Constraining the chemical evolution of the Galaxy through Differential Abundances

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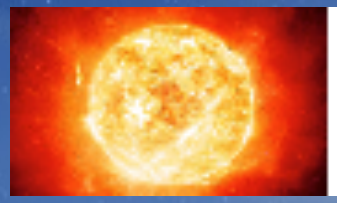
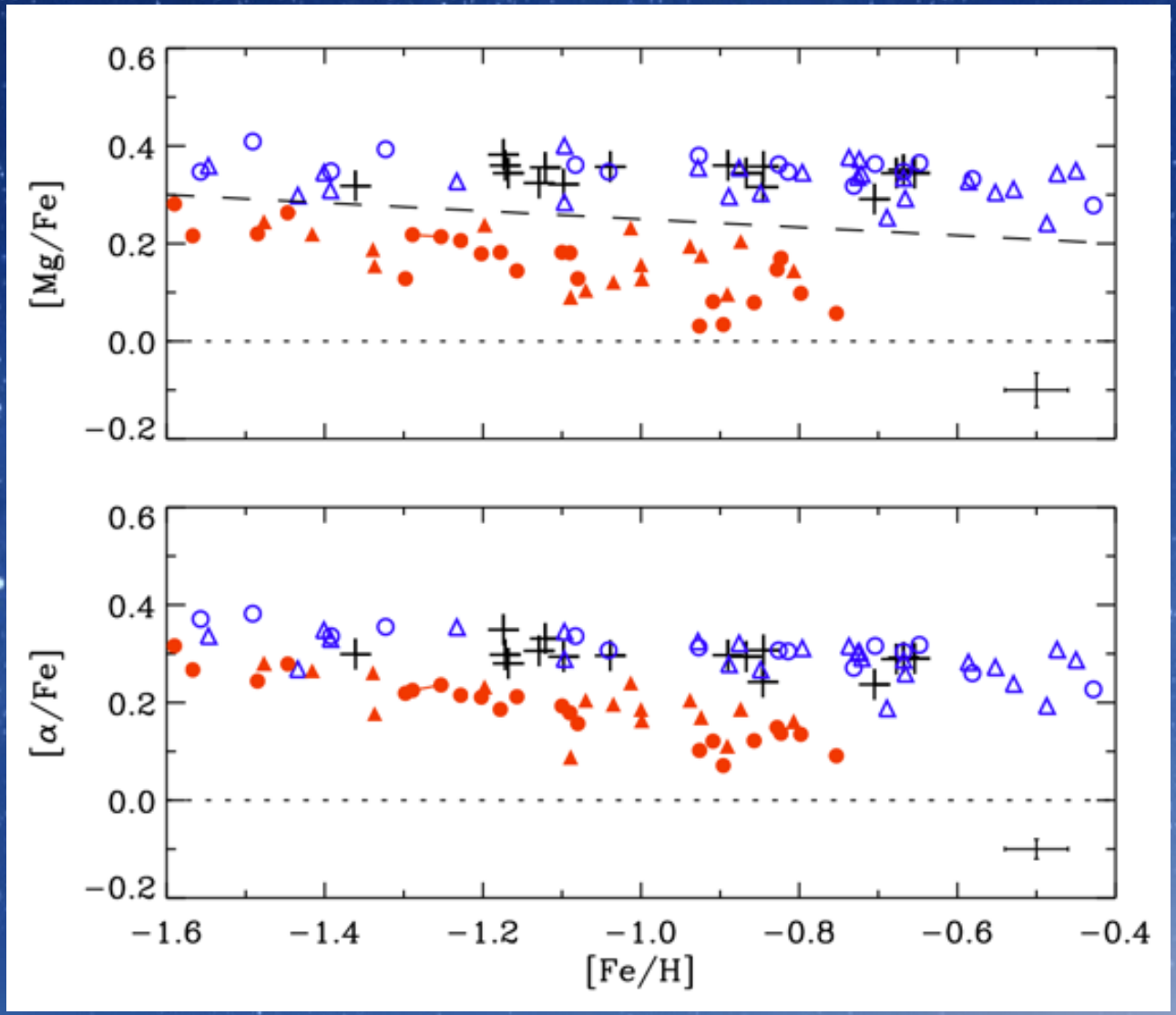
Jorge Meléndez

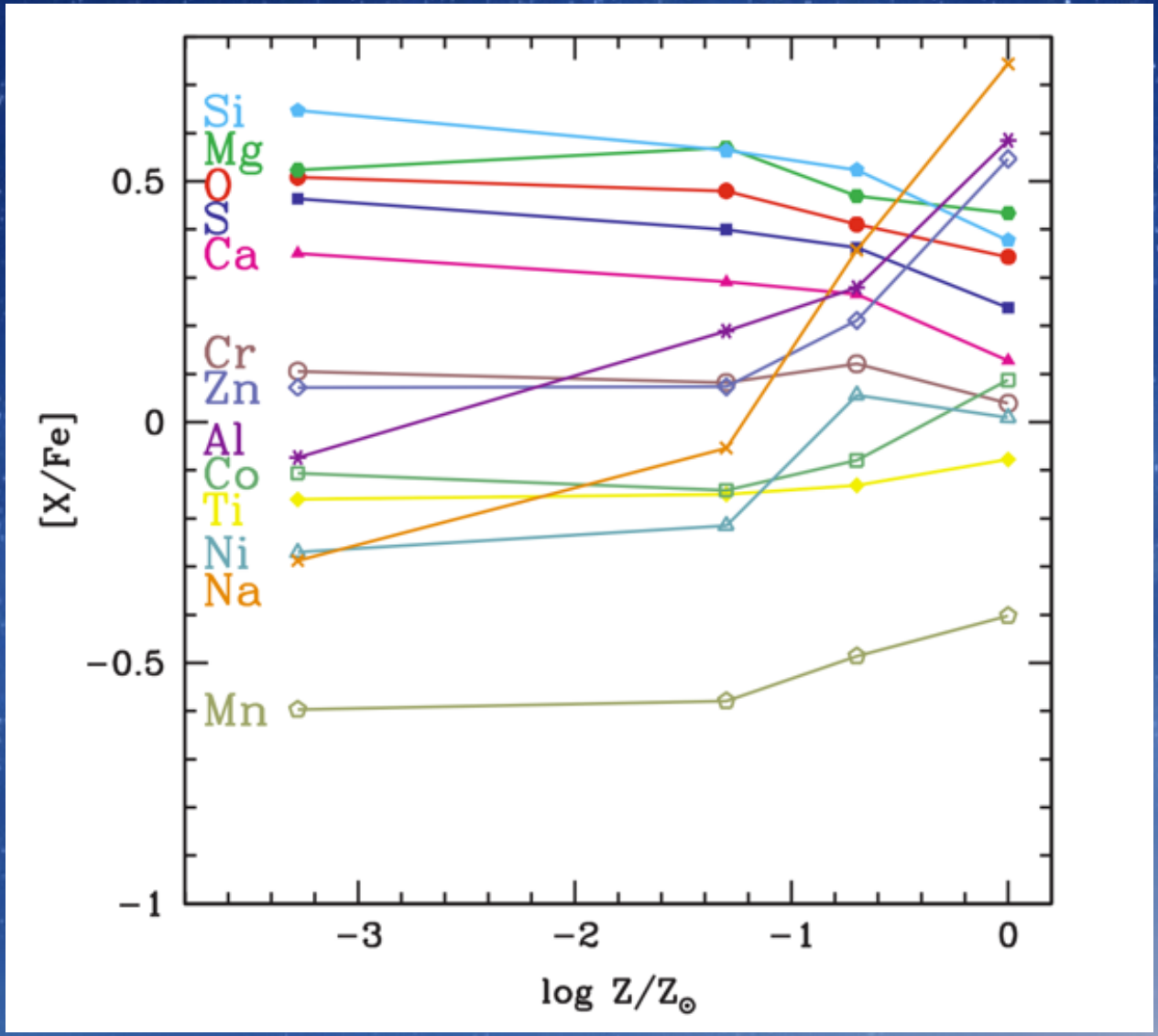
Precision Spectroscopy 2016.



