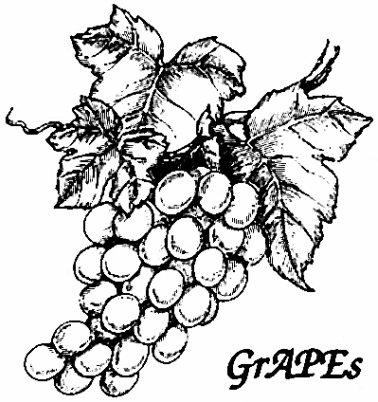
Chemical abundances of a solar-like stars sample

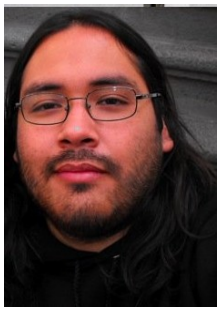
Ricardo López Valdivia
Dr. Miguel Chávez
Dr. Emanuele Bertone



Grupo de Atmósferas y Poblaciones Estelares

Miguel Chávez

Emanuele Bertone



IR

Optical

UV

Objetive

Make a detailed analysis of chemical abundances in solar-like stars aimming at studying possible trends between abundance and stellar properties (eg. Age, presence of exoplanets)

Define more suitable stellar samples for exoplanet searches

Low Resolution

Determine atmospheric parameters
Identify metal rich stars

High Resolution

Chemical abundances of several elements

Motivation

Gonzalez (1997) suggested a correlation between presence of exoplanets and metallicity.

Santos et al., (2001); Gonzalez et al., (2001); Fischer & Valenti, (2005); Sousa et al. (2011) confirmed the planet-metalicity correlation.

Gonzalez (2014) suggeted that [Ref] index (Fe,Mg,Si) is more sensitive to the presence of giant exoplanets

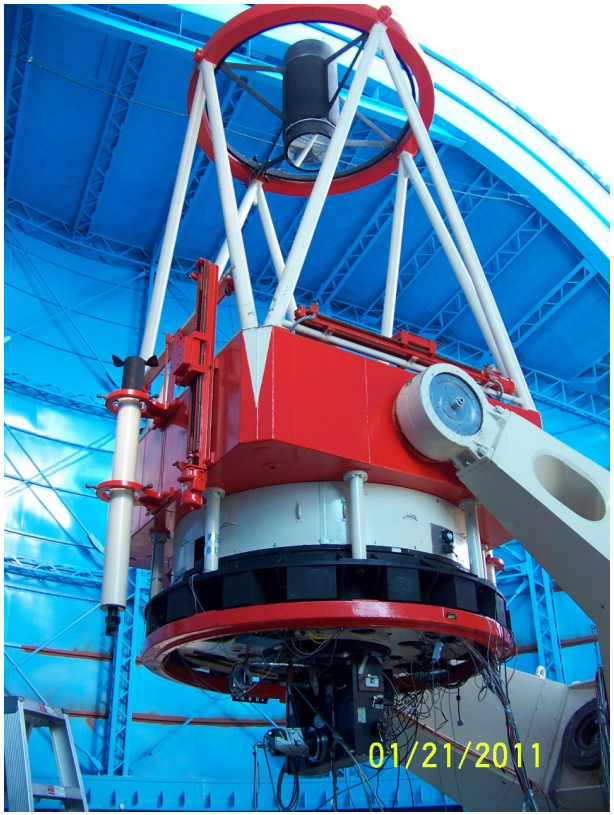
Large [X/Fe] ratio in stars with planets:

Si,Ca,Sc,Ti,V,Cr,Mn,Co,Ni,Na,Mg,Al (Neves et al., 2009)

[Mn/Fe] (Kang, Lee & Kim, 2011)

[Na/Fe], [Sc/Fe] and specially [Mg/Fe] Neptunian-like planets (Adibekyan et al., 2012)

