

Variation in the Heterogeneous Chemistry of Particulate Matter During the Polarimetric Cloud Analysis and Seeding Test (POLCAST) 2012 Campaign in Grand Forks, North Dakota



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Objective

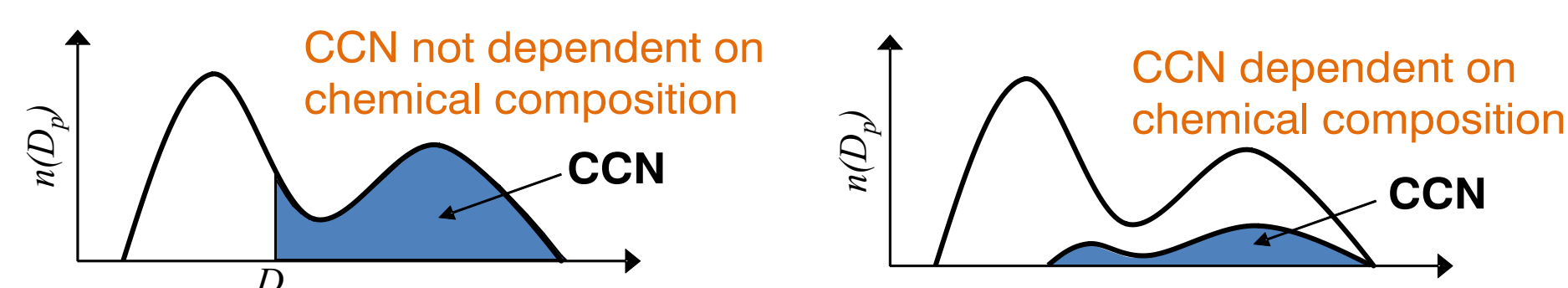
- Investigate **variations in the chemical composition of atmospheric aerosols** in Grand Forks, ND during the period of June 2012–October 2012.
- Evaluate the **influence of chemical variation in aerosols on cloud condensation nuclei (CCN)**, defining the impact of both **anthropogenic and biogenic species** in aerosols.

Introduction

- Aerosols are emitted into the atmosphere through various **natural** and **anthropogenic** processes.



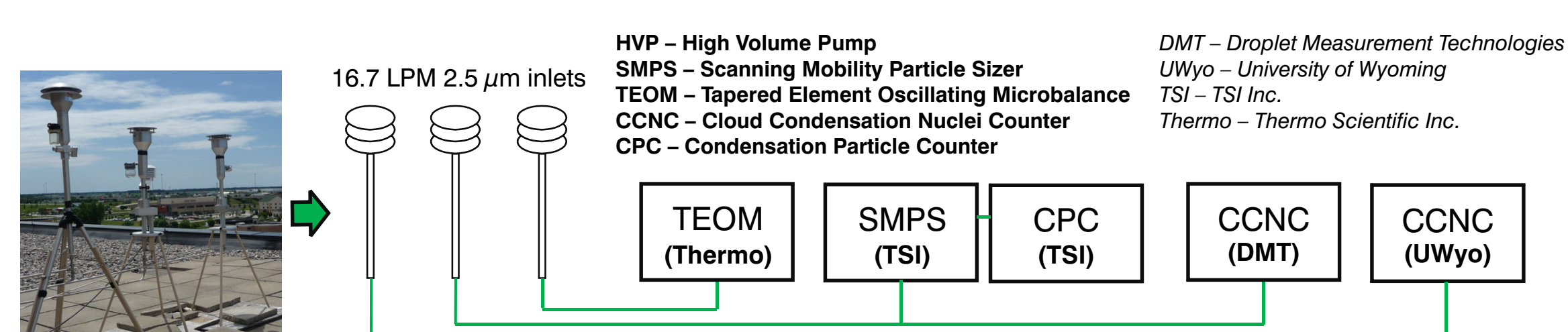
- Aerosols can potentially serve as cloud condensation nuclei (CCN), a process is possibly dependent on the chemical composition of the aerosol.



- To better describe this chemical dependence simultaneous measurements of both CCN concentrations and aerosol chemical compositions need to be performed.