SAMPA
Stellar Atmospheres Planets and Abundances



Nissen & Schuster 2010



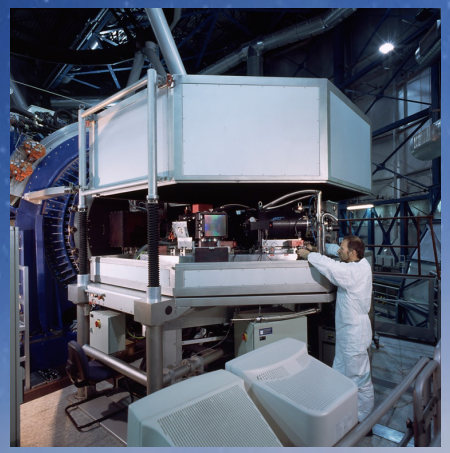
Kobayashi+ 2006

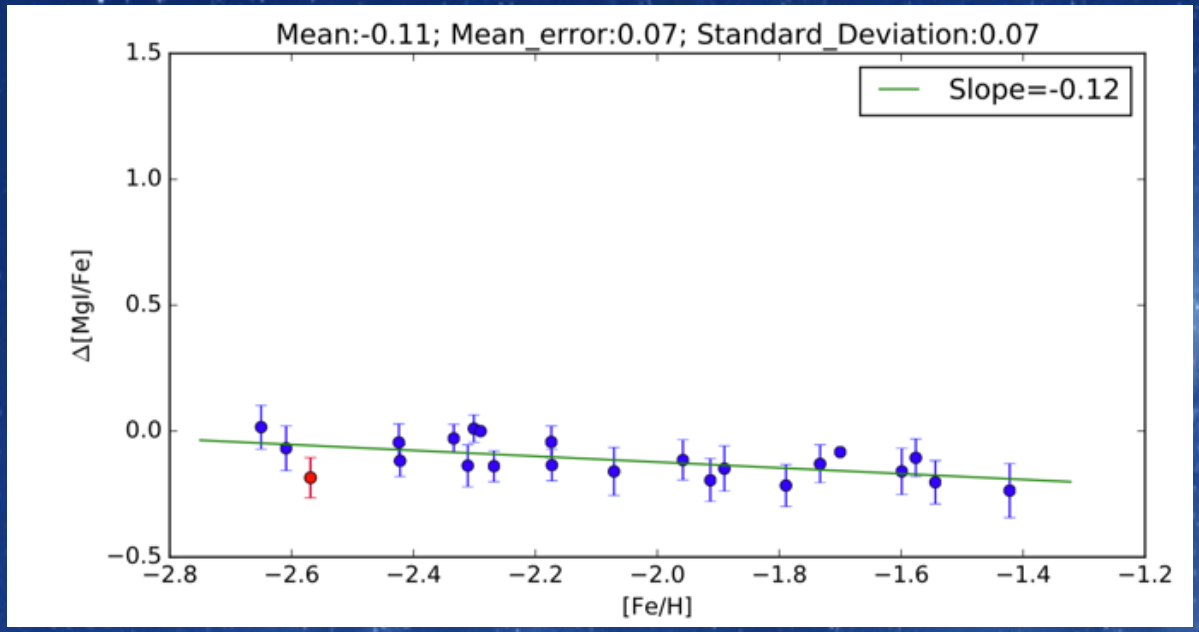
Sample & Measurements

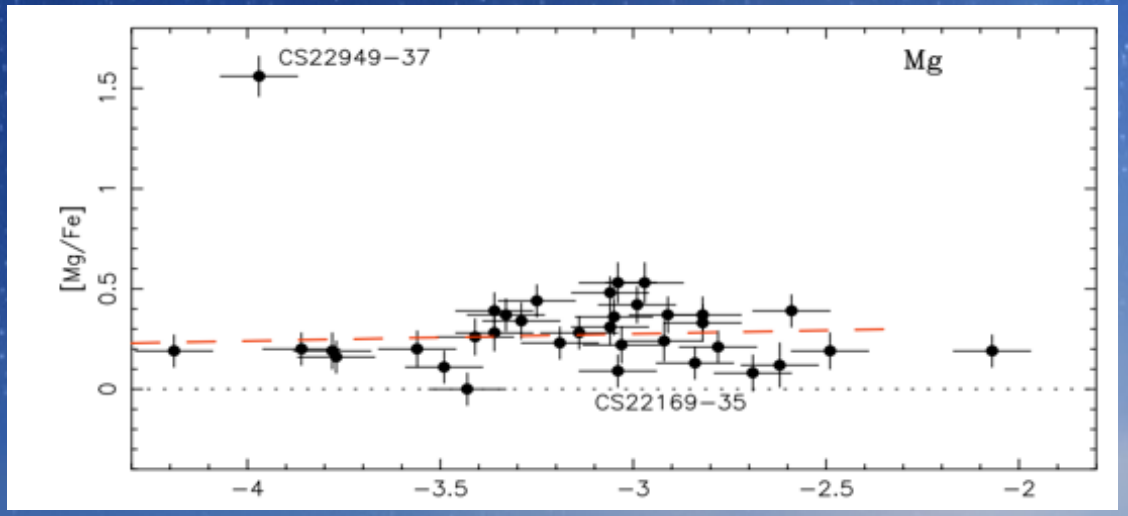
- UVES/VLT. R~50 000, S/N~200 (5000 A)
- 23 stars, with exposure times of approximately