Spectroscopic Data

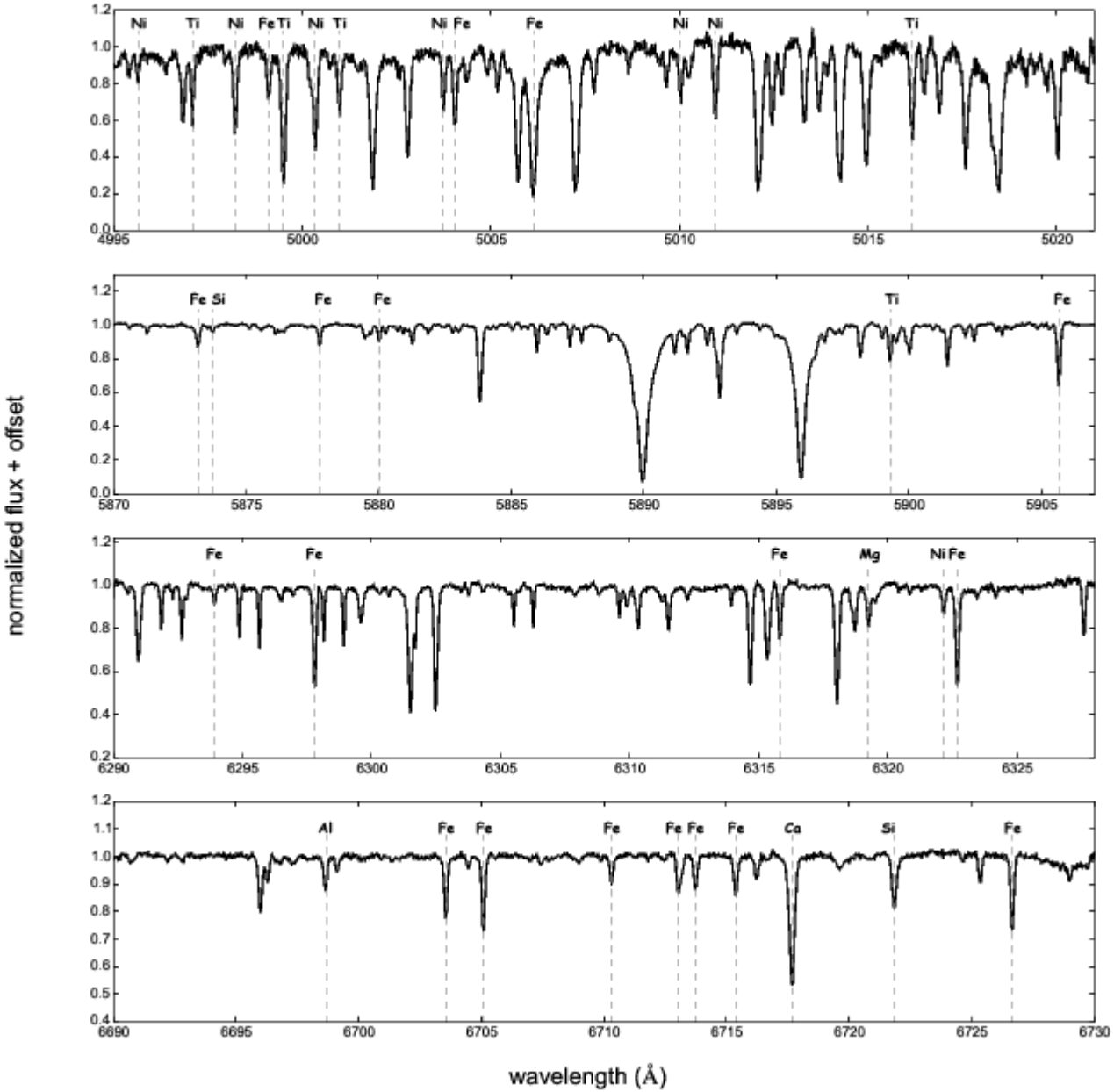


2.1 meters telescope
Guillermo Haro Astrophysical Observatory + CanHiS

40 A-wide intervals (5005, 5890, 6300, 6705), R ~ 80 000 , S/N > 100

Spectroscopic Data

Vesta



R ~ 80 000

Metodology

First step

MOOG (Sneden, 1973) + ATLAS9 models (Castelli & Kurucz 2003) + log gf (VALD) + EW

Lithium abundances for 52 stars (López-Valdivia et al. 2015)

Second (and final) step

MOOG (Sneden, 1973) + ATLAS12 models (Kurucz 1993) + log gf (VALD modified by us) + EW

Abundances of Mg, Al, Si, Ca, Ti, Fe, Ni for 38 stars (López-Valdivia et al. 2016 in prep.)

