

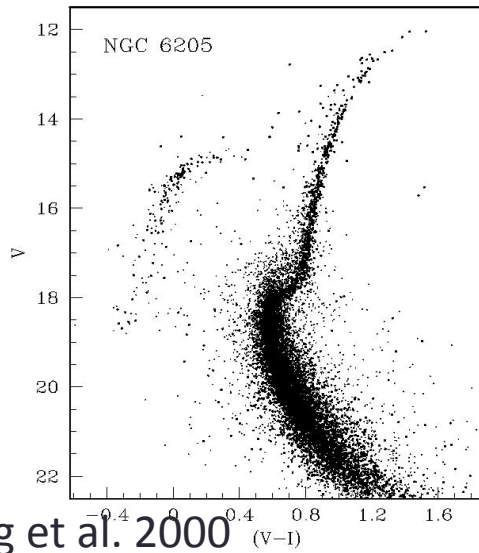
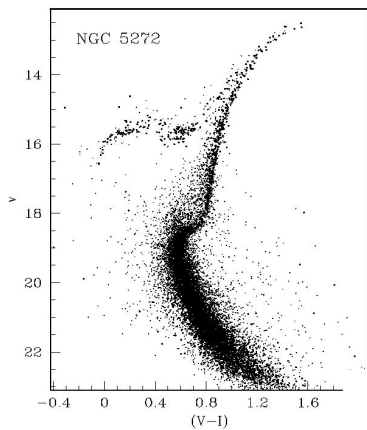
Abundance anomalies and HB:

The case of NGC2808

R. Gratton, V. D'Orazi, E. Carretta, A. Bragaglia, Y. Momany

The second parameter problem

First parameter: Metallicity (Sandage & Wallerstein 1960)



Rosenberg et al. 2000

Second parameter:

230 articles on ADS 2006-2011

Age e.g. Zinn (1980)

Concentration e.g. Fusi-Pecci et al. (1993)

CNO variations e.g. Freeman & Norris (1981)

Rotation e.g. Peterson et al. (1995)

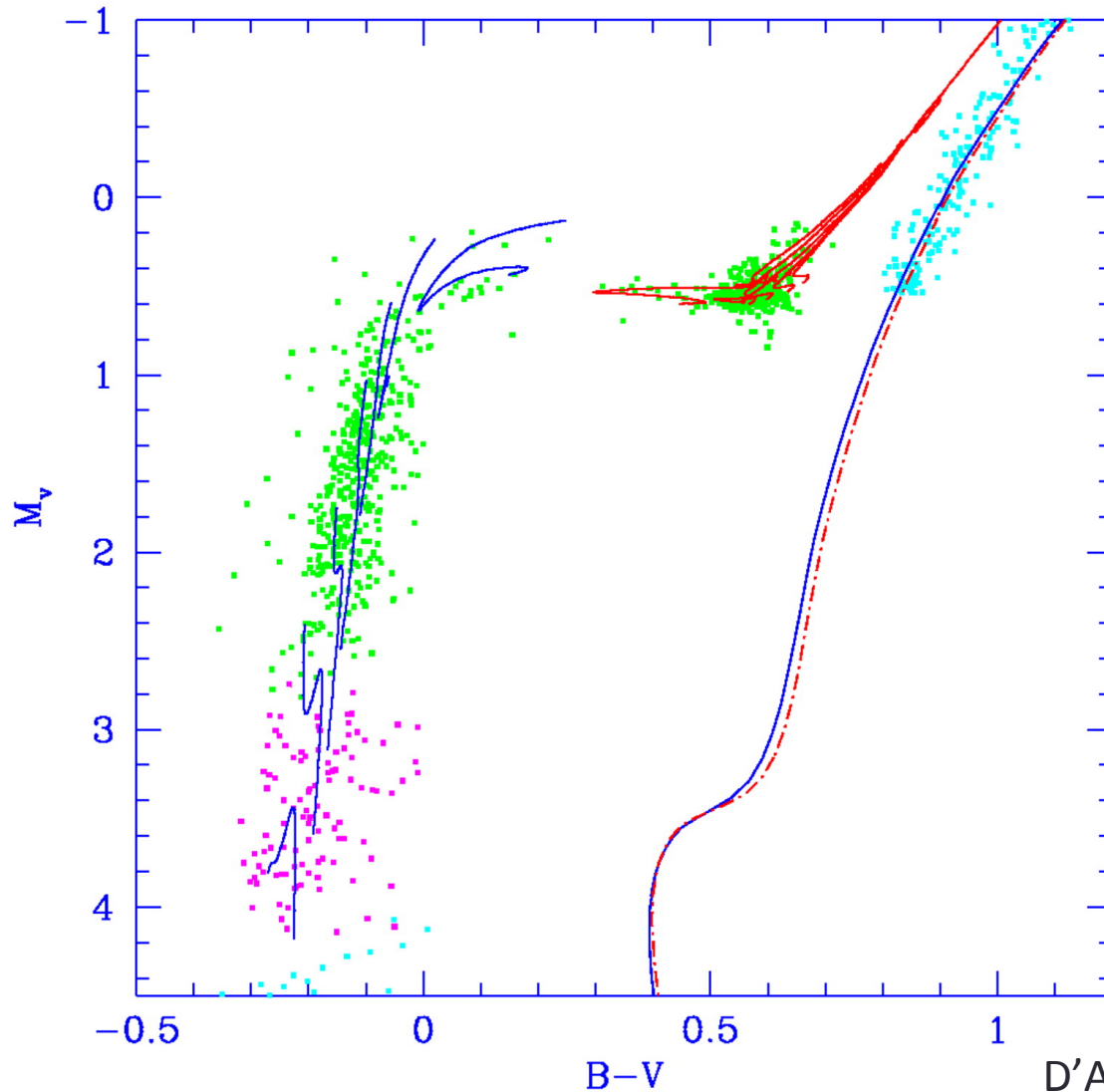
Binarity e.g. Moni-Bidin et al. (2006)