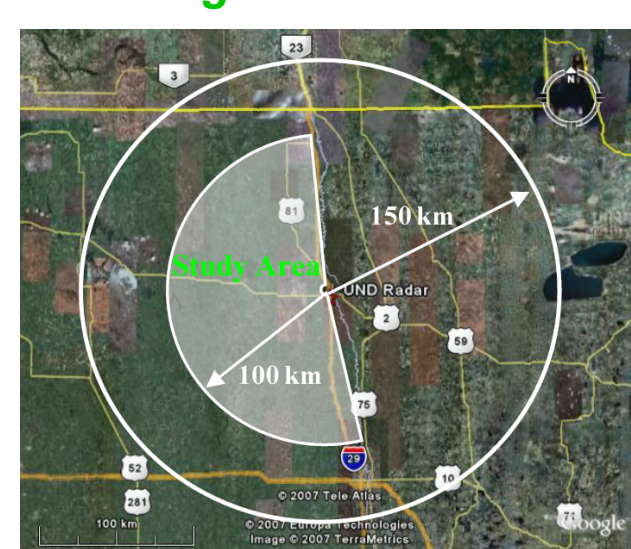
Sampling and Analysis Methods

Real-Time Aerosol Measurements (Ground Based)

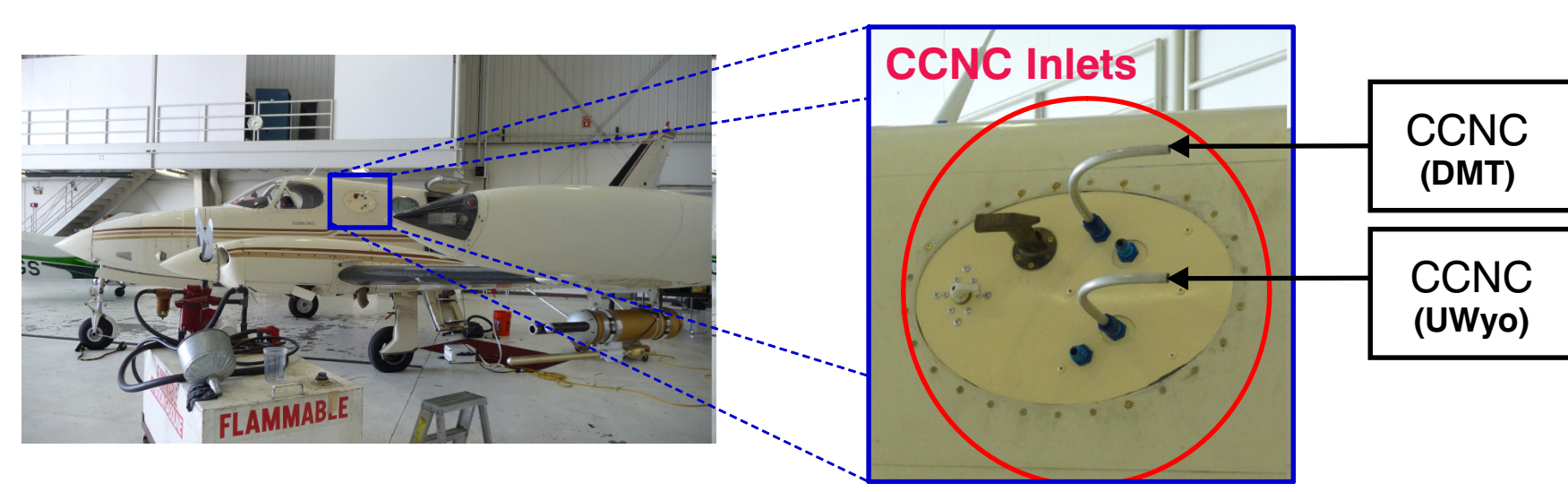


Real-Time Aerosol Measurements (Aircraft Based)

