Subaru Users Meeting FY2020 – Poster No. 14

Elemental abundances of 400 very metal-poor stars studied with LAMOST and Subaru

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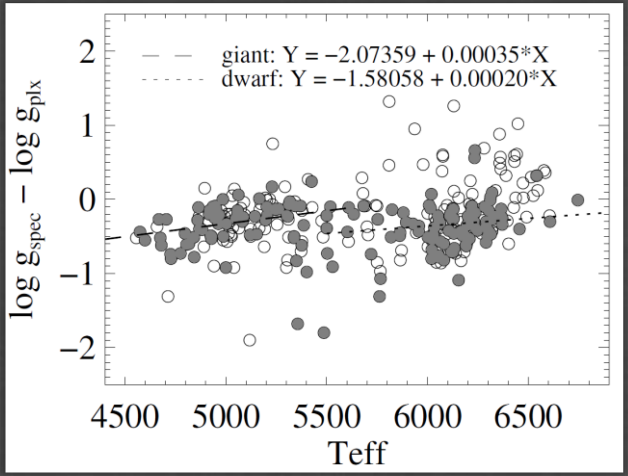
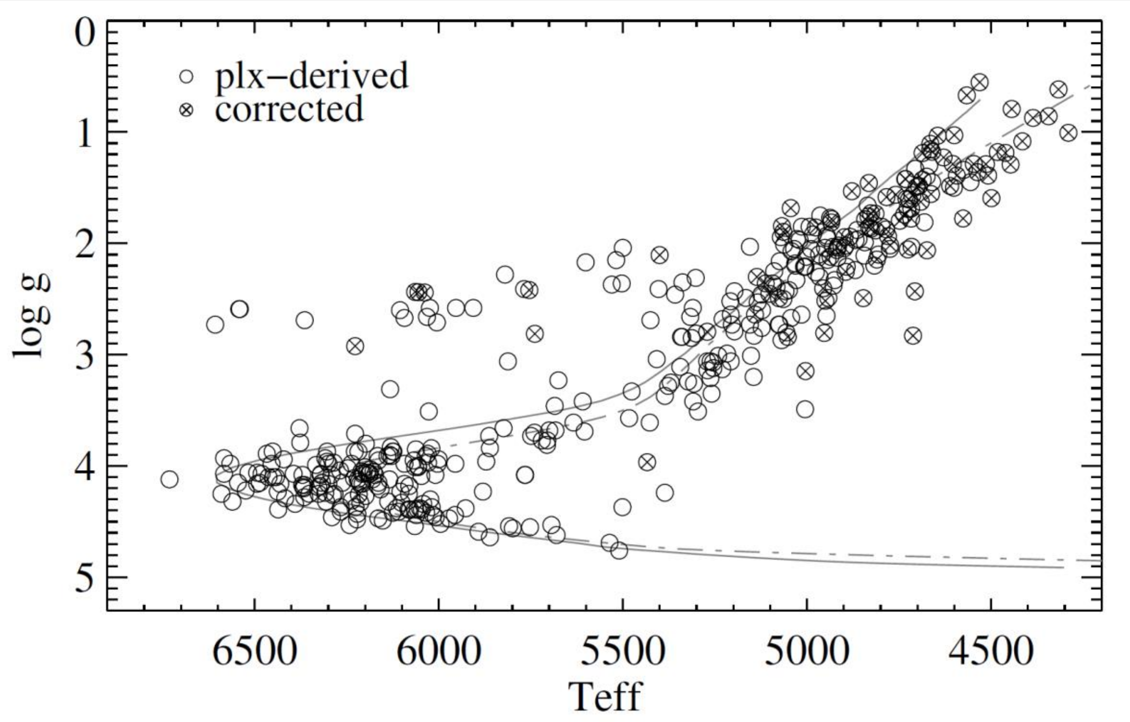
LAMOST-Subaru VMP star: the sample