He abundance e.g. Green (1980)

Planets e.g. Soker & Harpaz (2000)

Just one or more?

He and multiple populations

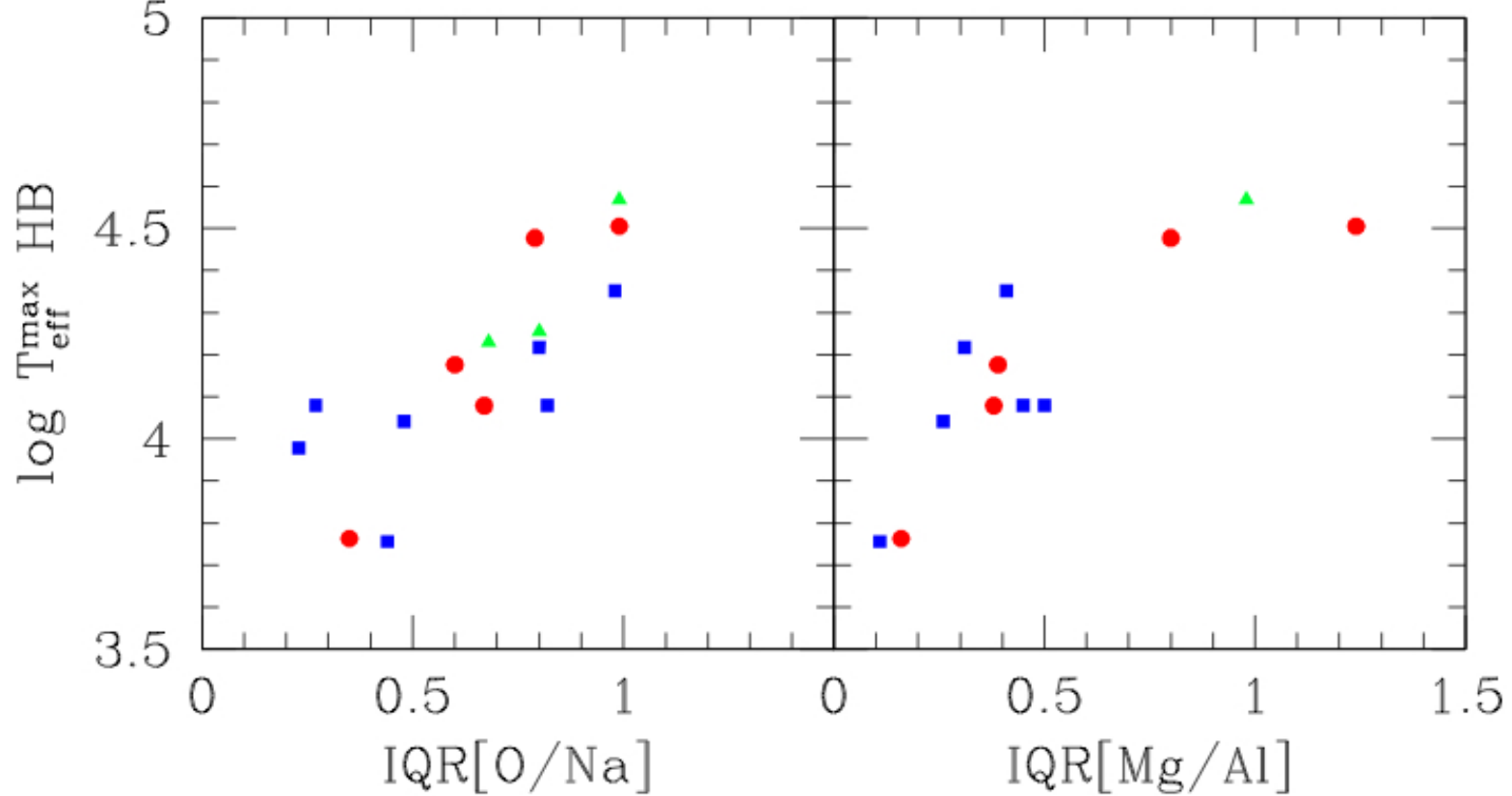


D'Antona & Caloi (2004)

- ◇ He variations affect HB morphology
- ◇ High He stars arrive less massive on HB, bluer
- ◇ Variations in light elements connected to He
- ◇ High Na low O stars rich in He

