

Impurities throughout the EGRIP ice core – a microstructural perspective

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Background

Localisation of impurities in microstructure unclear
 Important for deformation + integrity of ice core records
 EGRIP ice core with microstructure data

Questions

Difference between solid and dissolved impurities?
 Evolution of localisation with depth?
 Role of chemistry?



Methods

Raman Spectroscopy
 ~1 µm resolution
 500 µm below surface
 Solid inclusions

Laser Ablation ICPMS 2D Imaging
 Up to 10 µm resolution
 Sample surface
 All impurities

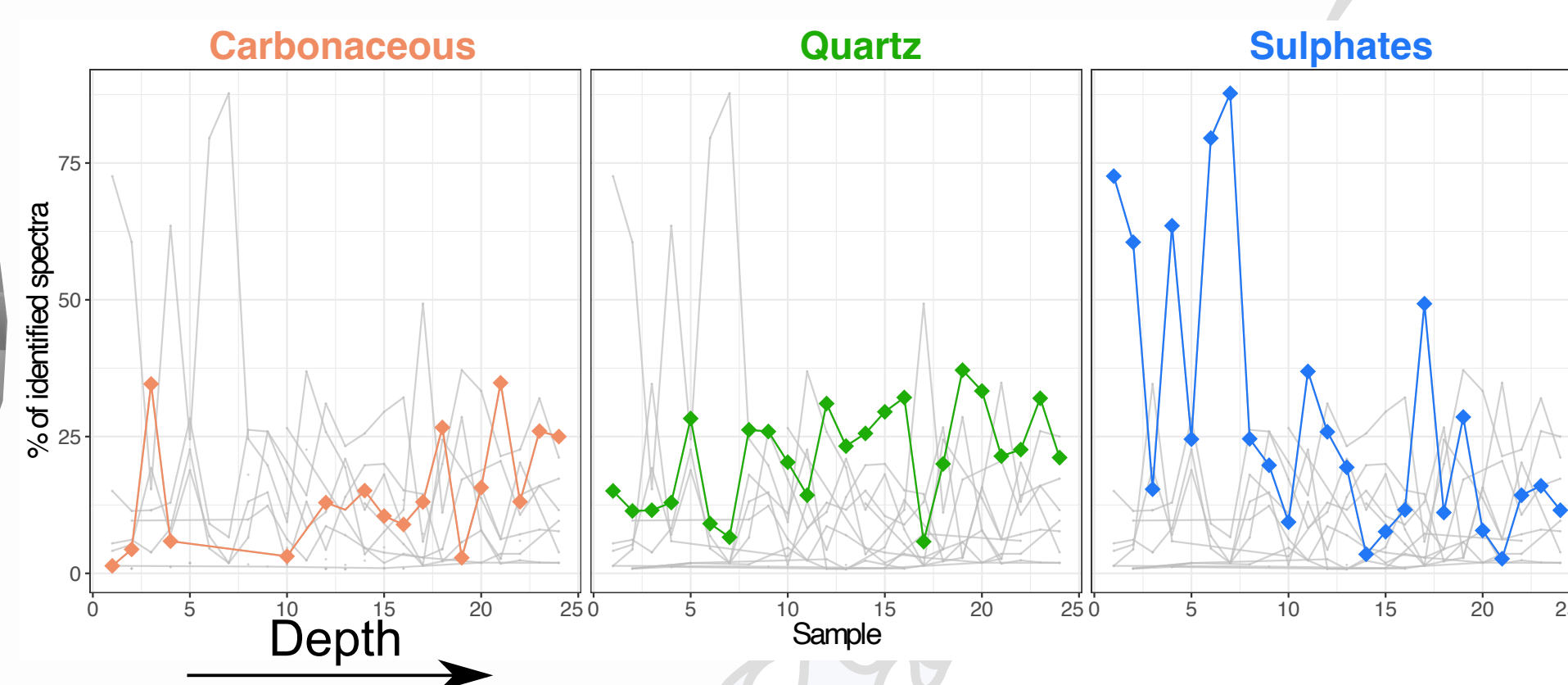
