

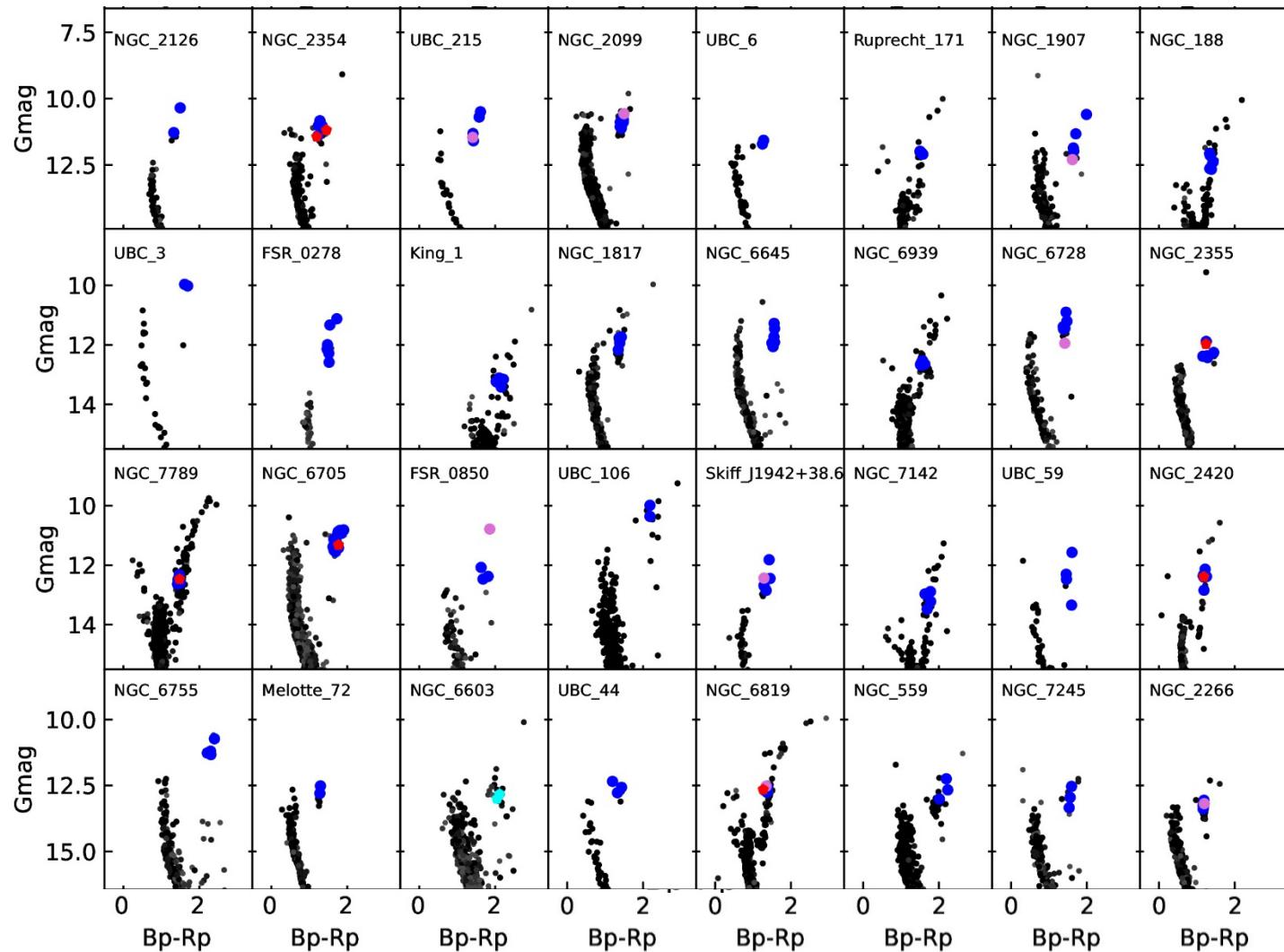
Spectroscopic analysis at OCCASO survey



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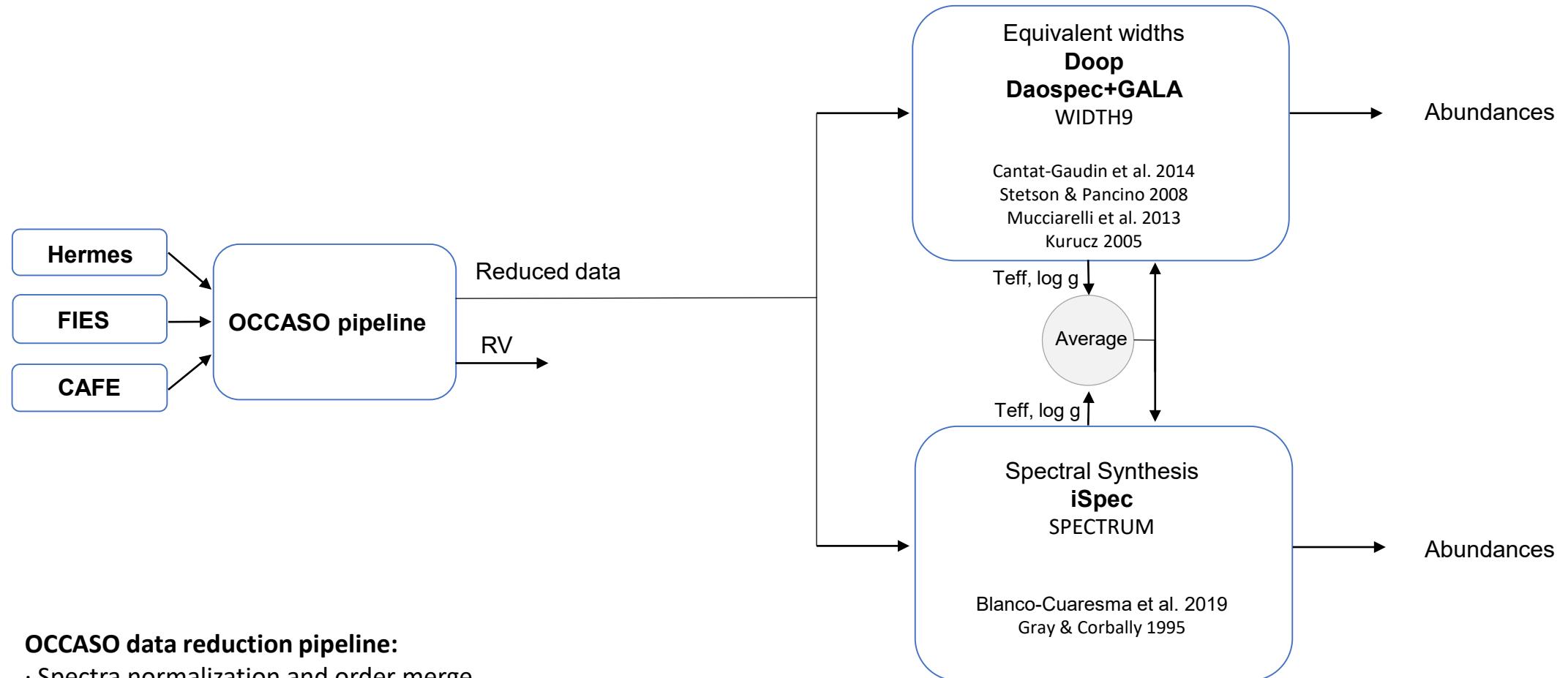
1 Open Clusters Chemical Abundances from Spanish Observatories (OCCASO)



We present the study of **red clump stars** observed with **high resolution spectroscopy** and analysed with **equivalent width** and **spectral synthesis** methods.