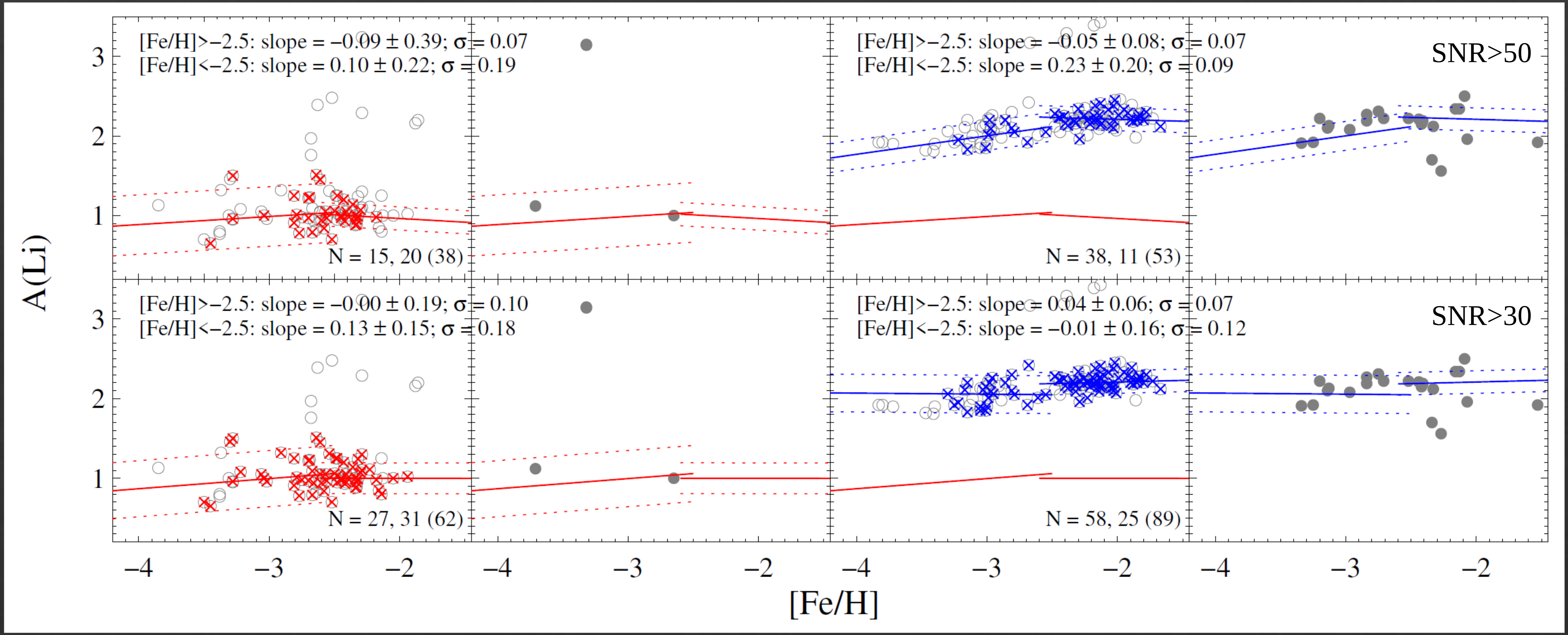
- A homogeneous abundance analysis of over 20 elements for more than 400 very metal-poor (VMP) stars, which have been selected from the LAMOST survey and follow-up observed using Subaru/HDS
- One largest high-resolution analyzed VMP star sample, including about 360 new objects
- The first attempt to estimate accurate surface gravity based on reliable Gaia parallax measurements for such large VMP star sample

segmented linear correction derived and adopted on objects with no reliable parallax measurements