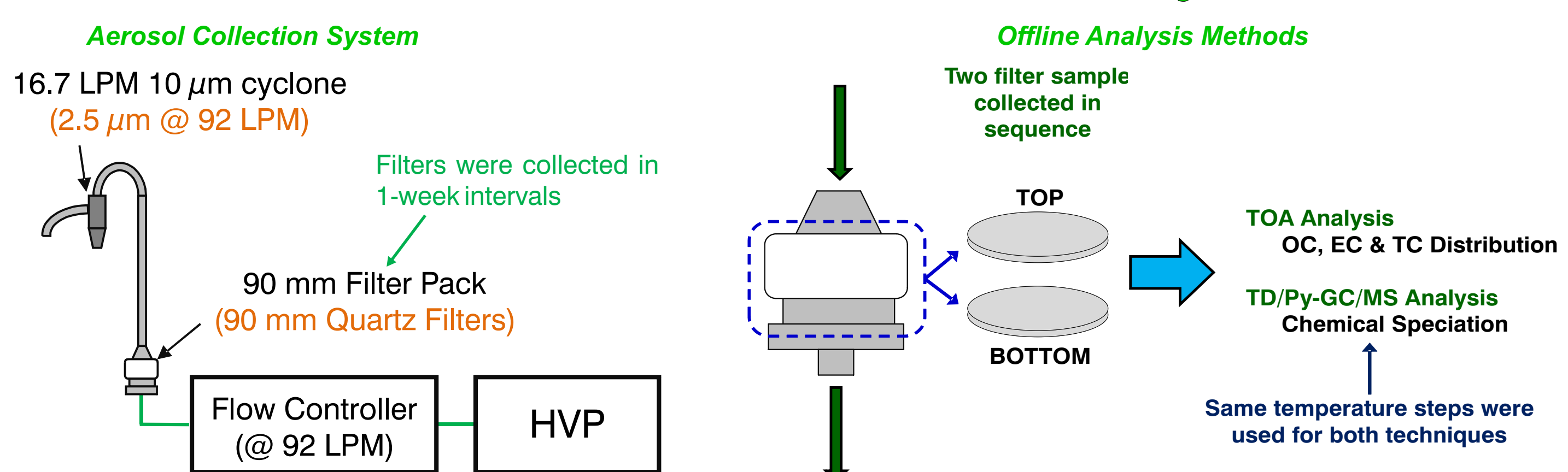
Study Area of Aircraft Measurements During POLCAST 2012