Sky Coverage	North
Total observed stars	312
Individual Spectra	1411
Observation nights	152
Open clusters	47
S/R (pix^{-1})	≥ 70
R	> 62000
Magnitude limit	G = 14
Age	> 0.3 Ga
Spectral Range	500 – 900 nm

3 Spectroscopic Analysis



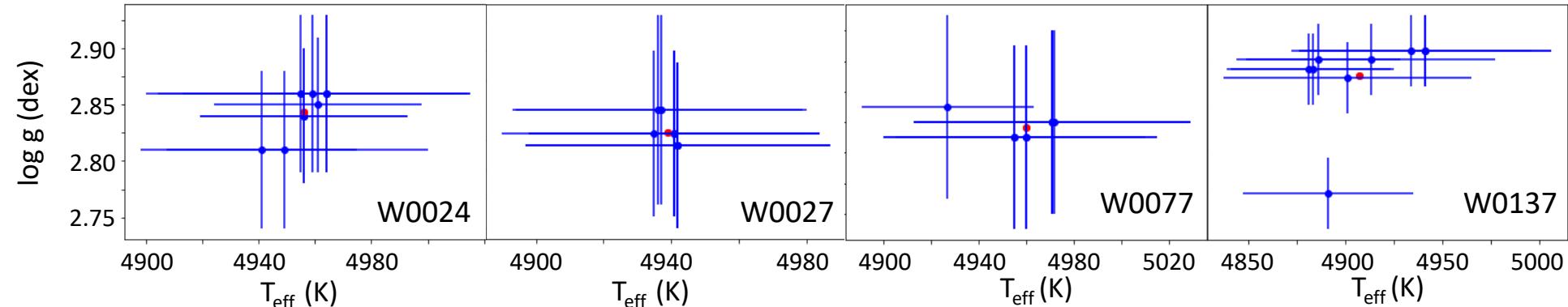
Carrera et al. submitted

Blanco-Cuaresma et al. 2017, Casamiquela et al. 2017

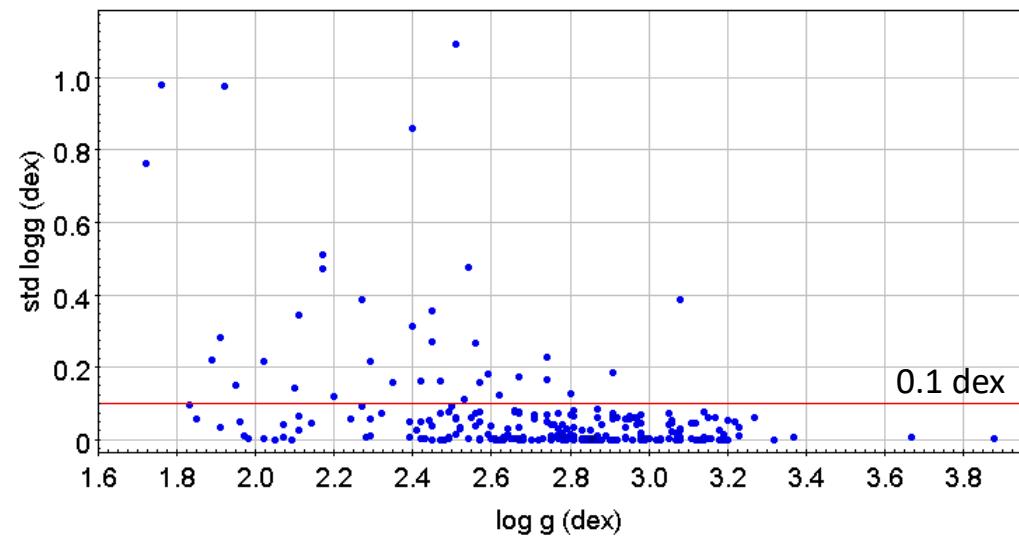
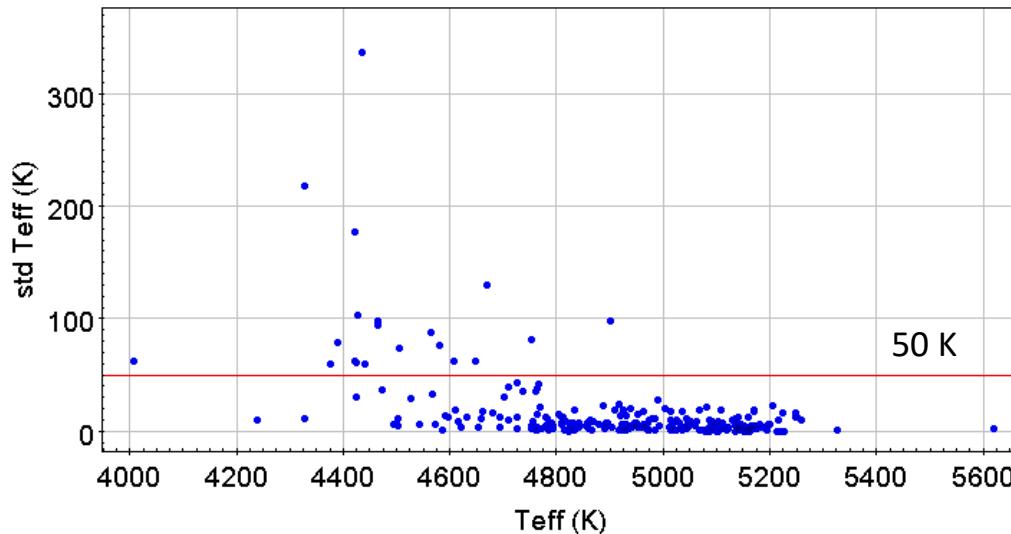
3 Spectroscopic Analysis: GALA