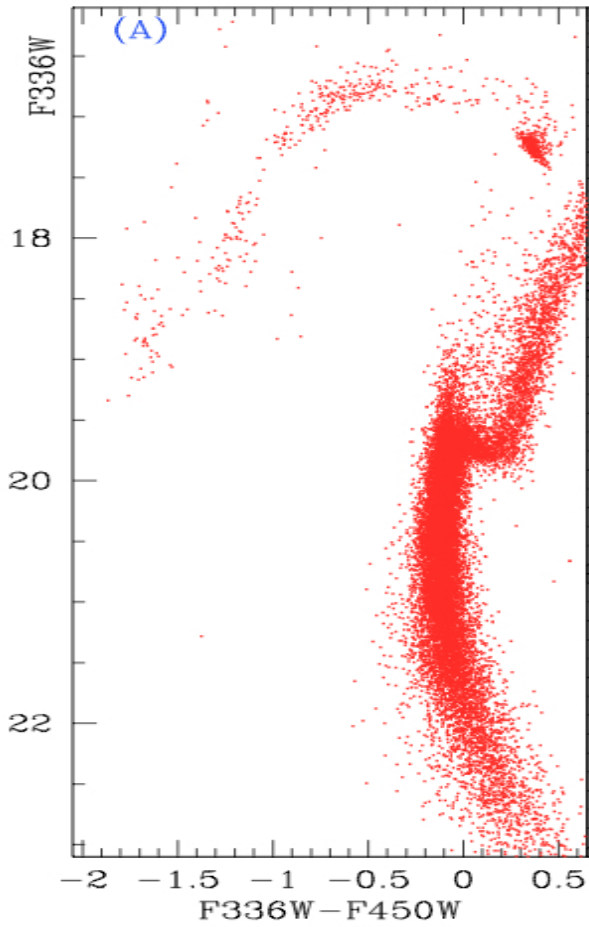
HB and anticorrelations

Carretta et al. 2007

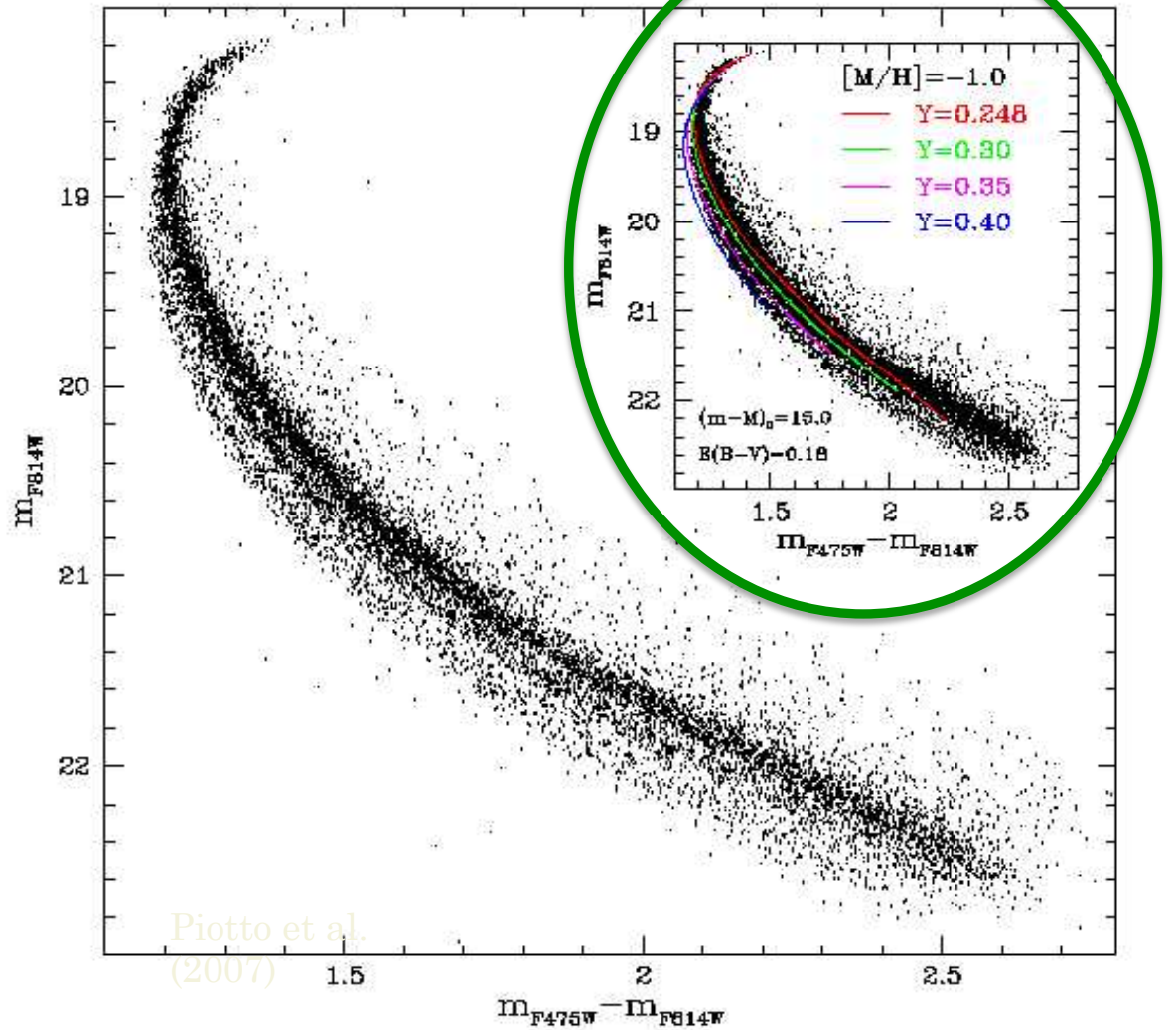


✧ HB abundance studies in M4 (Marino et al. 2011; Villanova et al. 2011); NGC6752 (Villanova et al. 2009)

