

# The GALAH Survey - DR3 validation

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## 1 Analysis bugs

### 1.1 BC correction

- found issue: BC interpolation wrong for  $4000\text{ K} < T_{\text{eff}} < 4080\text{ K}$  **Action: Flag**

### 1.2 lineflux minimum

- galah\_collect routine set minimum flux per line to 0.03 (was 0.02), low lineflux flagging was activated for  $< 0.03$ , not  $\leq 0.03$ . **SB: fixed in create\_product routine**

## 2 Trends with global parameters

Global parameters:  $T_{\text{eff}}$ ,  $\log g$ ,  $[\text{Fe}/\text{H}]$ ,  $\frac{\sigma(\varpi)}{\varpi}$ ,  $v_{\text{mic}}$ ,  $\chi^2$

### 2.1 Overall sample trends

### 2.2 Intra-cluster trends (same true $\varpi$ )

- issues for  $T_{\text{eff}} > 6500\text{ K}$  and  $T_{\text{eff}} < 4500\text{ K}$
- issues for both dwarfs and giants?
- **Action: large differences for FE\_H vs. FE\_H\_ATMO?** **SB: No, very similar values. Blending criterium (chimax) to high for Fe runs? Was set to include all lines irrespective of blending**

### 2.3 Inter-cluster trends

See Lorenzo Spina's email from 200131

## 2.4 Wide binaries

## 2.5 Solar twins

# 3 Validation of regions of the HRD

## 3.1 Cool dwarfs ( $T_{\text{eff}} < 4500 \text{ K}$ , $\log g > 4 \text{ dex}$ )

- Clumps in Li
- high  $[\text{O}/\text{Fe}]$  for some stars of expected low- $\alpha$  populations

## 3.2 Coolest giants ( $T_{\text{eff}} < 4080 \text{ K}$ )

- clumps? trends?

## 3.3 Edges of Isochrone sets

### 3.3.1 low $\log g$ ends

- masses wrong?

### 3.3.2 Youngest stars

- linear isochrone grid with 0.5..(0.5)..13.5 Gyr
- masses wrong?

### 3.3.3 Cool edge of RC

- overdensities in  $[\text{O}/\text{Fe}]$  at  $T_{\text{eff}} \sim 4500 \text{ K}$  and  $[\text{O}/\text{Fe}] \sim -0.2 \text{ dex}$

### 3.3.4 Overdensity at $T_{\text{eff}} \sim 4750 \text{ K}$ dwarfs

- masses, BC, A\_Ks, Ks weird, starting values (local chi2 min)? [SB: Ks ok. CMD of 2MASS and Gaia consistent, but showing them at lower Teff](#)

### 3.3.5 High mass stars

### 3.3.6 2nd RC

## 3.4 Hot stars $T_{\text{eff}} > 6500 \text{ K}$

- offset for  $[\text{O}/\text{Fe}]$  for  $T_{\text{eff}} > 6500 \text{ K}$ ? high  $[\text{Ba}/\text{Fe}]$  and low  $[\alpha/\text{Fe}]$
- high  $[\text{Ca}/\text{Fe}]$  scatter for  $T_{\text{eff}} > 7000 \text{ K}$
- tails at high  $[\text{Ba}/\text{Fe}]$ , low  $[\text{O}/\text{Fe}]$

### 3.5 High $A_{K_S}$ stars

- difference of  $A_{K_S}(\text{RJCE})$  vs.  $A_{K_S}(E(B - V))$ ?

### 3.6 Metal-rich stars

- split in  $[\text{Al}/\text{Fe}]$  around  $[\text{Fe}/\text{H}]$  0.2 dex?

## 4 Benchmark Star Abundances

Script: GALAH\_DR3/GBS/GBS\_PERFORMANCE\_ABUNDANCES.IPYNB

- Jofre+2018 GBS2.1

## 5 Comparison with SDSS DR16

- general trends - star by star comparison - separated for giants and dwarfs

## 6 Upper limits

- look at specific regions of the HRD and decide when enough detections are available to warrant upper limit calculations - create lineflux plots similar to DR2 Figure 6