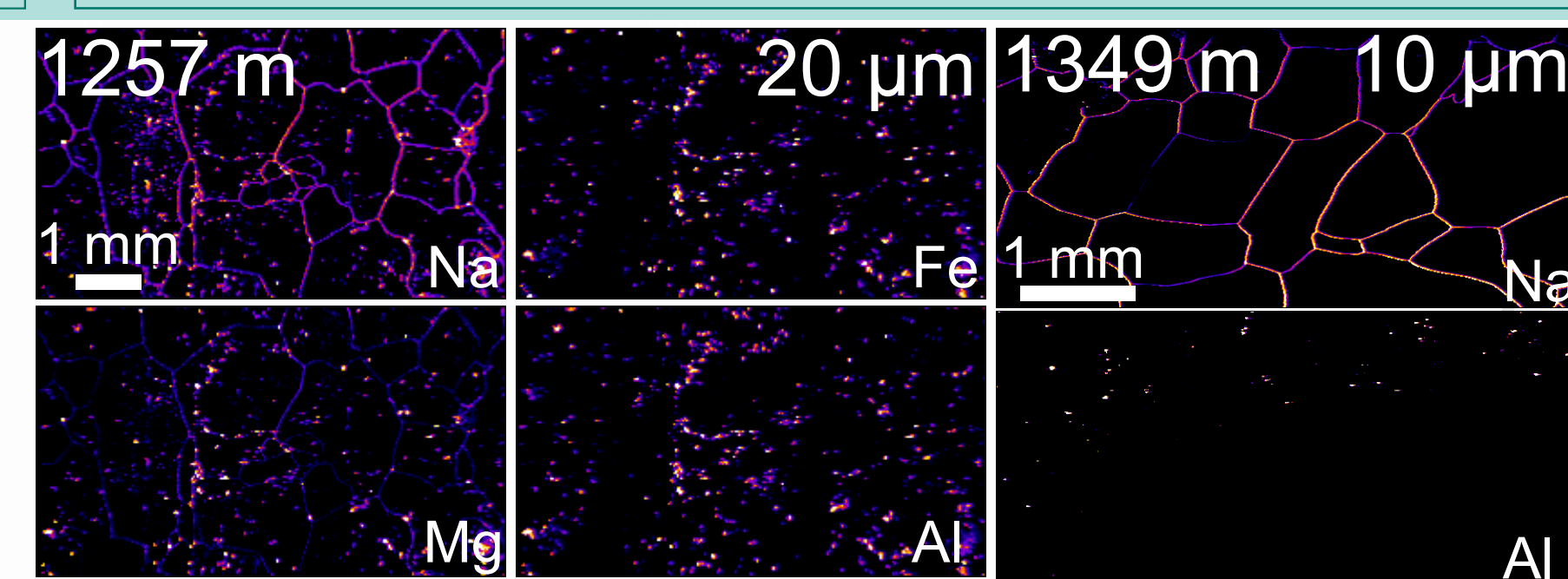
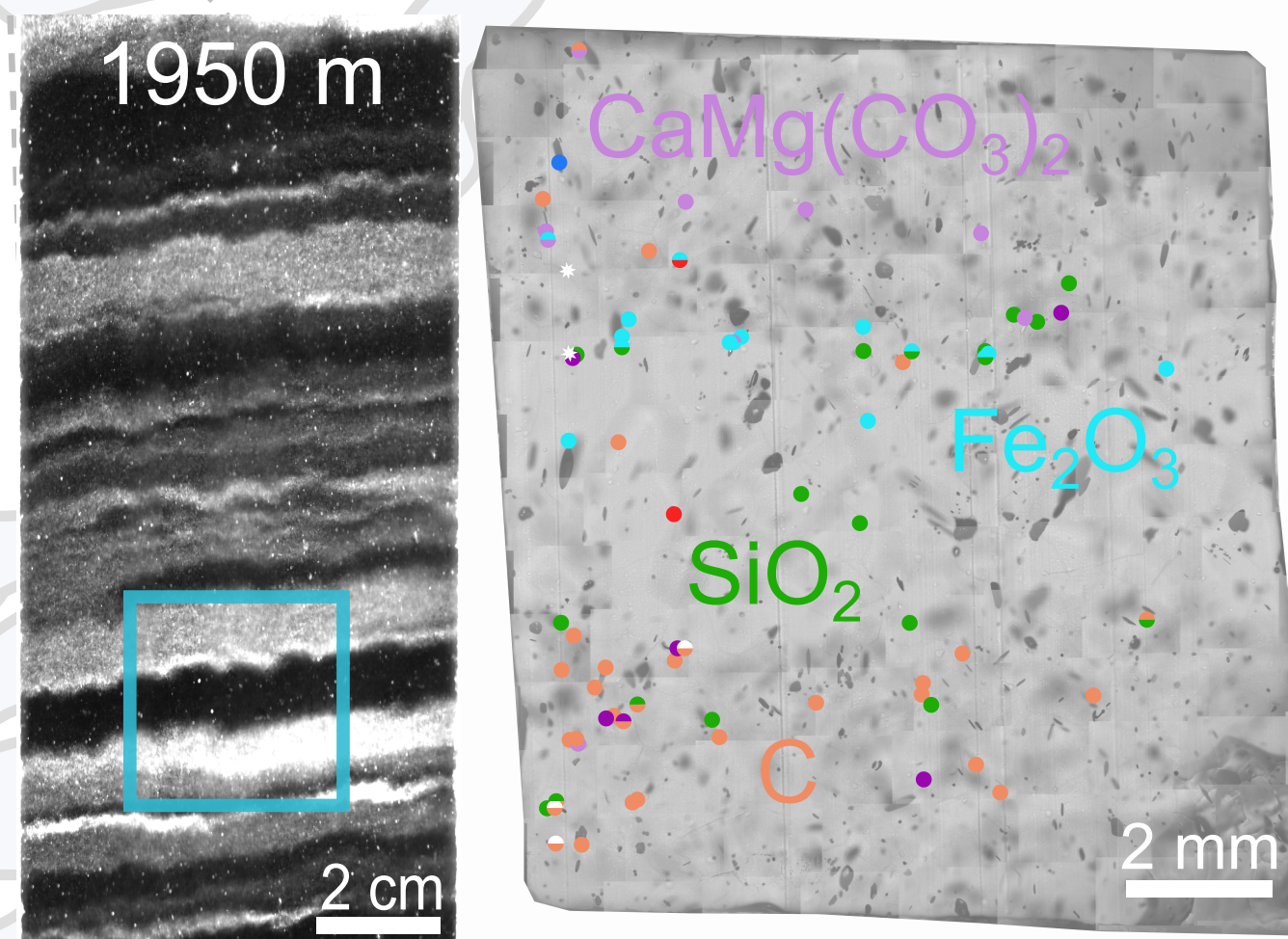
>1600 inclusions

>30 2D images

Grain interior
 Clustering
 Mineralogy changes with depth
 Cloudy bands complex

Chemistry-dependent:
 Soluble at grain boundaries
 Insoluble in particle clusters in grain interior
 Localisation increases with depth

Results



Conclusions

Largest microstructural impurity dataset throughout one ice core
 Foundation for:

- Generalisations/model parameterisations
- Method development for Beyond EPICA
- Detailed deformation studies

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