NGC2808



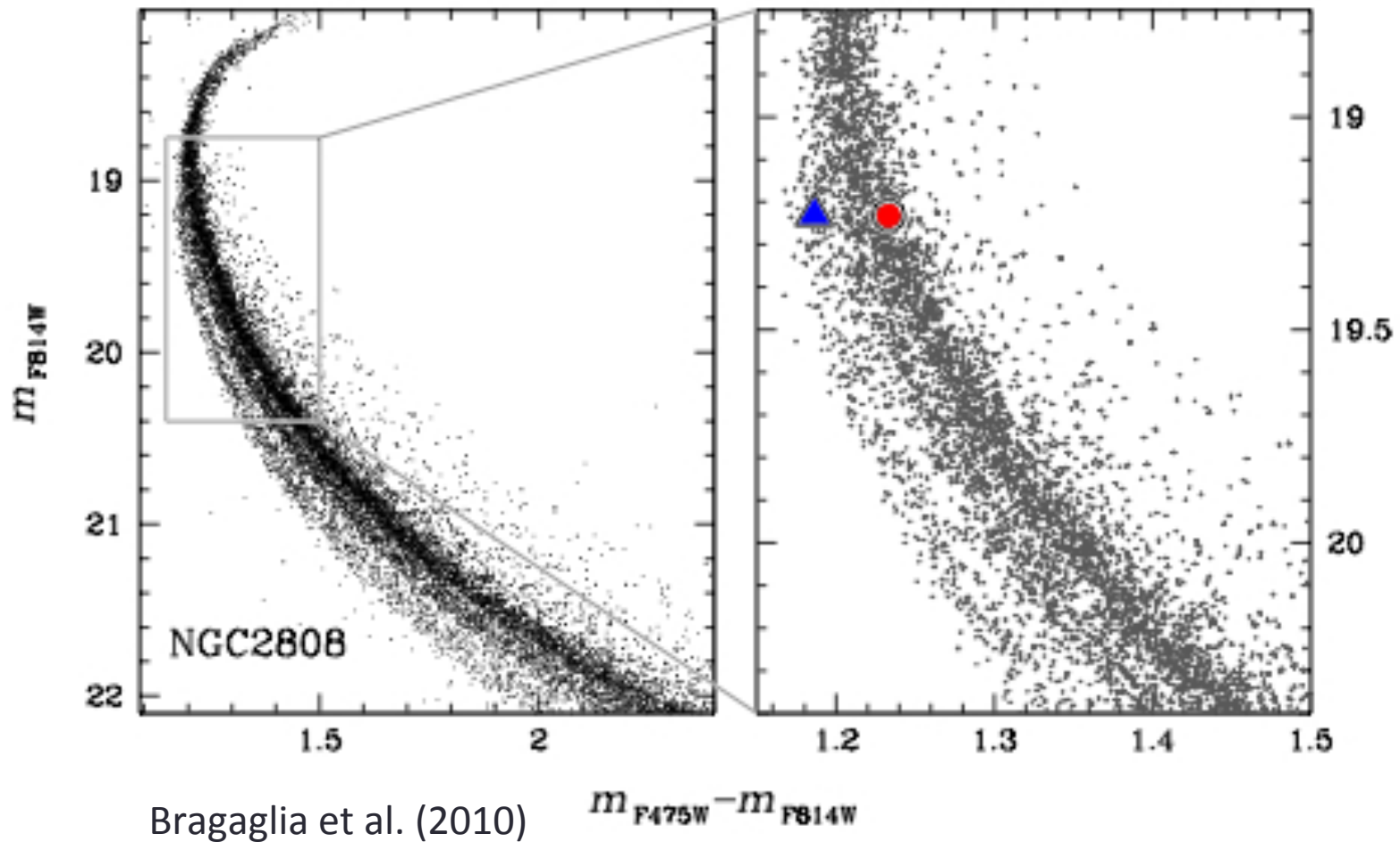
Momany et al. 2004