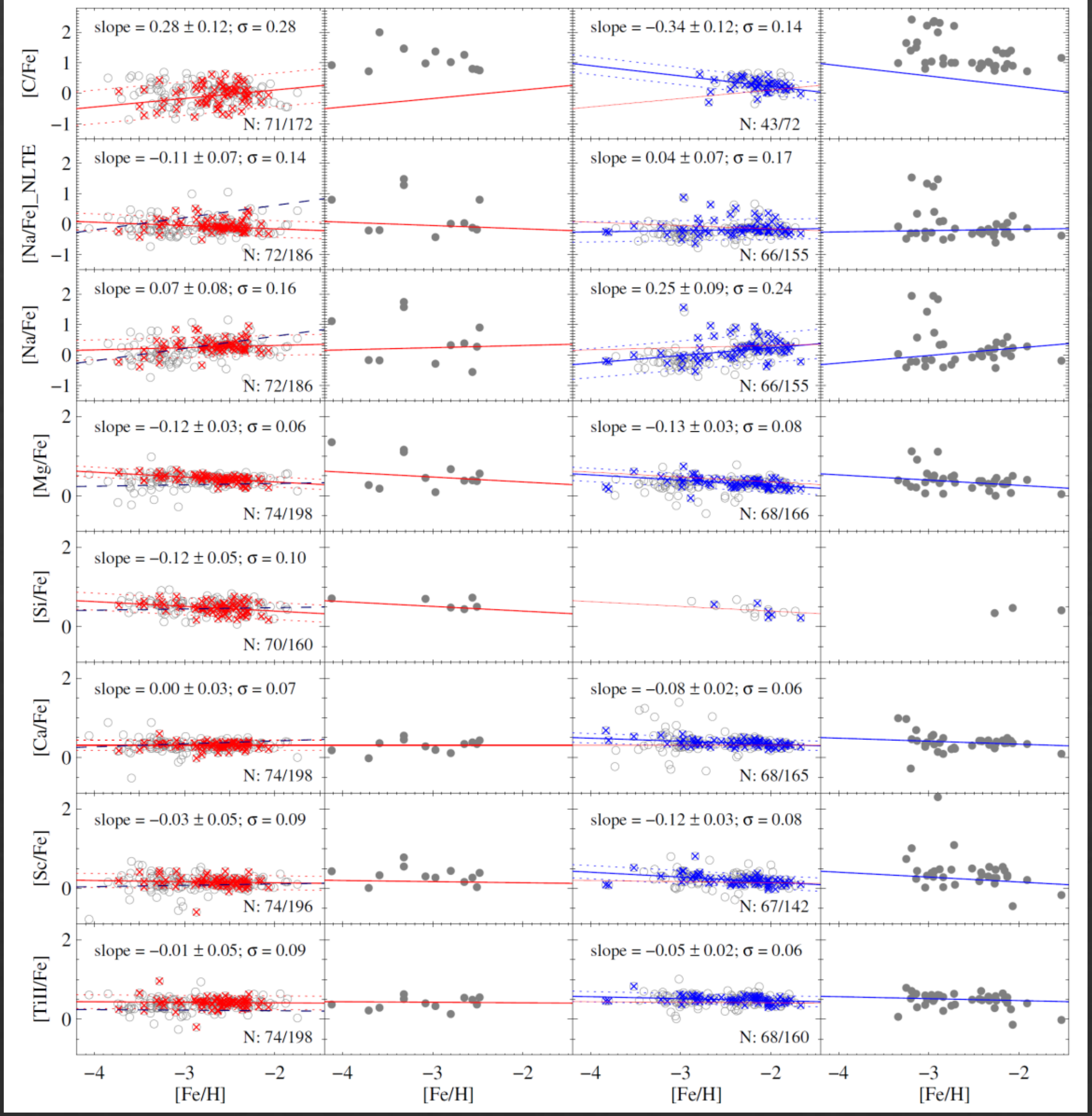


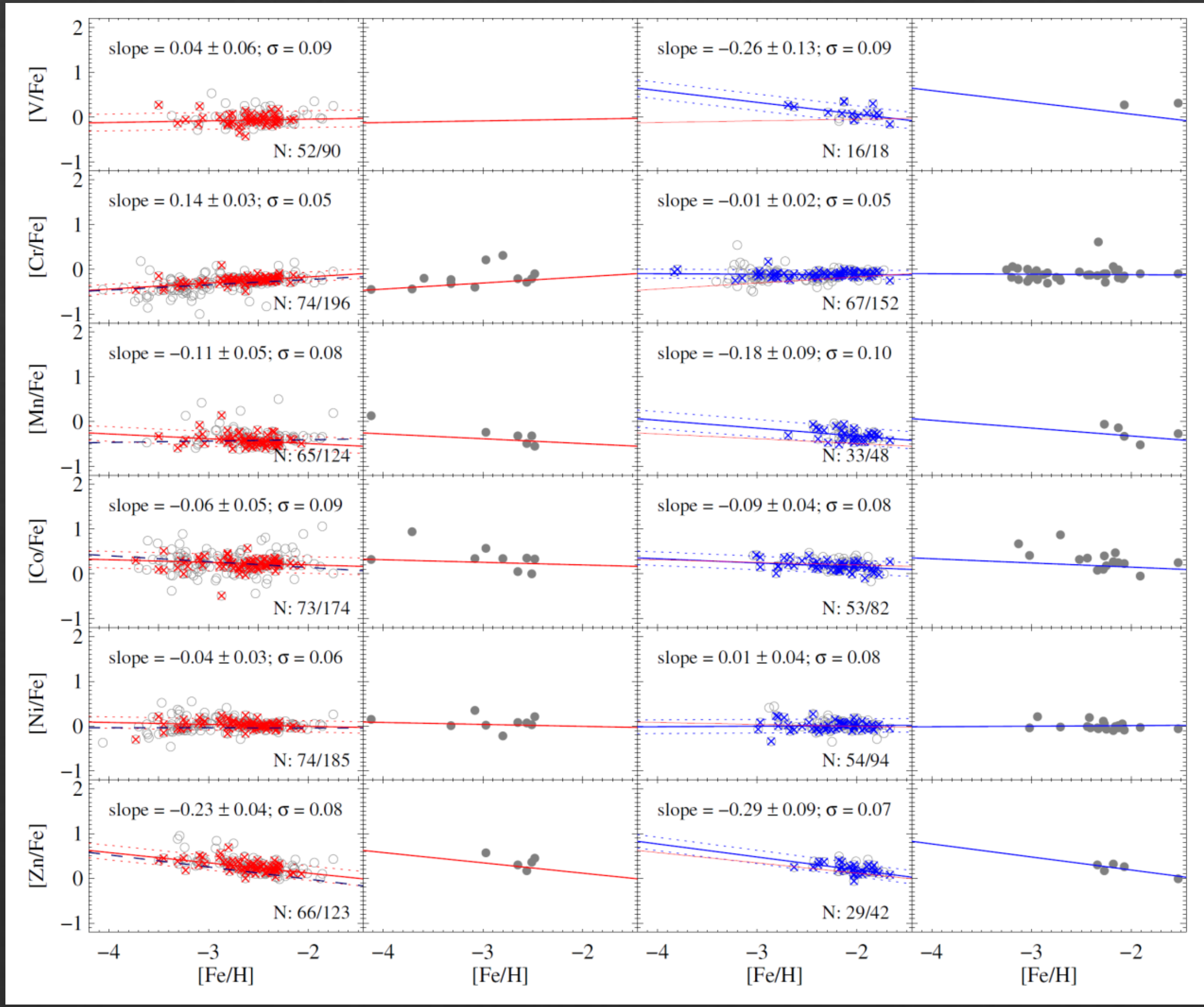
Observed abundance trend: Lithium



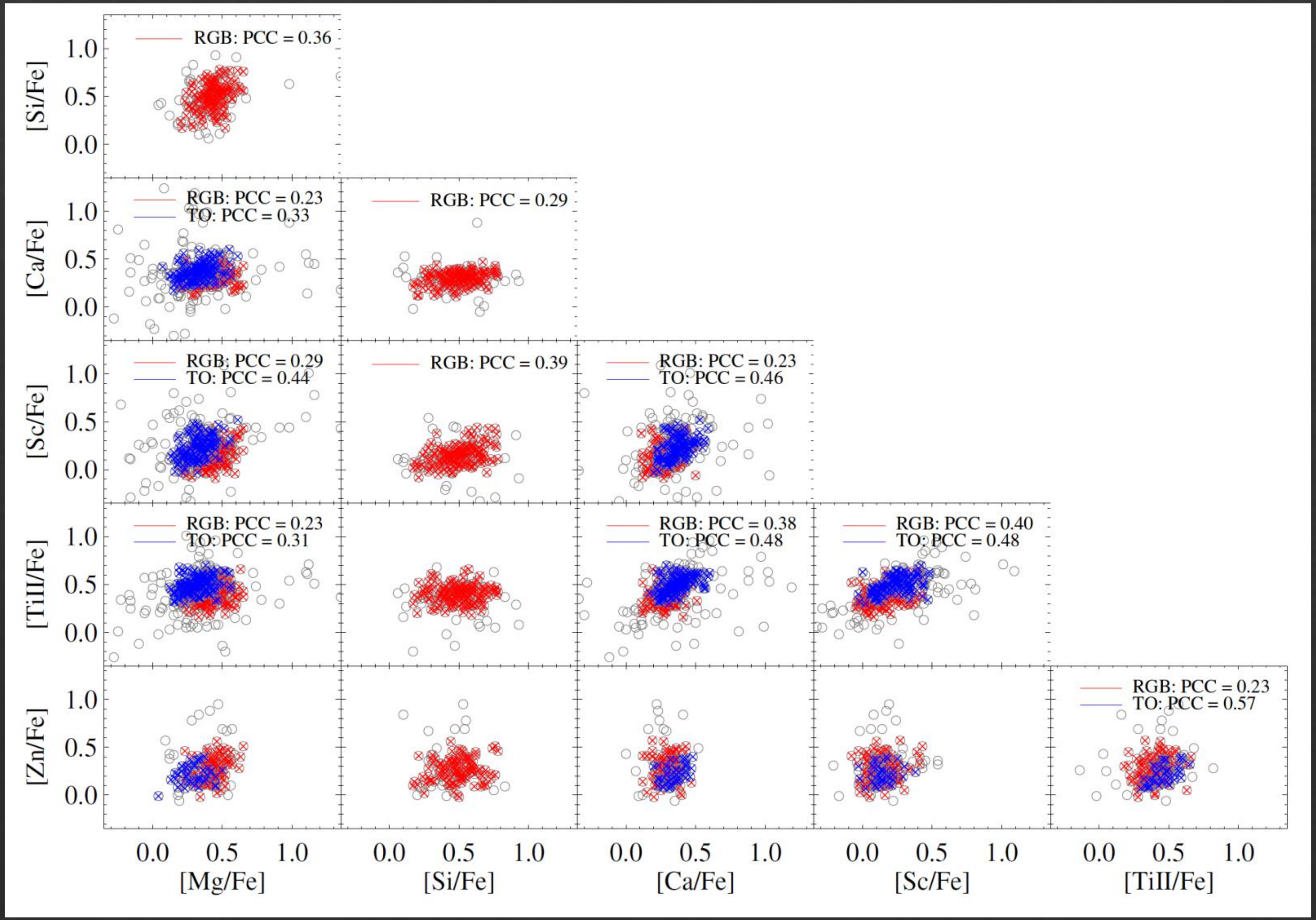
- The Li abundances of turnoff (blue) stars with [Fe/H]> -2.5 show a clear plateau with A(Li)=2.2,whereas those with lower metallicity have lower values (~ A(Li)= 2.0) showing possible decreasing trend with decreasing metallicity
- Red giants (red) with 956 log g & 2 have an almost constant value of A(Li)= 1.0