Results: Lithium abundance

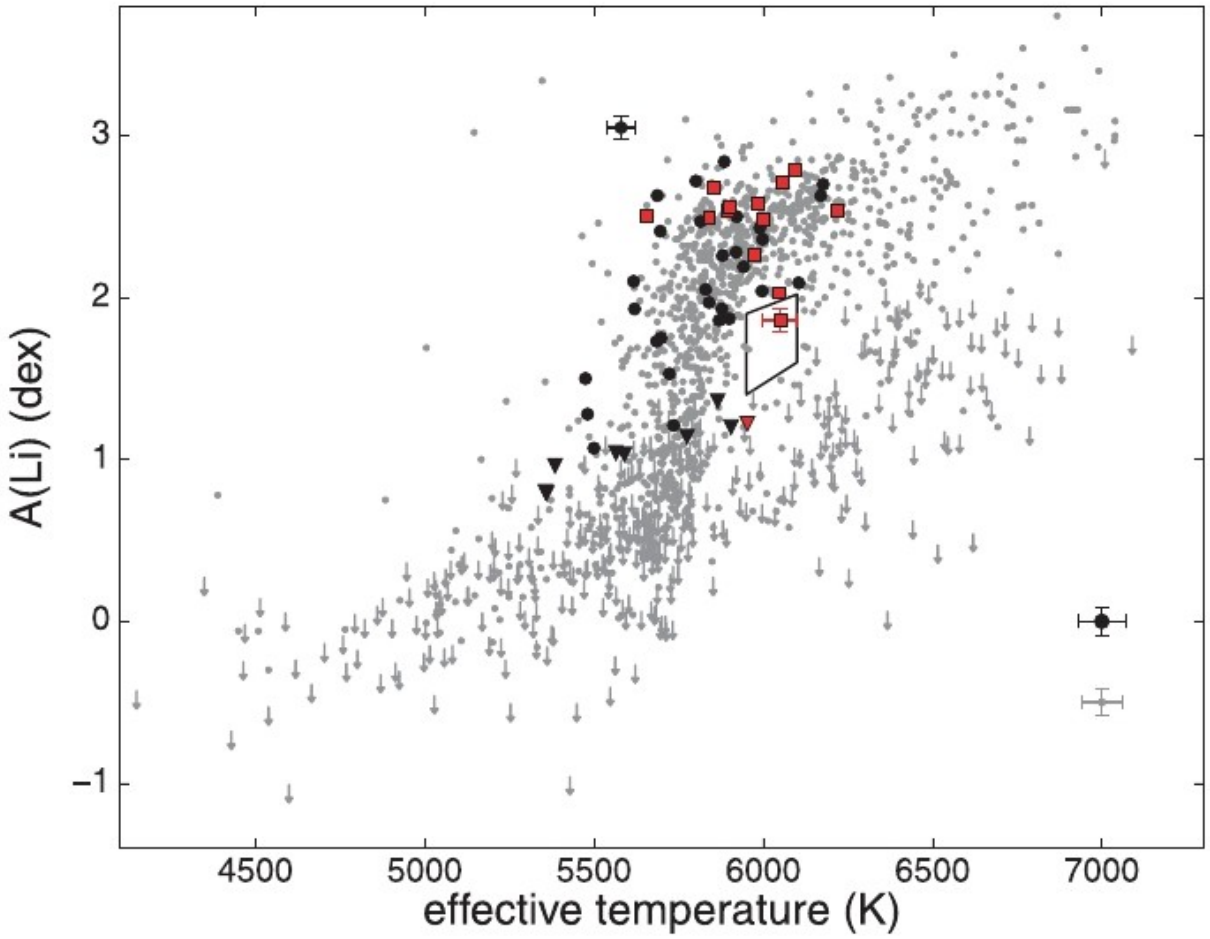


Figure 4. Distribution of lithium abundance with $T_{\rm eff}$. Black filled circles indicate stars in our sample with [M/H]<0.16 dex, red squares show our SMR stars, and downward triangles mark 3σ upper limits. Grey dots and downward arrows represent Ramírez et al. (2012) determinations and upper limits. The polygon shows the so called *lithium desert*. At the bottom right of the panel, we show the average errors for this work (black) and Ramírez et al. (2012) (grey).