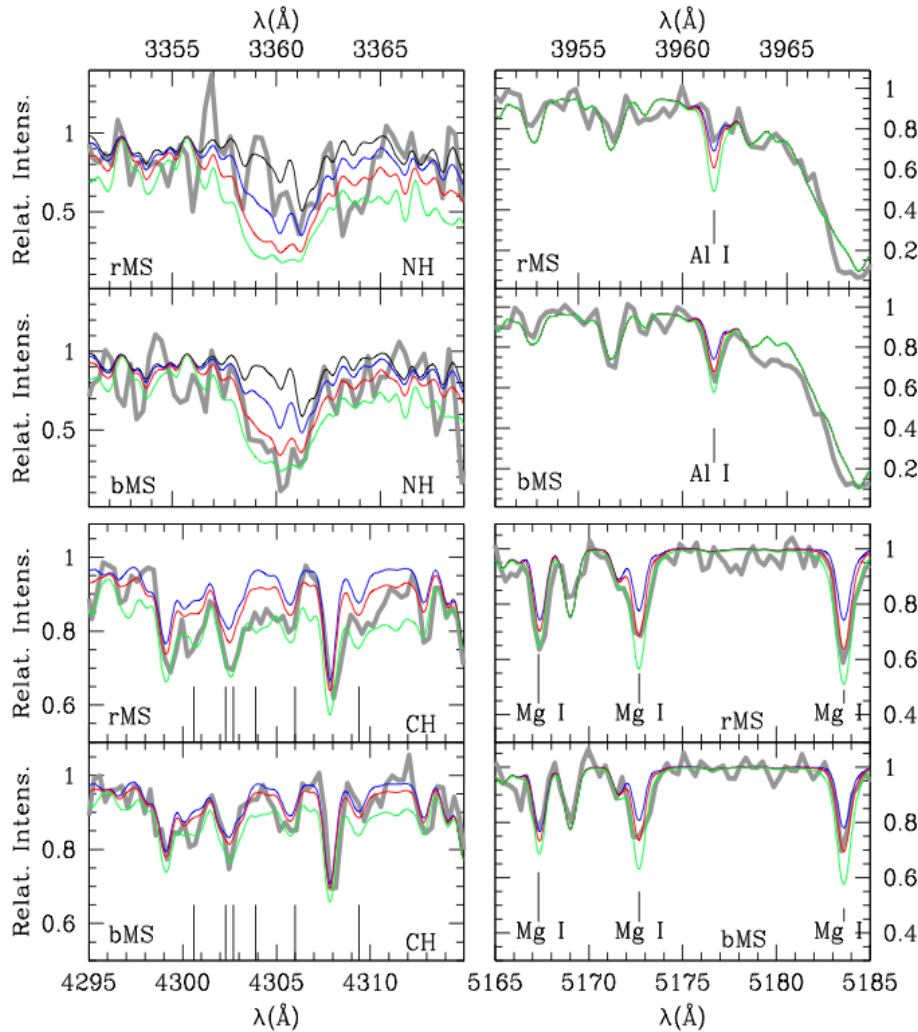
Piotto et al.
(2007)

