS
12 V395 Vul	187811	B2.5Ve	97679	0.0043	0.11	GCAS
28 V1624 Cyg	191610	B2.5Ve	99303	0.0021	0.10	SXARI
39 ϵ Cap	205637	B2.5Vpe	106723	0.0086	0.16	GCAS
OW Pup	60606	B3Vne	36778	0.0073	0.15	GCAS
V462 Car	66768	B3Vn:	39310	0.0067	0.17	EB
V438 Pup	71302	B3V	41250	0.0010	0.17	EA
HR 6274	152478	B3Vnep	82868	0.0031	0.10	I
V543 Lyr	176502	B3V	93177	0.0043	0.10	BCEP
V378 And	217543	B3Vpe	113640	0.0030	0.10	L
LQ CMa	52356	B4Vn	33673	0.0044	0.14	GCAS
PQ Pup	67888	B4V	39866	0.0016	0.16	GCAS
AI Pyx	75112	B4V	43114	0.0069	0.13	GCAS
PP Car	91465	B4Vne	51576	0.0076	0.23	GCAS
V518 Car	92938	B4V	52370	0.0113	0.16	GCAS
θ Cir	131492	B4Vnpe	73129	0.0126	0.27	GCAS
V532 Lyr	171406	B4Ve	90970	0.0013	0.10	GCAS
37 ψ Per	22192	B5Ve	16826	0.0058	0.11	GCAS
15 DV Cam	34233	B5V	24836	0.0013	0.12	EA
V1369 Ori	34959	B5Vp	25011	0.0020	0.21	I
V420 Pup	67698	B5Ve	39834	0.0073	0.27	GCAS
	78190	B5V	44545	0.0022	0.10	SV
V716 Cen	124195	B5Ve	69491	0.0091	0.41	EB/KE
QS Aql	185936	B5V	96840	0.0014	0.11	EA
V379 Vul	187640	B5V	97572	0.0008	0.11	GCAS
V2163 Cyg	204860	B5.5Ve	106145	0.0046	0.13	SR

References:

- Adelman, S. J., Yüce, K., Engin, S., 2000, *IBVS*, No. 4946
Adelman, S. J., Gentry, M. L., Sudiana, I. M., 2000, *IBVS*, No. 4968
ESA, 1997, *The Hipparcos and Tycho Catalogs*, SP-1200
Hoffleit, D., Saladyga, P., Wlasuk, P., 1983, *A Supplement to the Bright Star Catalogue*, Yale University Observatory, New Haven, CT
Hoffleit, D., Warren, W. H., Jr., 1991, *The Bright Star Catalogue*, 5th Rev. Ed., ADC Selected Astronomical Catalogs, Vol. 1, NASA Goddard Space Flight Center