López-Valdivia et al. (2015)

Results: Lithium abundance

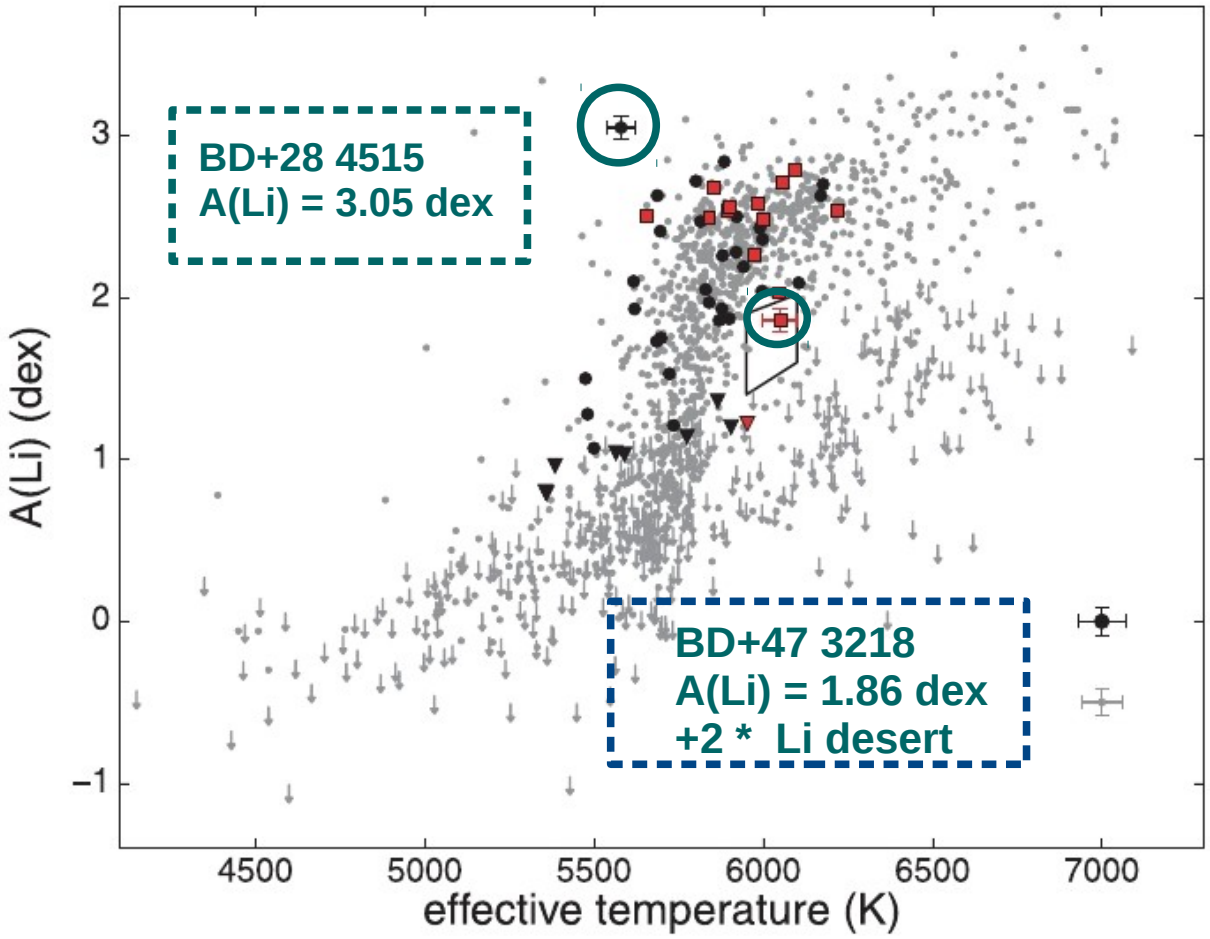
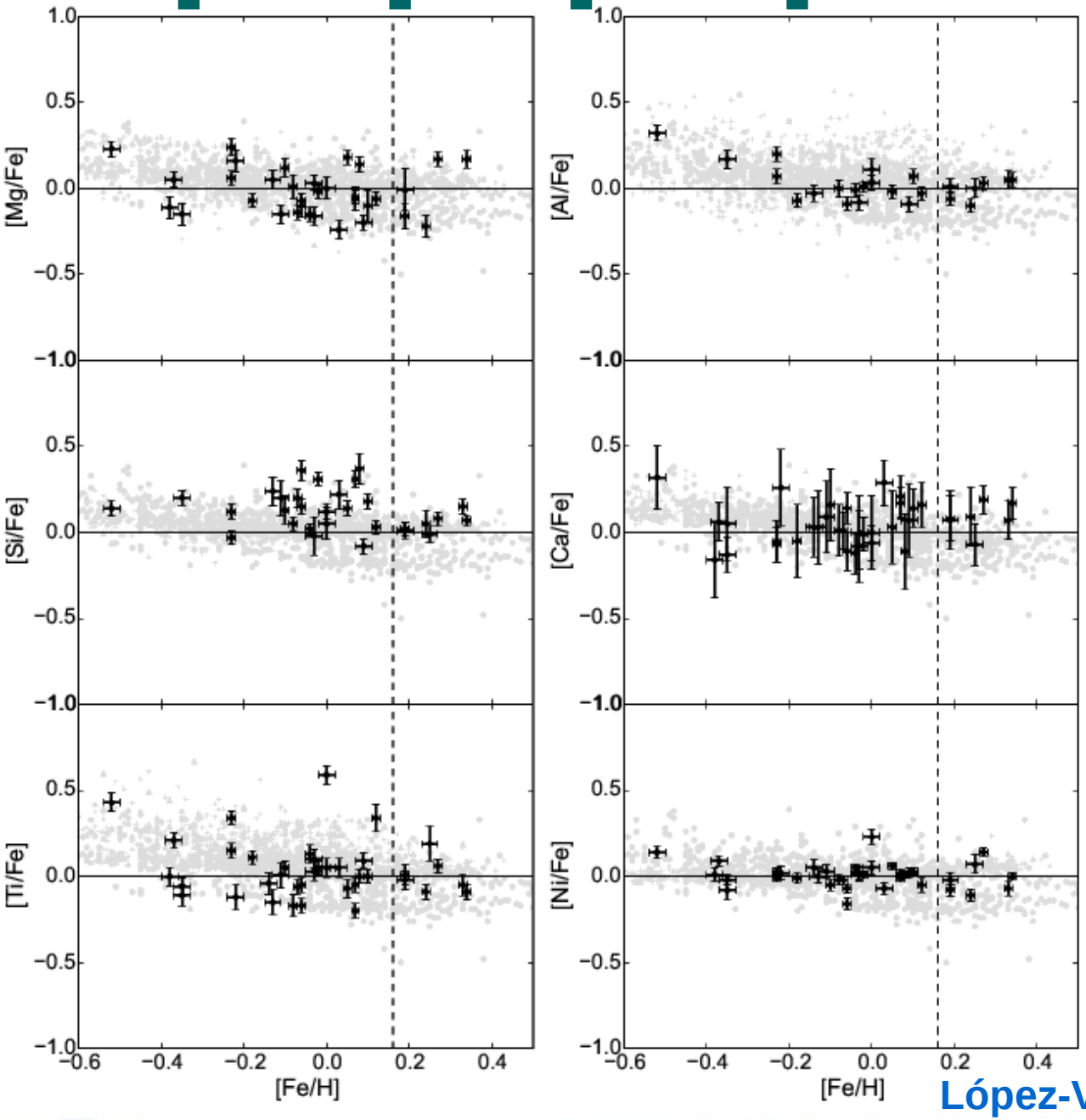