2 hours each. 6240 < Teff < 6911

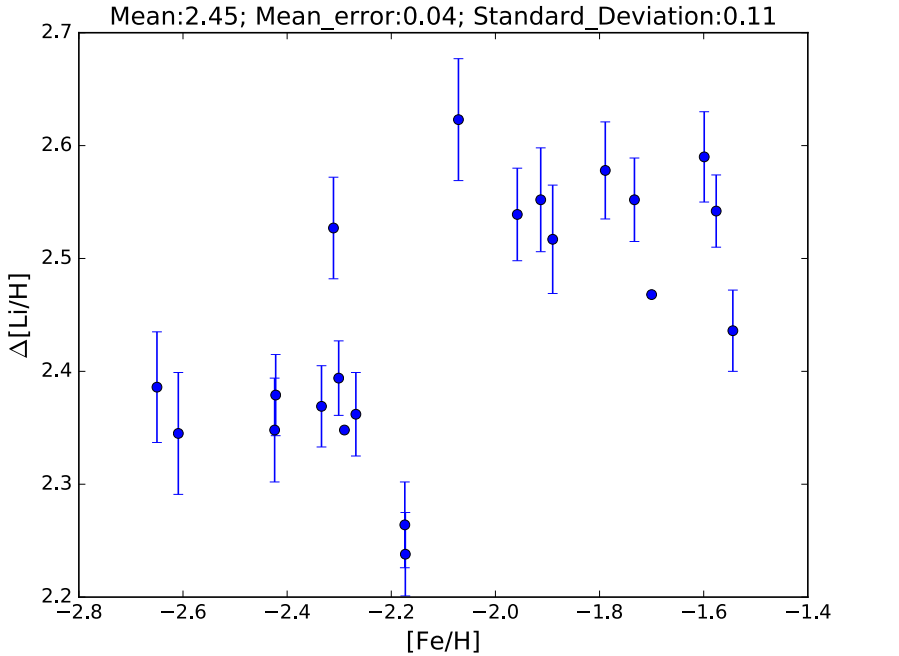
- 4.0 < log g < 4.6
- Equivalent Widths measurements: splot task – IRAF
- Abundances calculations: MOOG (Sneden 1973)
- Differential excitation equilibrium solutions, differential ionization equilibrium solutions, differential abundances: q2 code (Ramírez, et al. 2014)

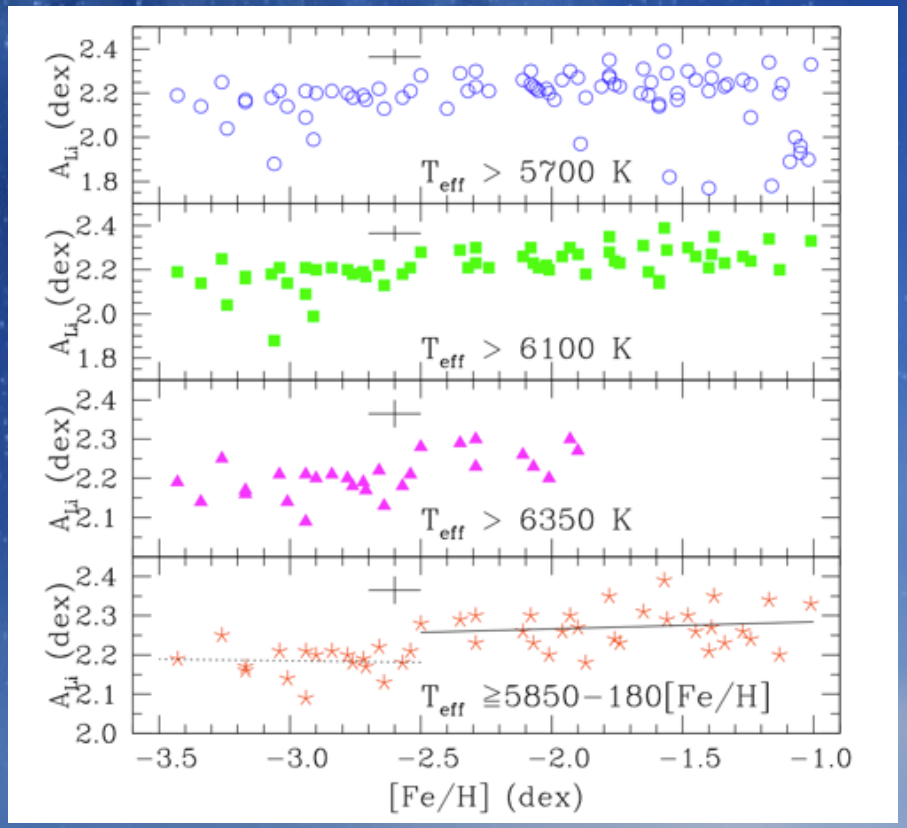



Mean:-0.11; Mean_error:0.07; Standard_Deviation:0.07
Slope=-0.12
Δ[MgI/Fe]
[Fe/H]
1.5
1.0
0.5
0.0
−0.5
−2.8
−2.6
−2.4
−2.2
−2.0
−1.8
−1.6
−1.4
−1.2