light and iron-peak elements: abundance trends





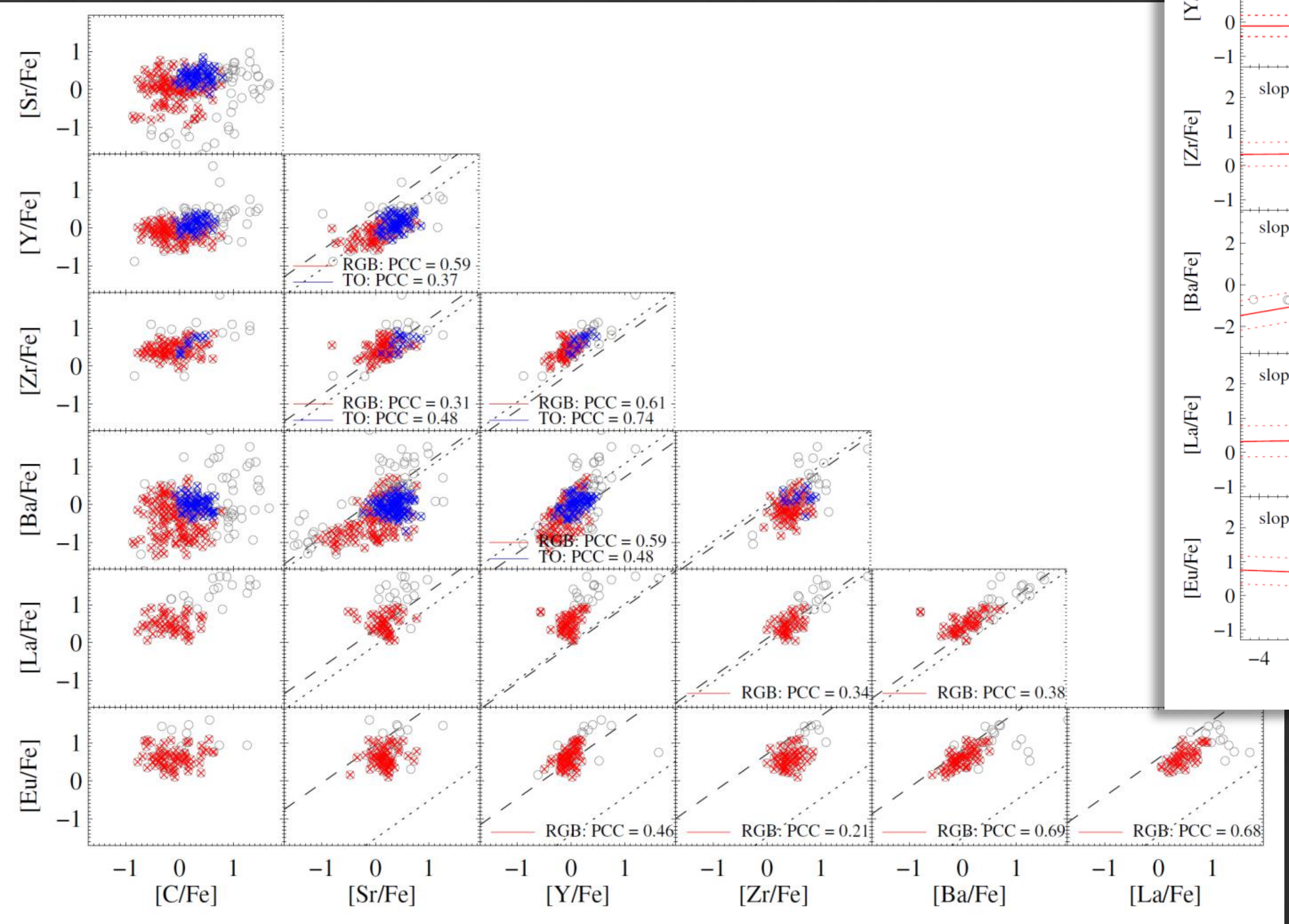
light and iron-peak elements: abundance correlation