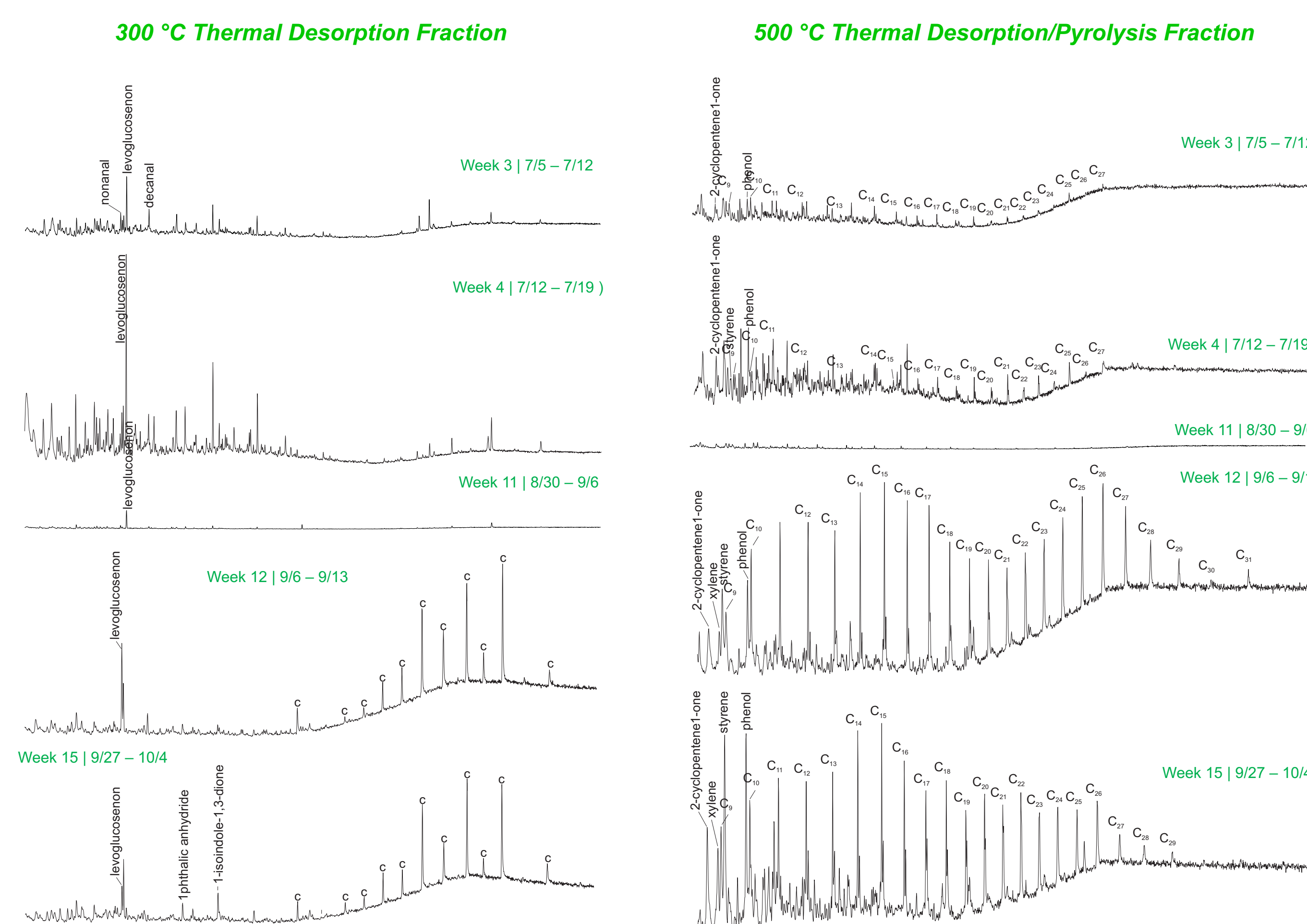
Aerosol Monitoring Instrumentation