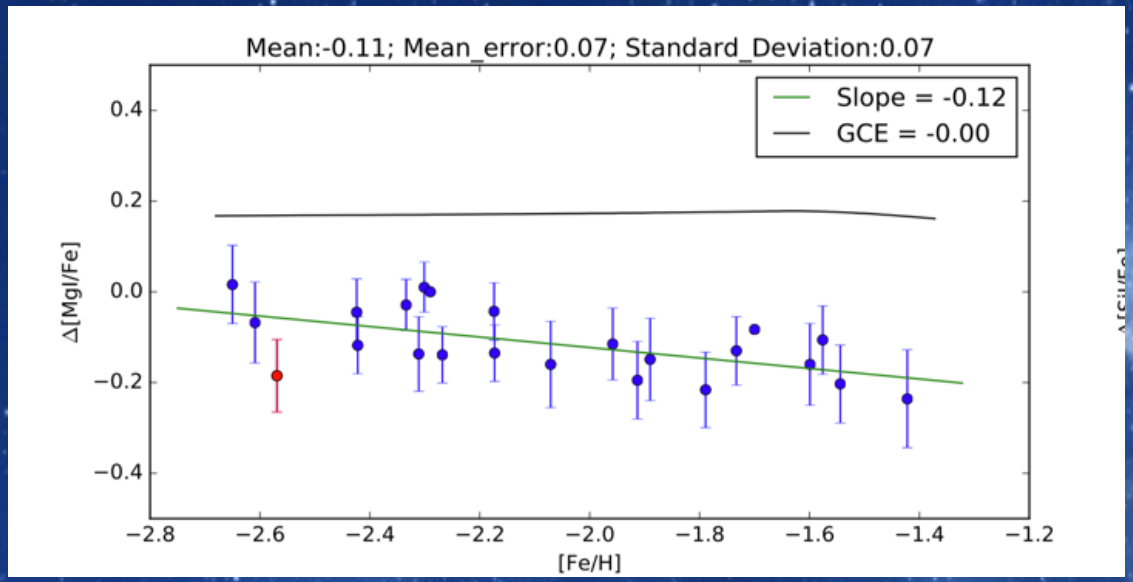

CS22949−37
Mg
CS22169−35
[Mg/Fe]
1.5
1
0.5
0
−4
−3.5
−3
−2.5
−2

Cayrel+ 2004

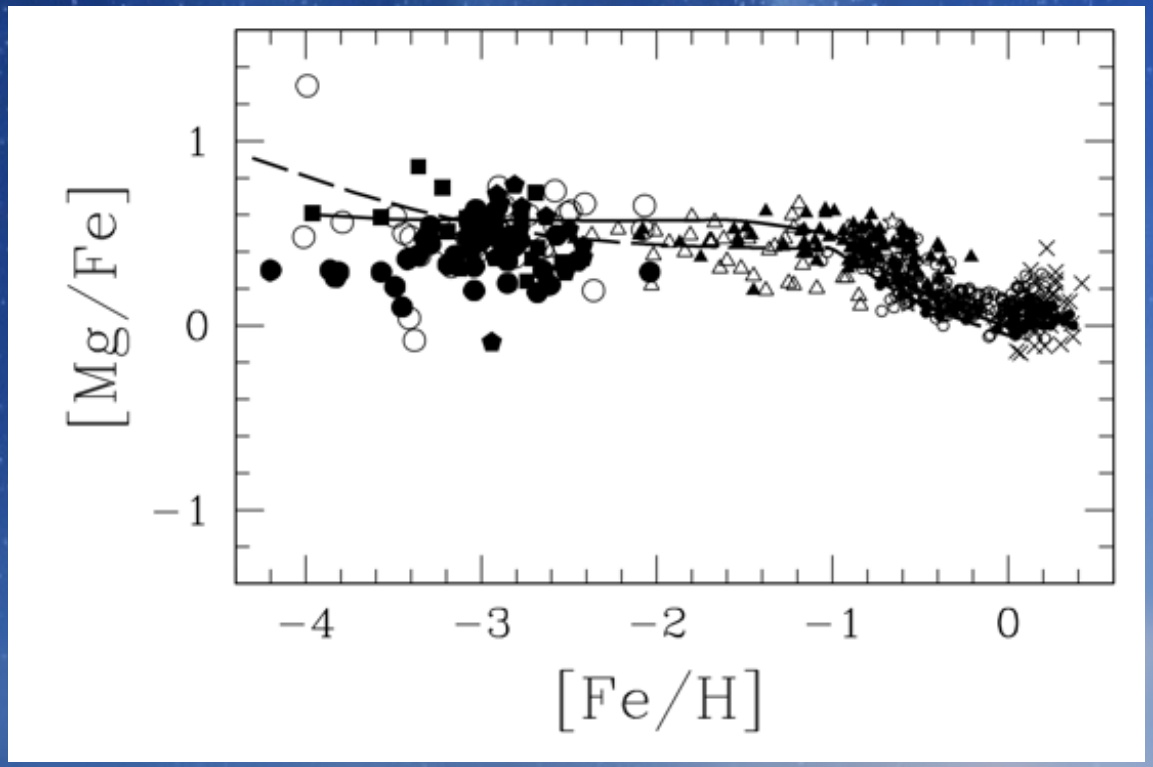




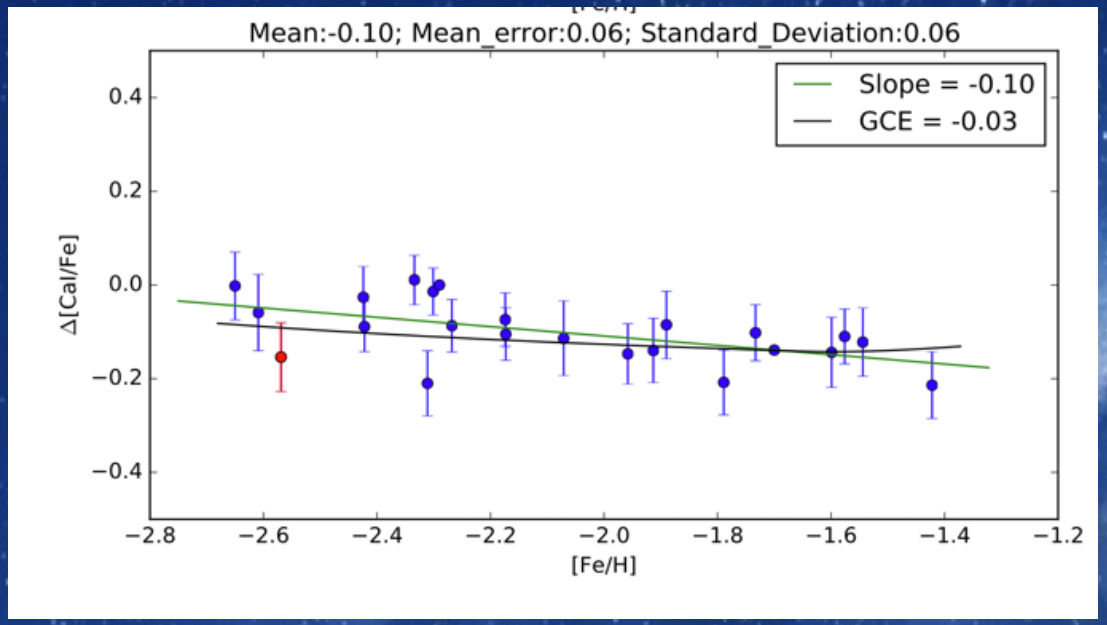
Kobayashi+ 2006



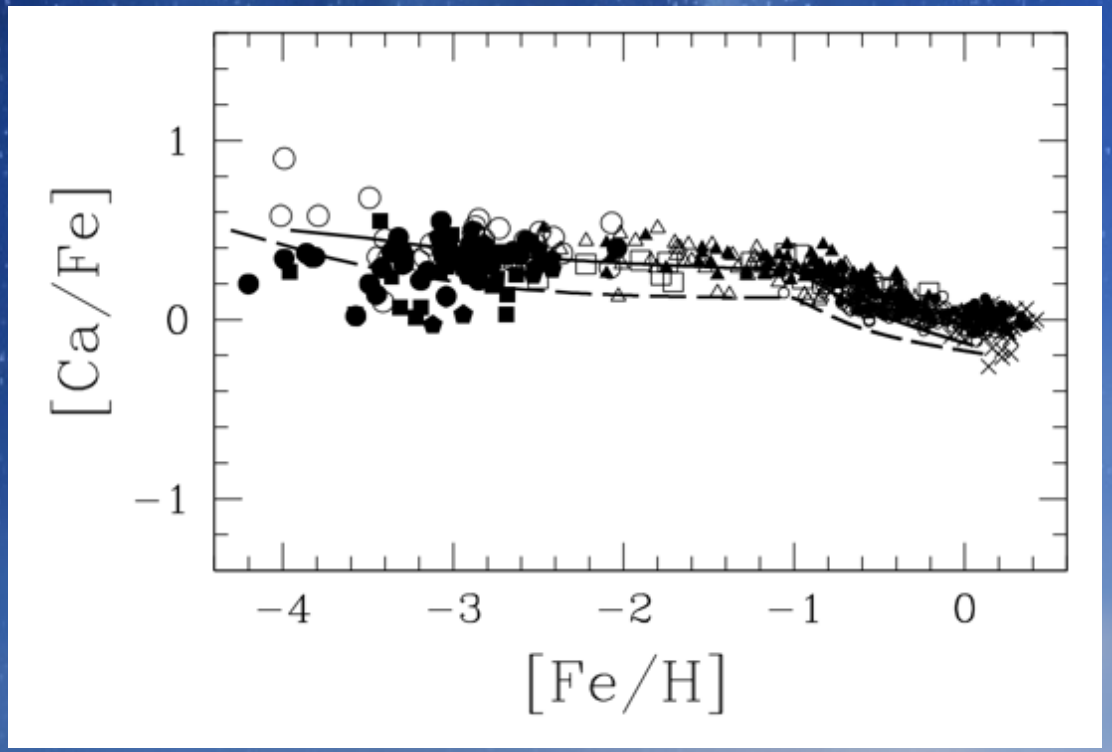