Dependency of the atmospheric parameters on the GALA input parameters

Example with stars of the cluster NGC 752



Distribution of T_{eff} and $\log g$ standard deviations



$\sigma T_{\text{eff}} > 50 \text{ K} :$
8% of the sample

$\sigma \log g > 0.1 \text{ dex} :$
14% of the sample

3 Spectroscopic Analysis: GALA

Selection criteria of the result:

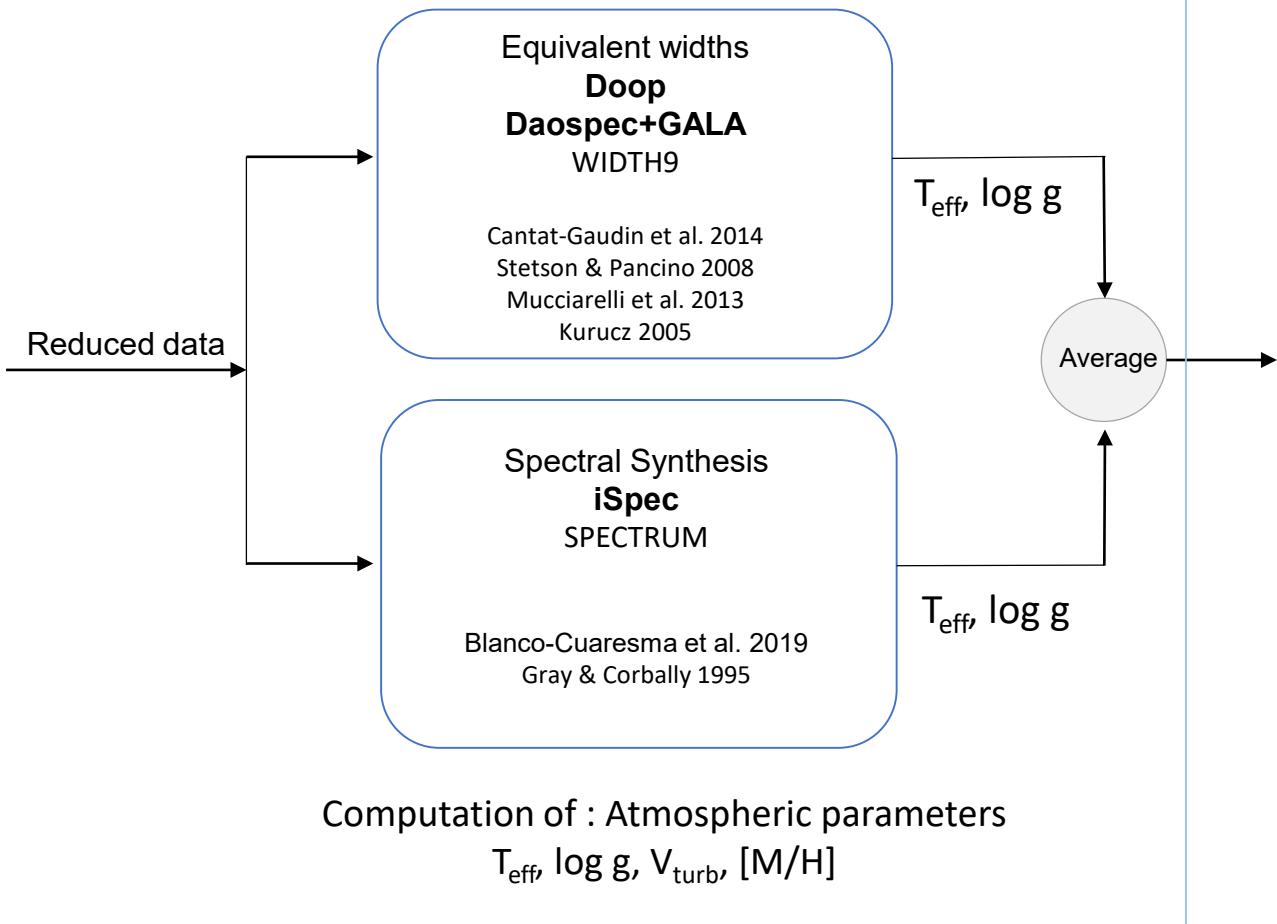
- Gala Merit Function Criterion: we choose the solution that has the best merit function.
- Proximity Criterion: we choose the solution more similar to guess. $|T_{\text{eff guess}} - T_{\text{eff}}| < 100 \text{ K}$, $|\log g_{\text{guess}} - \log g| < 0.5 \text{ dex}$
- Most repeated value: we choose the solution to which GALA converges more times.