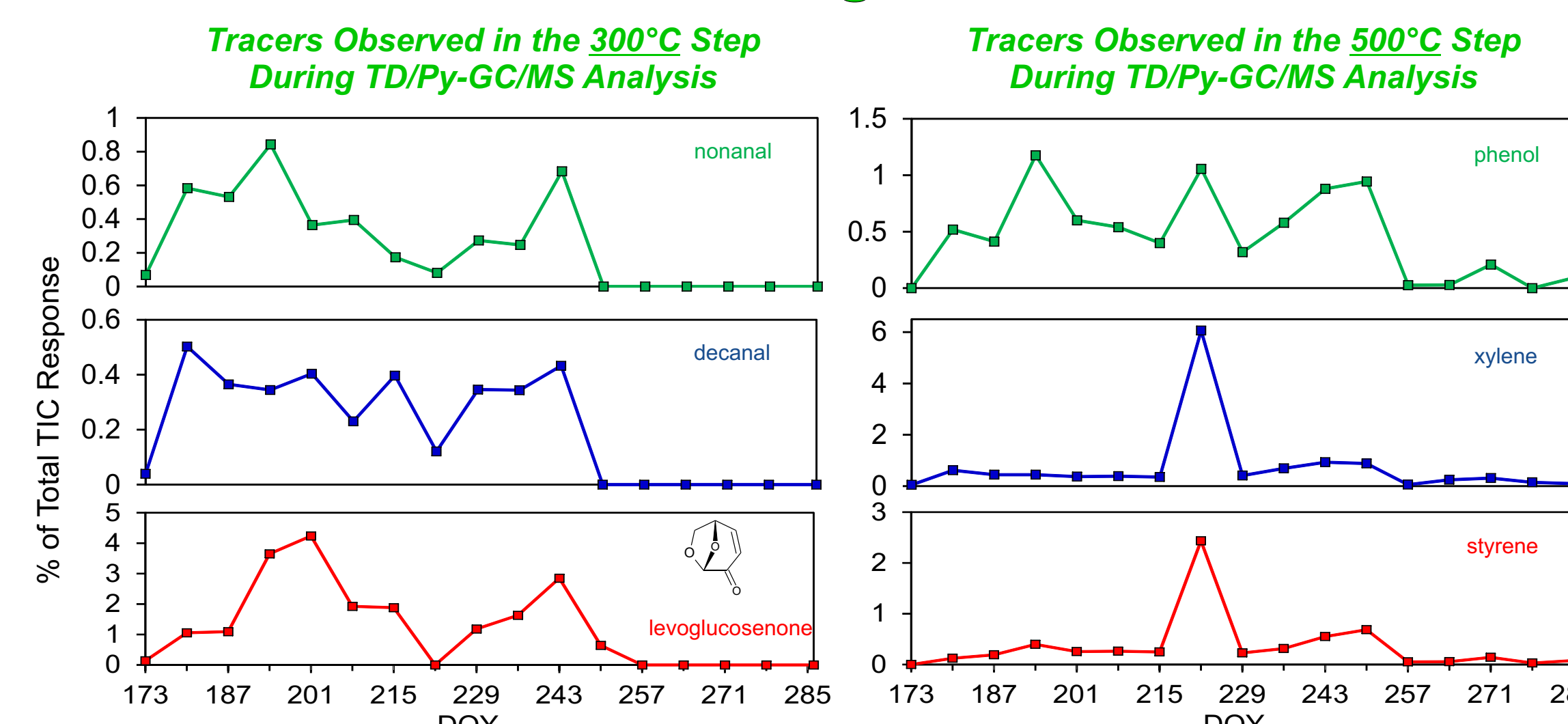
Ground Based Aerosol Collection & Offline Analysis