[Mg/Fe] = +0.35



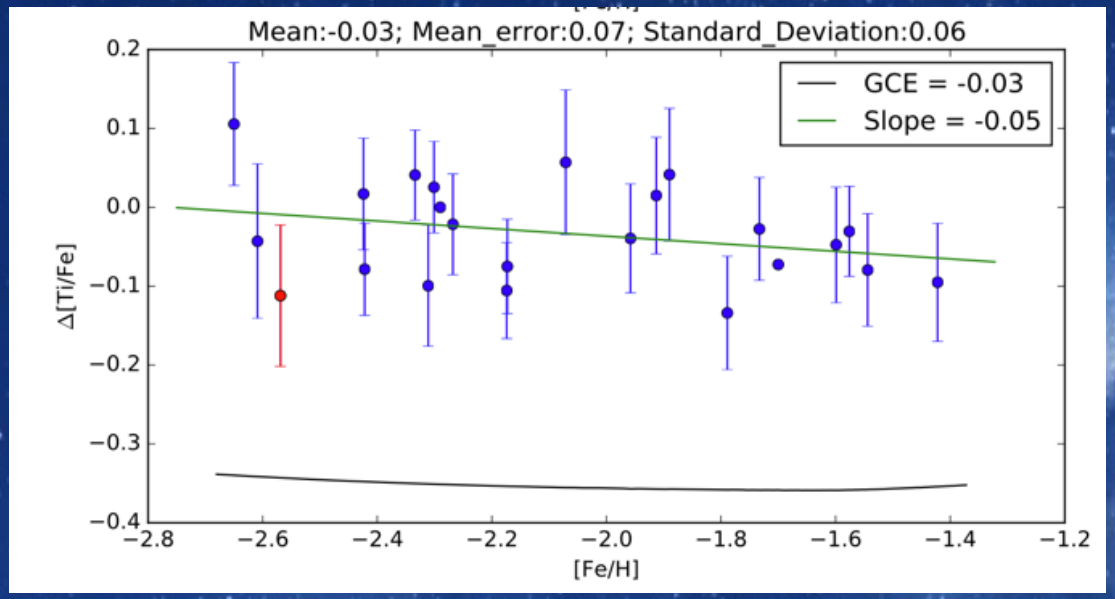
Kobayashi+ 2006



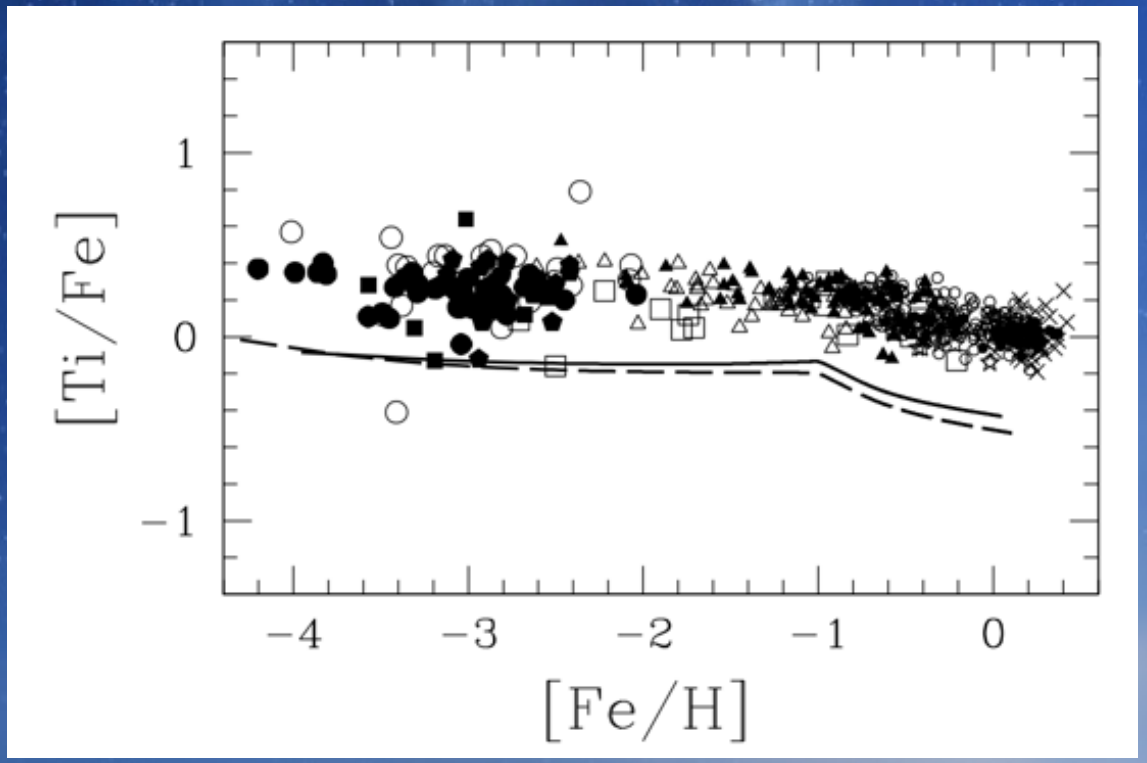
[Ca/Fe] = +0.40



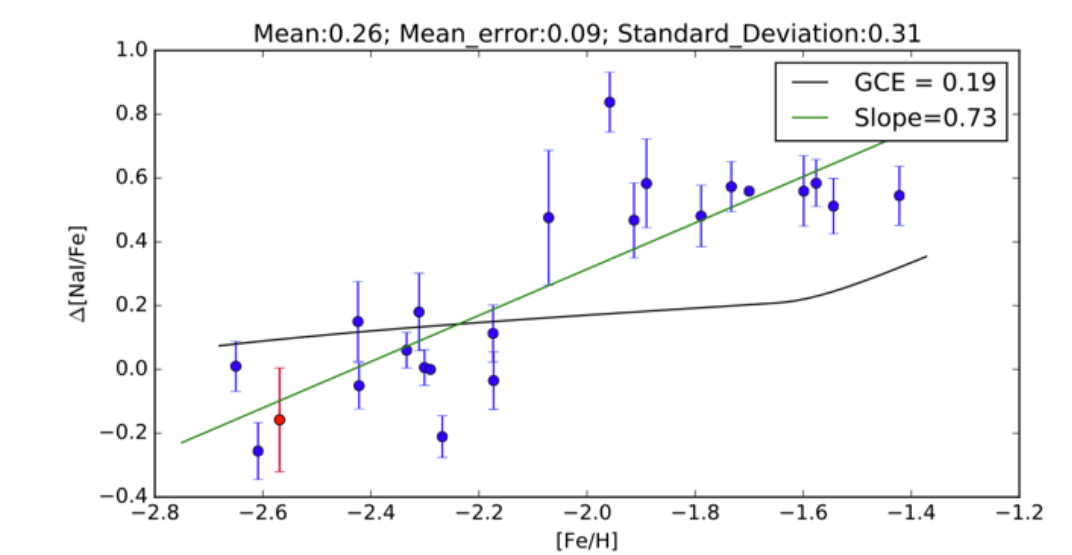
Kobayashi+ 2006



[Ti/Fe] = +0.46

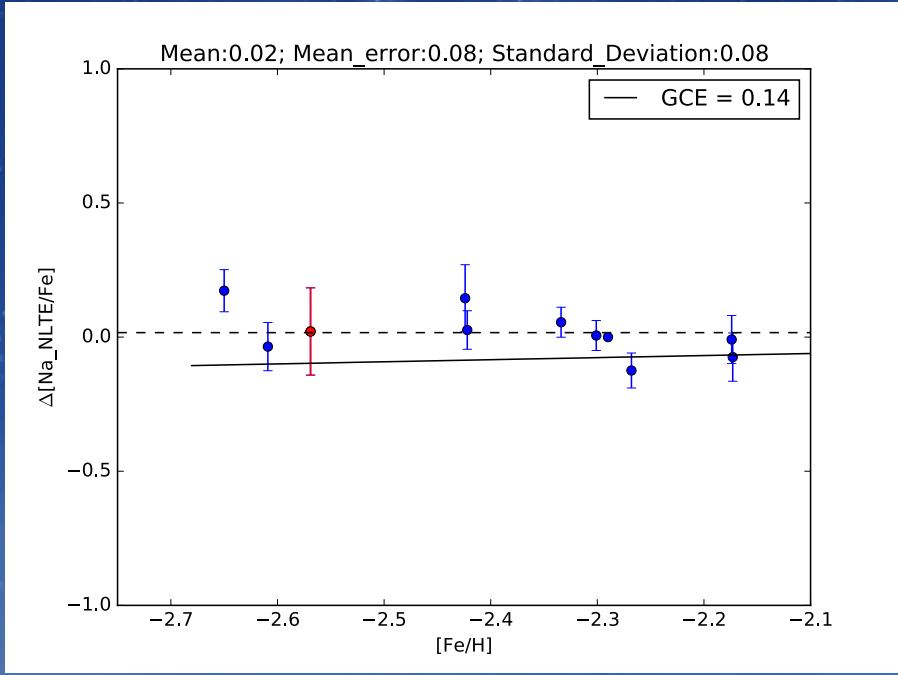


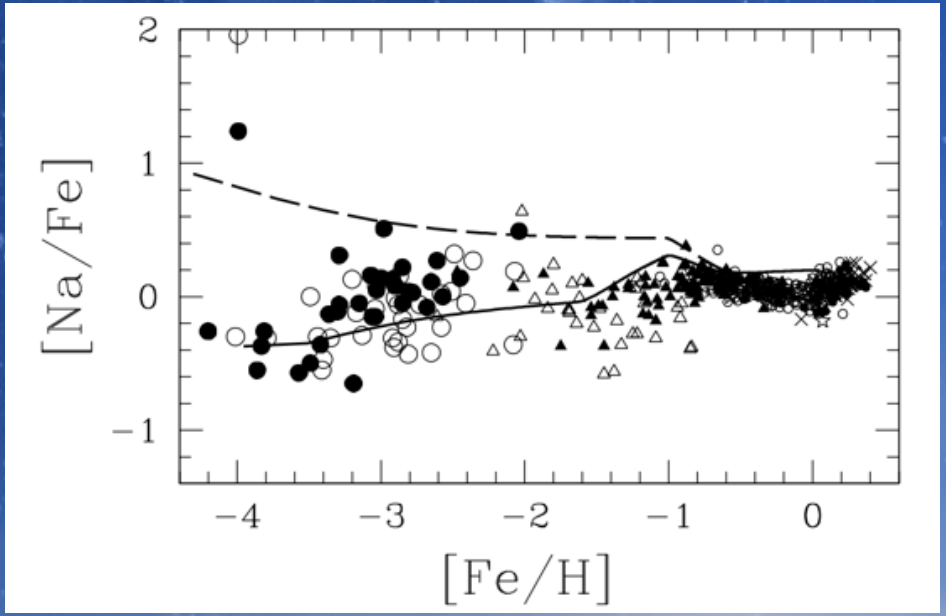