Figure 4. Distribution of lithium abundance with $T_{\rm eff}$. Black filled circles indicate stars in our sample with [M/H]<0.16 dex, red squares show our SMR stars, and downward triangles mark 3σ upper limits. Grey dots and downward arrows represent Ramírez et al. (2012) determinations and upper limits. The polygon shows the so called *lithium desert*. At the bottom right of the panel, we show the average errors for this work (black) and Ramírez et al. (2012) (grey).

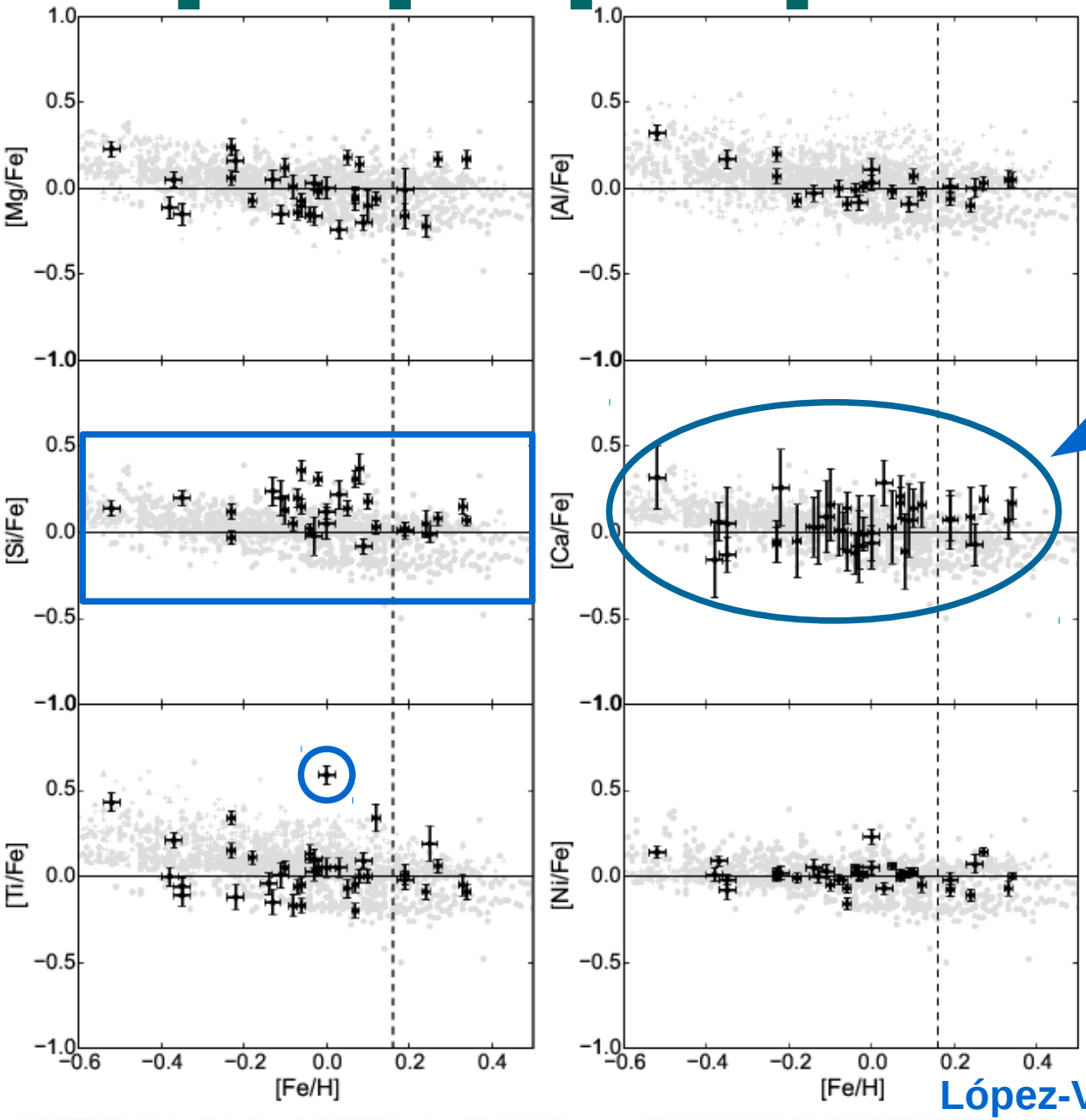
López-Valdivia et al. (2015)

Results: [X/Fe] vs [Fe/H] ratio



López-Valdivia et al. In prep

Results: [X/Fe] vs [Fe/H] ratio



Log g

López-Valdivia et al. in prep

Thanks

Questions