New Views of the Magellanic Clouds
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NLTE Abundances from Magellanic Cloud B Stars

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Abstract. Nine MC young globular cluster and field stars are analysed using fully line-blanketed LTE ATLAS 9 atmospheres and the DETAIL/SURFACE non-LTE line formation code. CNO mixing seems to occur much earlier than predicted by standard theory.

1. Observations

Spectra were taken with CASPEC (R= 20 000) on the ESO 3.6m telescope at La Silla/Chile achieving a S/N of around 100. The stars show no Hα emission and are slow rotators with $v \sin i < 65$ km/s (*cf.* Reitermann et al. 1990).

2. Model Atmosphere Analysis

The method (Balmer profiles, Si II/III/IV ionisation equilibria, weak and strong O II lines) was thoroughly revised to be capable of deriving $T_{\rm eff}$, $\log g$, ξ, ε(O) and ε(Si) *simultaneously* and treating the metallicity of the underlying atmosphere in a *consistent* manner (for a full description see Gummersbach et al. 1998).

3. Results for Individual Stars

Table 1 summarizes the derived stellar parameters and abundances (in the usual notation $\varepsilon(\mathrm{X}) := \log(\mathrm{n(X)/n(H)}) + 12$). Nomenclature for cluster members is taken from Robertson (1974), for LMC field stars from Brunet et al. (1975), for SMC field stars from Azzopardi & Vigneau (1975). Brackets around ξ indicate that the microturbulence could not be co-determined simultaneously from silicon

Table 1. Derived stellar parameters

star	$T_{\rm eff}$	$\log g$	ξ	ε(He)	ε(C)	ε(N)	ε(O)	ε(Mg)	ε(Al)	ε(Si)
BRU 217 **LMC**	18100	2.66	11	10.80	%	7.60	8.42	6.90	5.80	7.12
BRU 231	17600	2.46	14	10.90	(7.80)	7.90	8.40	7.00	5.80	7.05
NGC 1818/D1	24700	4.00	0	11.15	7.65	7.59	8.46	7.35	6.05	7.10
NGC 1818/D12	16850	2.83	4	10.90	(8.10)	8.00	8.45	6.75	5.80	6.90
NGC 2004/B15	19900	3.11	(6)	10.85	7.90	%	8.35	6.78	5.90	6.74
NGC 2204/B30	23450	3.34	14	10.90	(7.60)	7.50	8.35	7.00	5.80	6.90
AV 175 **SMC**	19200	2.67	(13)	10.90	%	7.30	8.20	6.60	5.45	6.90
AV 218	23100	2.93	13	10.90	7.50	7.20	8.00	6.90	5.70	6.80
NGC 330/B30	16950	2.77	(6)	10.90	(7.30)	7.30	8.25	6.85	%	6.82
Δ(typical) = $\pm$	1000	0.2	2	0.2 – 0.3 *dex*						

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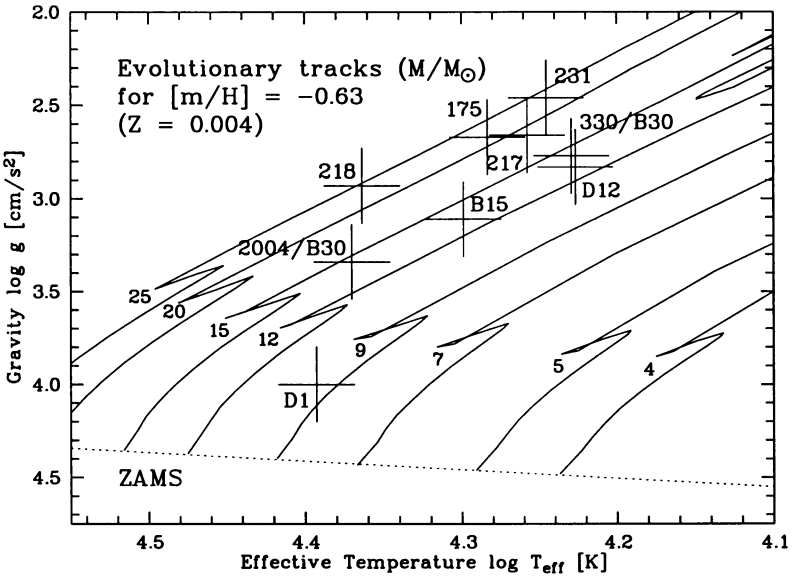

Figure 1. Kiel diagram showing the loci of the program stars with respect to evolutionary tracks according to Charbonnel et al. (1993) for a metallicity between those derived for the two Clouds.

and oxygen lines, those around ε(C) that carbon is solely based on C II 4267. Compare to MC H II data by Garnett (these proceedings)!

4. Global Results

- No significant metallicity difference between the clusters and their surrounding fields (but see Hill, these proceedings)
- No post-MS gap (stars on extended blue loops?)
- CNO mixing already on the MS (*cf.* NGC 1818/D1 in Table/Figure 1), unexplained by standard evolution, possibly rotationally induced (see contributions of Langer and Venn, these proceedings).

References

Azzopardi, M., & Vigneau, J. 1975, A&AS, 19, 271
Brunet, J.P., et al. 1975, A&AS, 21, 109
Charbonnel, et al. 1993, A&AS, 101, 415
Gummersbach, C. A., et al. 1998, A&A, 338, 881
Reitermann, A., Baschek, B., Stahl, O., & Wolf, B. 1990, A&A, 234, 109
Robertson, J.W. 1974, ApJ, 191, 67

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