Kobayashi+ 2006



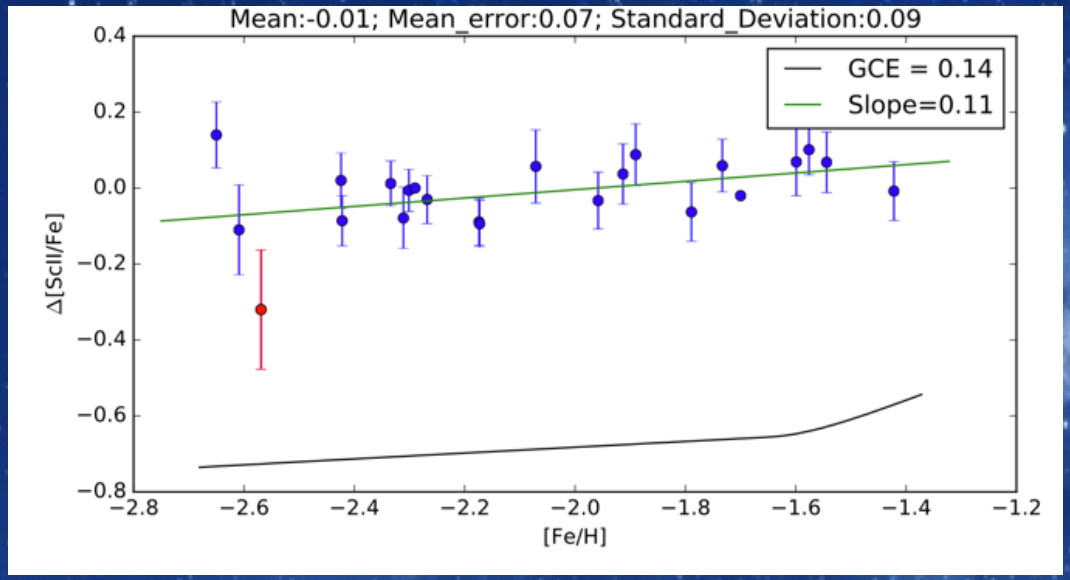
[Na/Fe] = +0.05

Kobayashi+ 2006

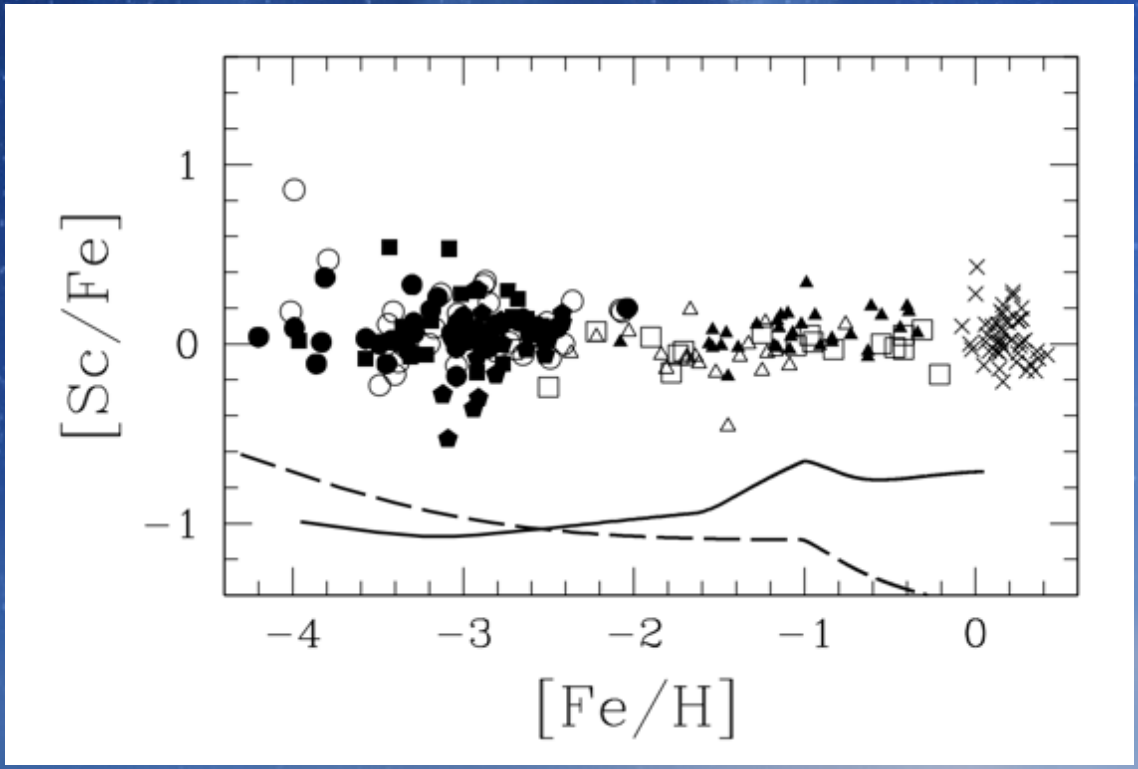




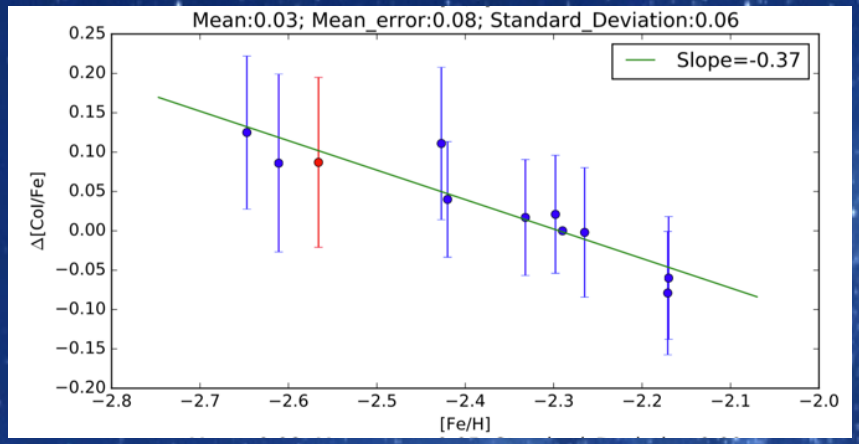
NLTE corrections: Lind+ 2011

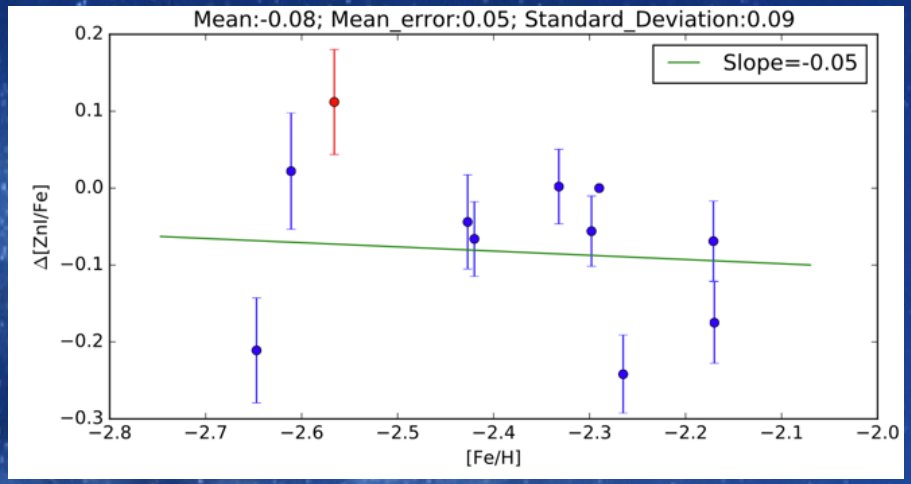