Piotto et al. 2007

NGC 2808 MS stars composition



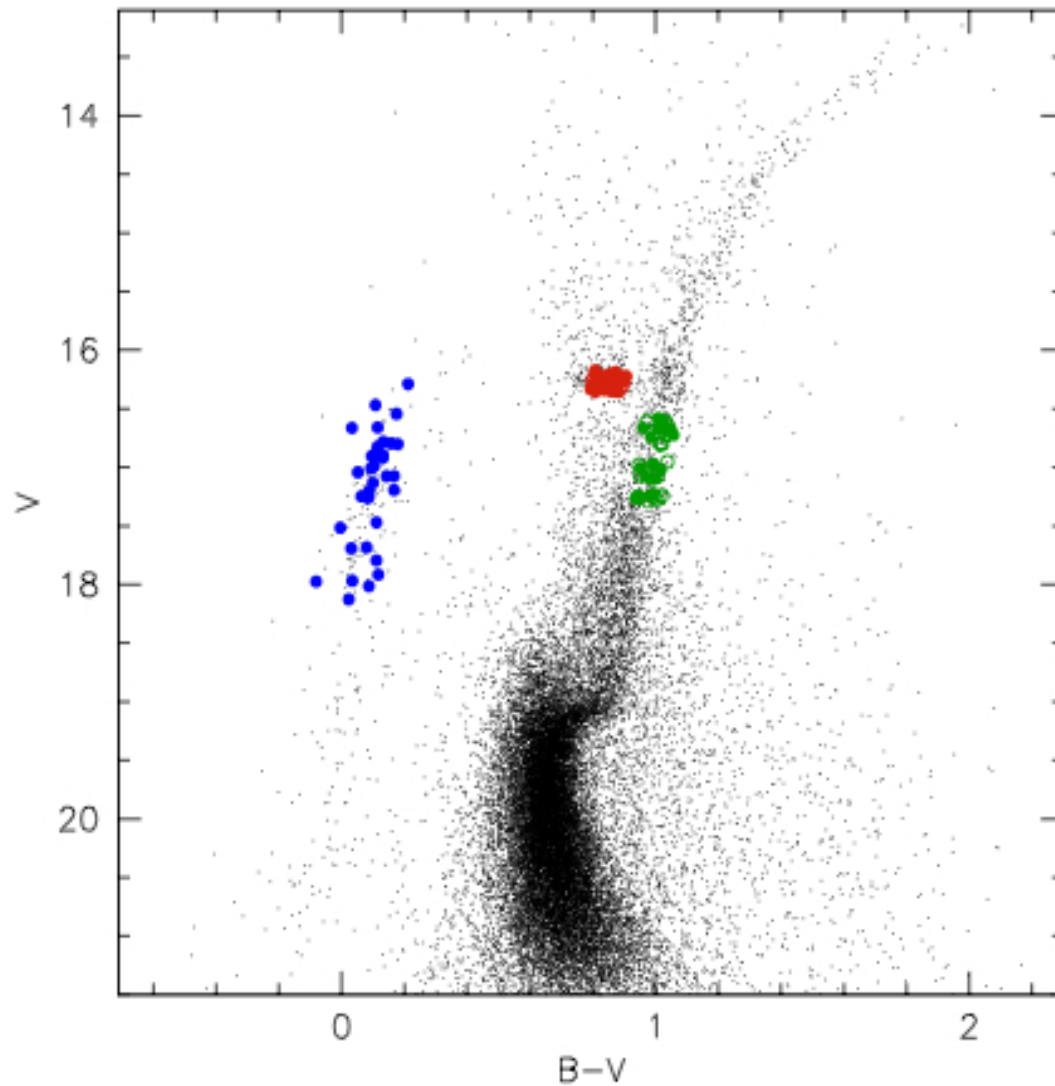
Abundances of NGC2808 MS stars



[Fe/H]=-1.1 **[Fe/H]=-1.1**
[C/Fe]=-0.3 **[C/Fe]=-0.7**
[N/Fe]=0.5 **[N/Fe]=2.0**
[Al/Fe]=-0.6 **[Al/Fe]=1.0**
[Mg/Fe]=0.4 **[Mg/Fe]=0.1**
[Na/Fe]=-0.3 **[Na/Fe]=0.7**

Bragaglia et al. (2010)