	Merit Function	Proximity Criterion	Most repeated value	%
Case 1	✓	✓	✓	78%
Case 2	✗	✓	✓	13%
Case 3	✓	✓	✗	2%
Case 4	✗	✗	✗	7%

We use this method to select the result, evaluate its degree of confidence and to detect potentially problematic stars.

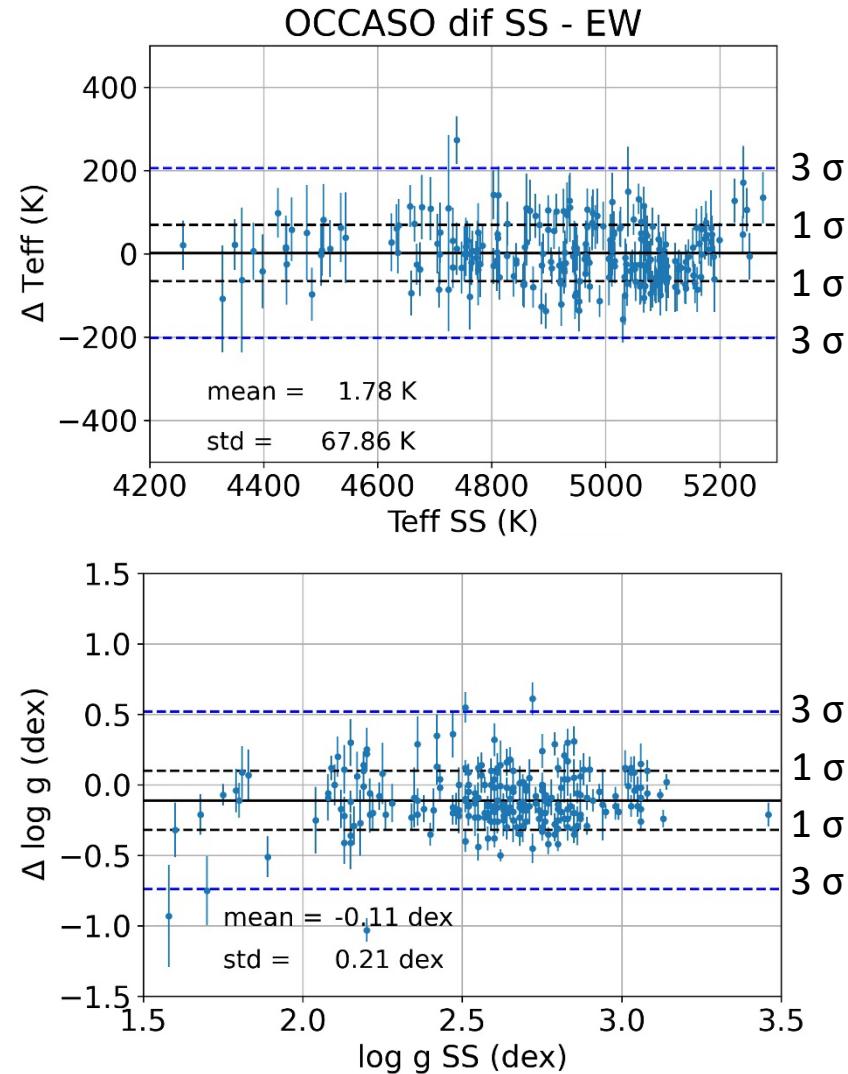
3 Spectroscopic Analysis

Step 1: Atmospheric parameters



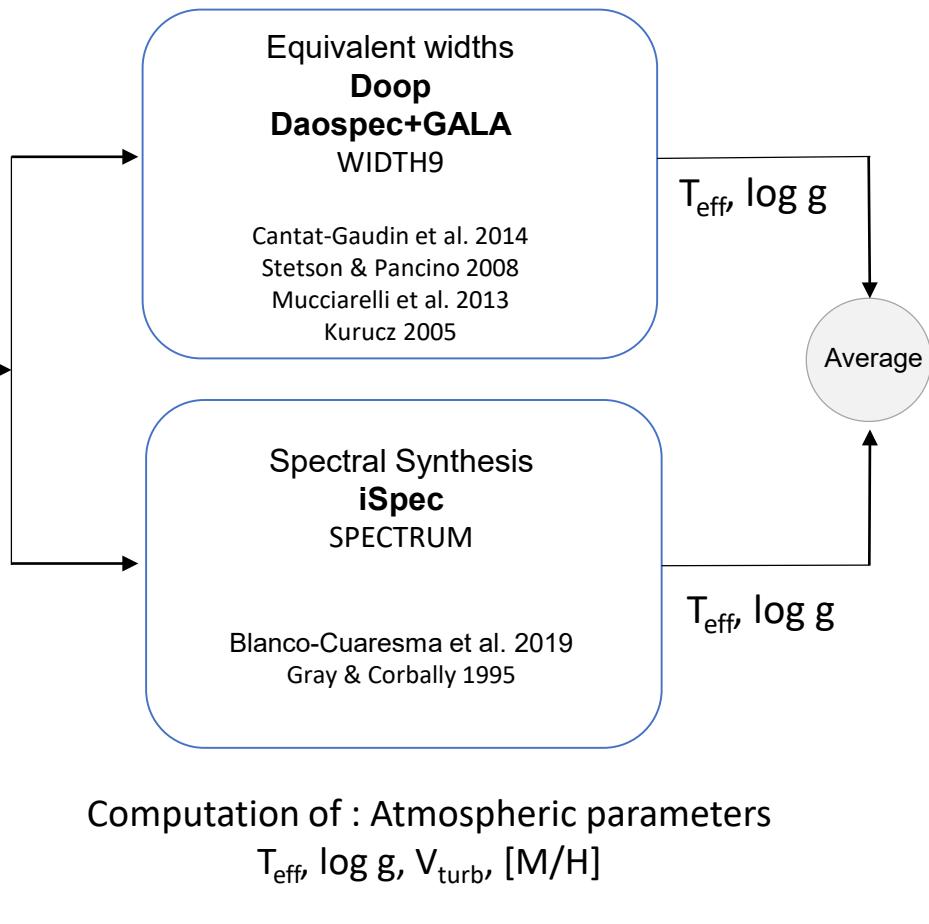
4 Spectroscopic Analysis, GALA and iSpec comparison