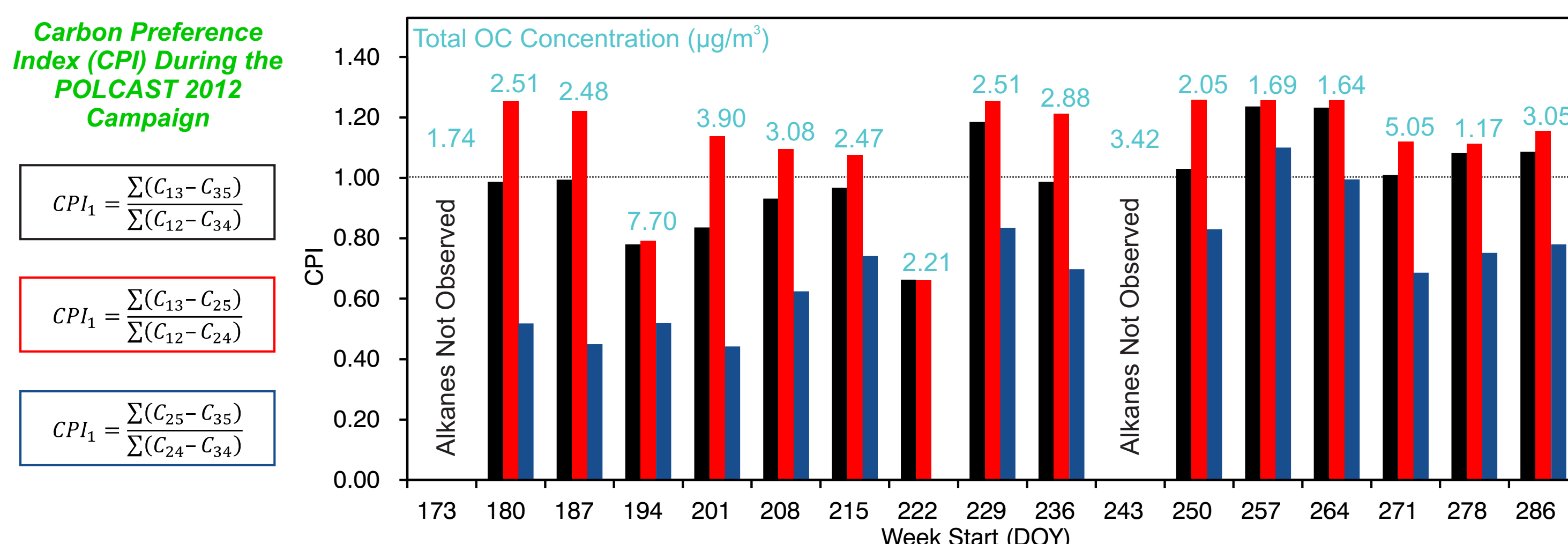
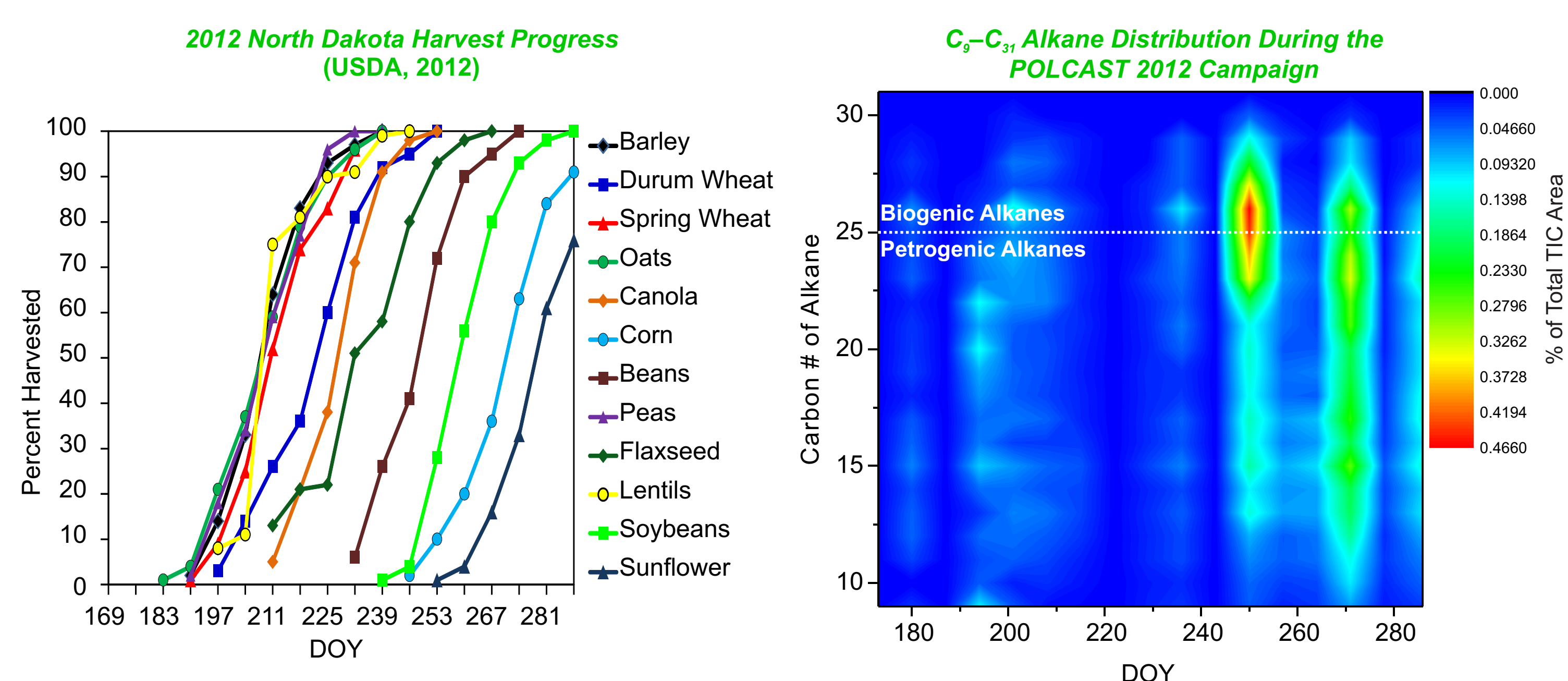
Thermal Desorption/Pyrolysis–GC/MS