HB FLAMES observations



49 RHB

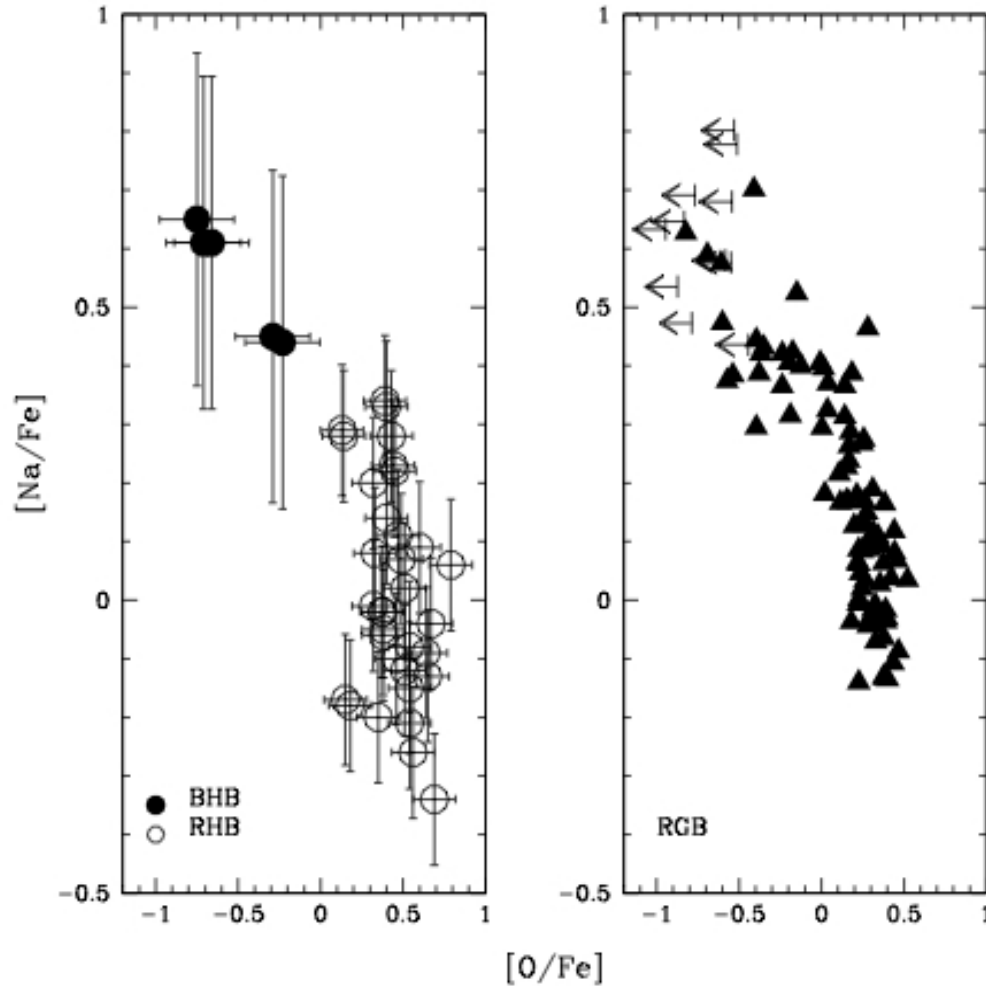
36 BHB

34 RGB

$\lambda \sim 5820-6146 \text{ \AA}$

$\lambda \sim 7745-8335 \text{ \AA}$

HB stars abundances

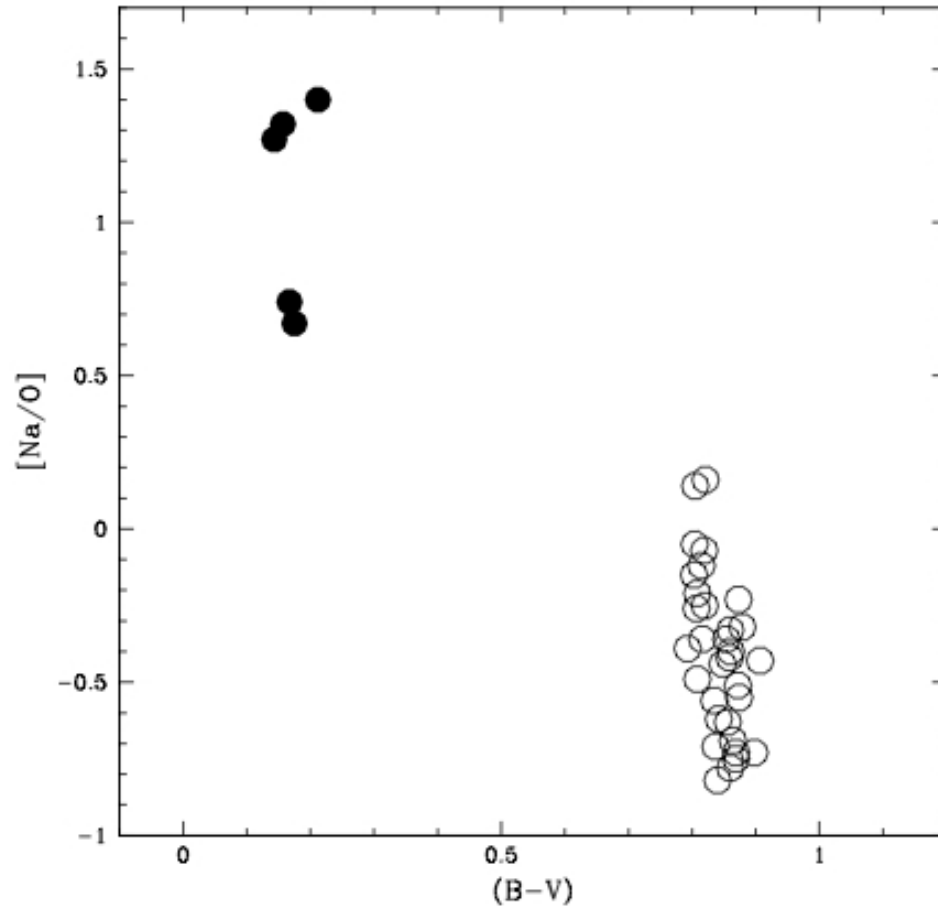


Members

37 RHB

6 BHB with $T_{\text{eff}} < 11,500$

[Na/O] vs temperature



HB and multi-populations

- ✧ BHB stars are high Na-low O
- ✧ RHB stars more O rich (Na poor), some spread
- ✧ Multiple populations explanation for HB morphology!
- ✧ Possible Na-O in RHB, maybe mixture of populations
- ✧ RHB -> red MS; BHB intermediate MS. EBT blue MS? More data on MS coming!