Step 1: Atmospheric parameters comparison

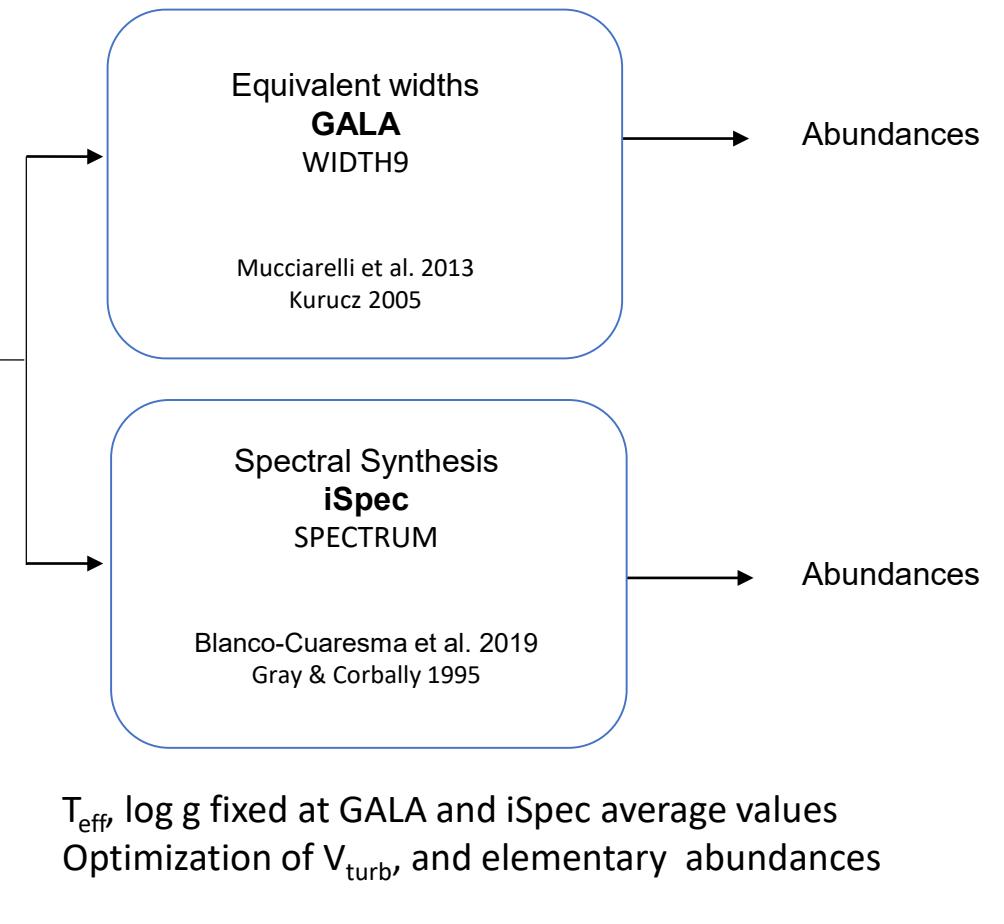


3 Spectroscopic Analysis

Step 1: Atmospheric parameters

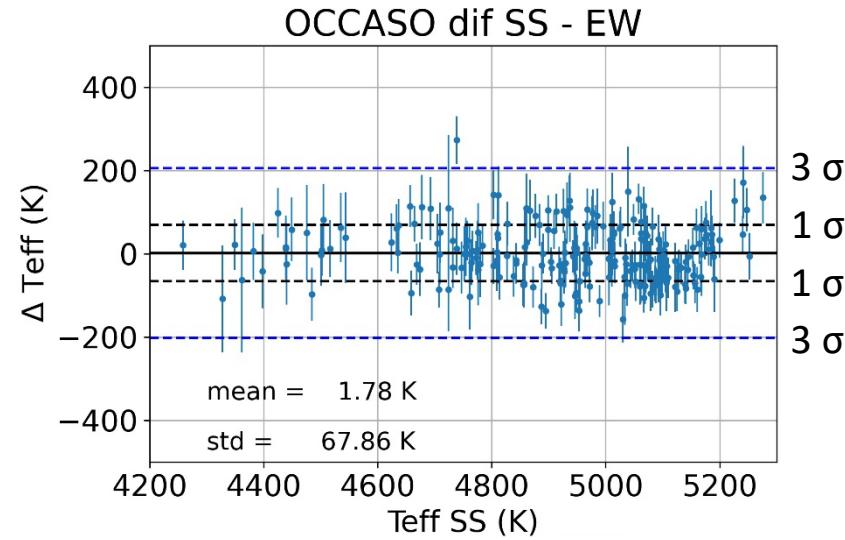


Step 2: Elementary abundance

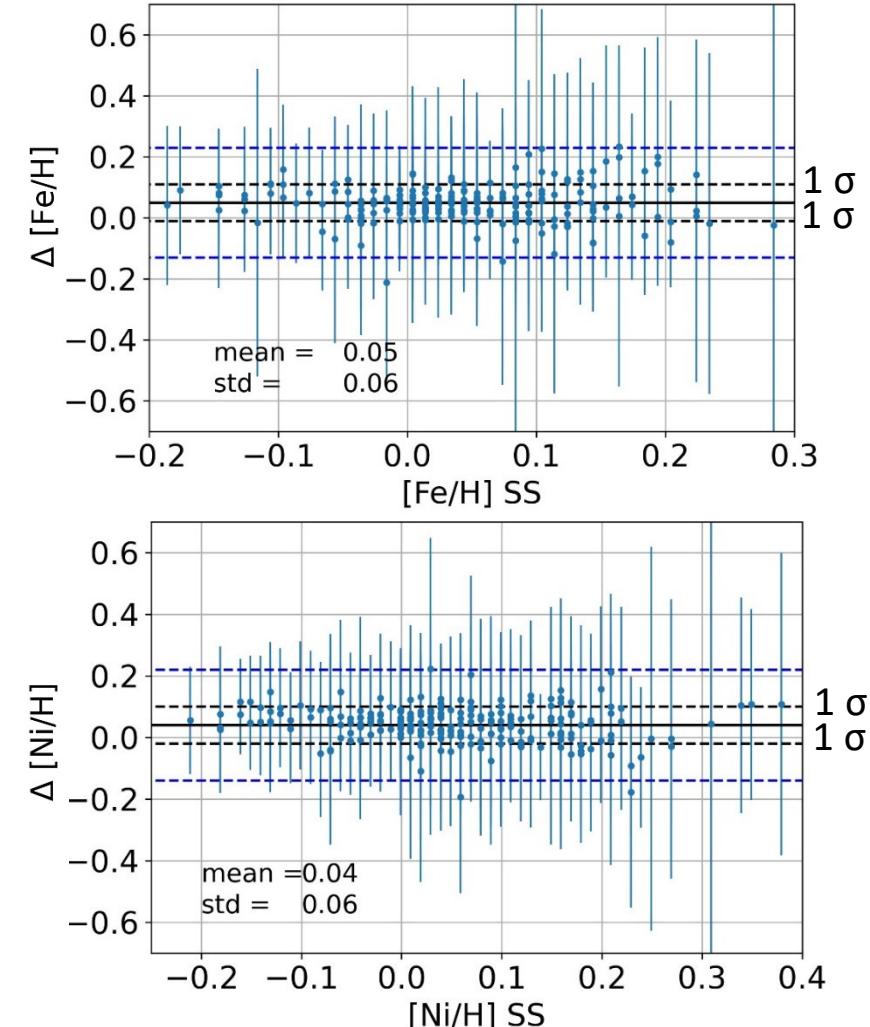


4 Spectroscopic Analysis, GALA and iSpec comparison

Step 1: Atmospheric parameters comparison



Step 2: Abundance comparison





5 Conclusions

- In GALA there is a dependency in the calculation of atmospheric parameters with the guess parameters. That is especially relevant for 14% of the sample.
- We have developed a method to mitigate this dependency.
- There is no important systematic dependence on the atmospheric parameters determined by both methods.
- By averaging the results on temperature and gravity from both methods and then using these averaged values to calculate the abundance, we minimize the systematic difference in the determination of abundances.
- We have computed temperature, gravity and abundances for 312 stars belonging to 47 open clusters with a precision between 0.05 and 0.15 dex in the abundance of the clusters.



Thank you