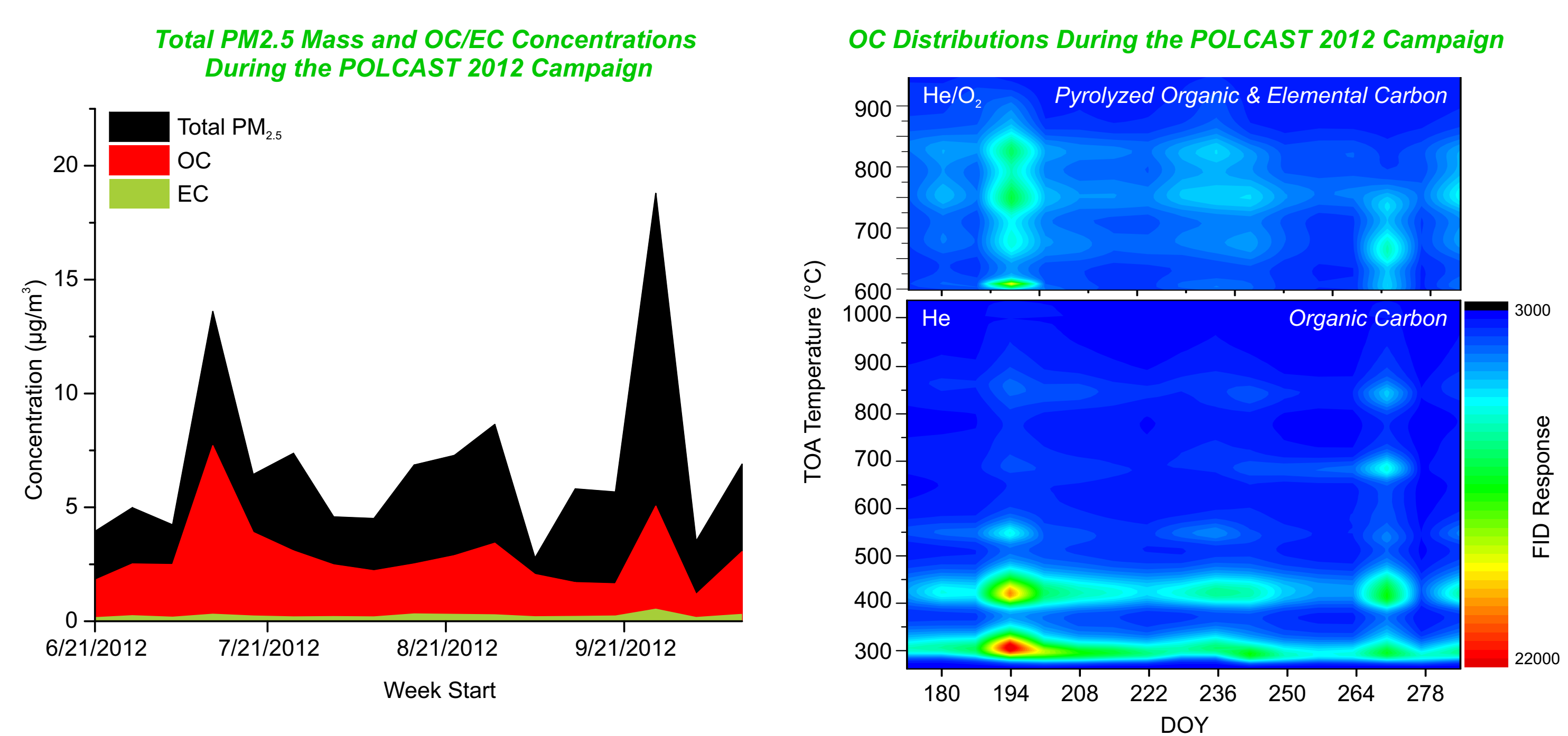
Various Tracers Observed During the POLCAST 2012 Campaign



Distribution of Alkanes During the POLCAST 2012 Campaign



Evaluating PM_{2.5}, OC and EC



Conclusions

- Variations in OC and tracer compound concentrations indicate possible contributions of both anthropogenic and natural sources of PM.
- Levoglucosenone, a specific marker for aged smoke plumes, was observed in large concentrations during specific events throughout the summer months.
- High concentrations of alkanes, especially those of biogenic origin, were found to occur during periods of extensive crop harvesting activities.

Acknowledgements

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