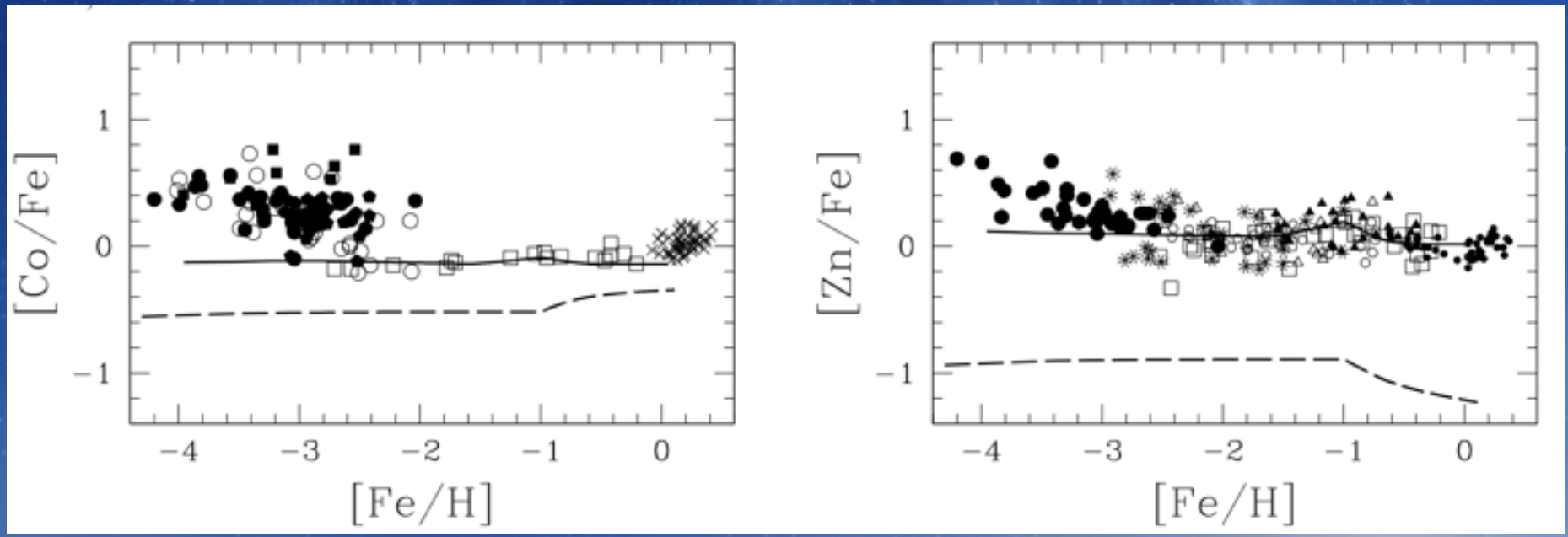
[Sc/Fe] = +0.38



Kobayashi+ 2006







Kobayashi+ 2006

Conclusions

- Differential abundances can better constrain GCE.
- There are no detectable distinct populations in alpha element abundances.
- Both alpha-elements and odd Z elements behave as predicted by GCE, as previously observed.
- We found a previously unobserved slope in Sc abundance, predicted in GCE models.
- As found by other authors, such as Cayrel+ 2004, we find, in our reduced sample, a small slope in Co and Zn, not seen in GCE model predictions.