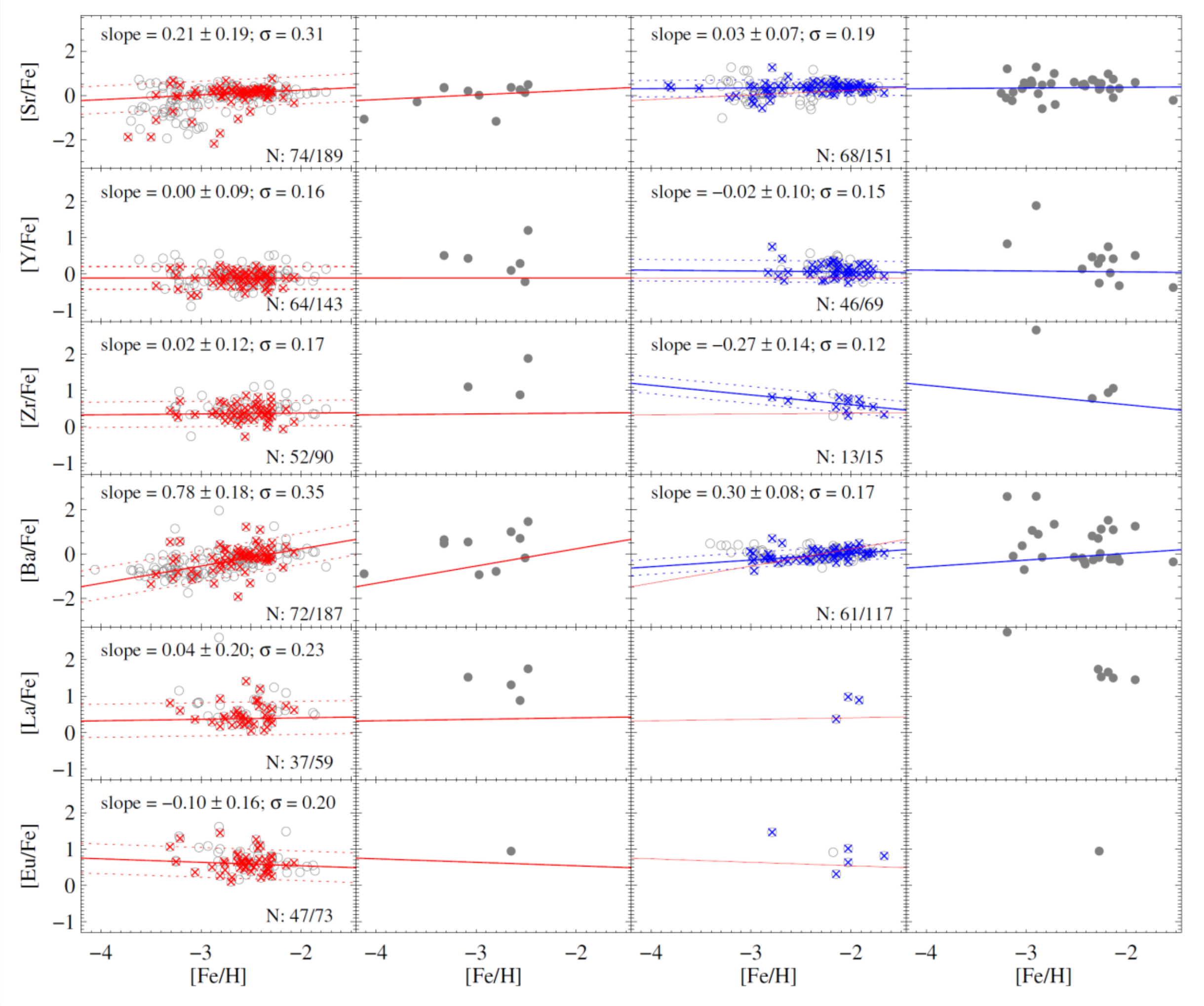


- Correlations of abundance ratios between Mg and Si and between Ca and Ti are found while the correlation between the two groups (Mg-Si and Ca-Ti) is weaker, suggesting the enrichment processes are between dierent between them to a certain extent
- Sc abundances show relatively strong correlation with all the four elements Mg, Si, Ca and Ti
- A correlation is found between Zn and Ti, whereas the correlation is not clear between Zn and other - elements

Heavy elements: abundance trend and correlation

- Larger scatters compared with lighter elements, suggesting that small number of processes have significantly contribute to the enrichment and interstellar medium polluted by these processes was not well mixed





- Correlations among most of the heavy elements, and stronger between elements around the same abundance peaks

Comparison with Galactic chemical evolution models

- GCE model can reproduce the observed abundance trend in general
- Mg abundance ratios show a decreasing trend with increasing metallicity, which is not well reproduced
- The over-abundances of Ti and Sc not reproduced
- The high Zn abundance ratios, as well as the small over-abundances of Co, are not well reproduced