



UNSURPASSED PRODUCTIVITY

Field-based Comprehensive Odor Monitoring Using SIFT-MS

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Summary

Introduction to SIFT-MS

SIFT-MS for odor analysis field campaigns

Odors from poultry farms in Queensland, Australia

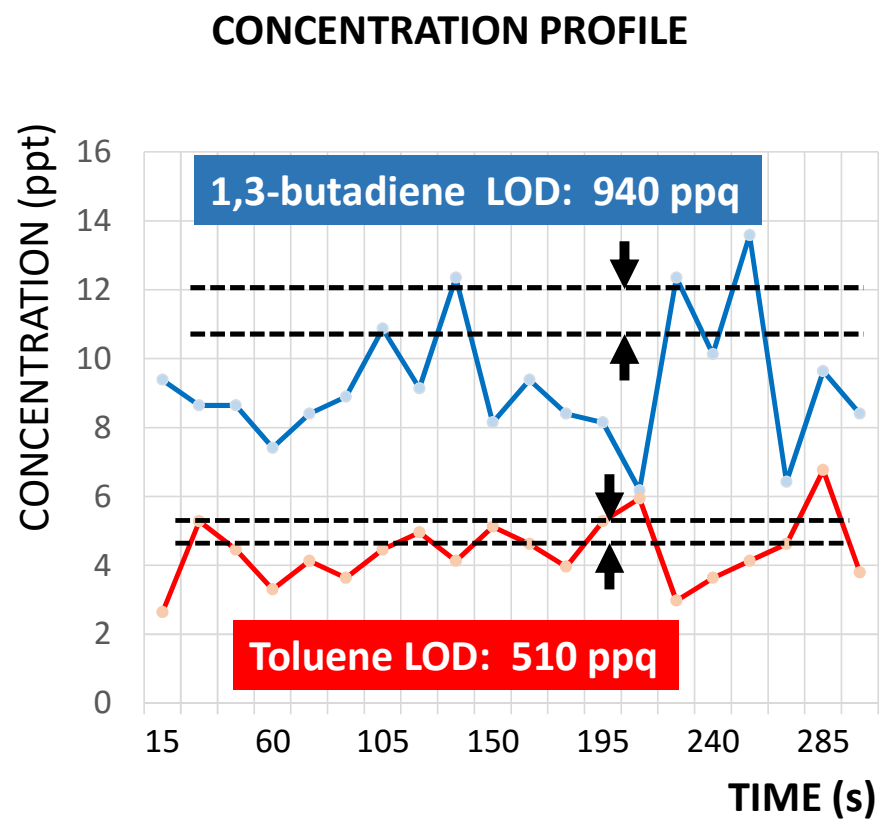
Who is using Syft Instruments



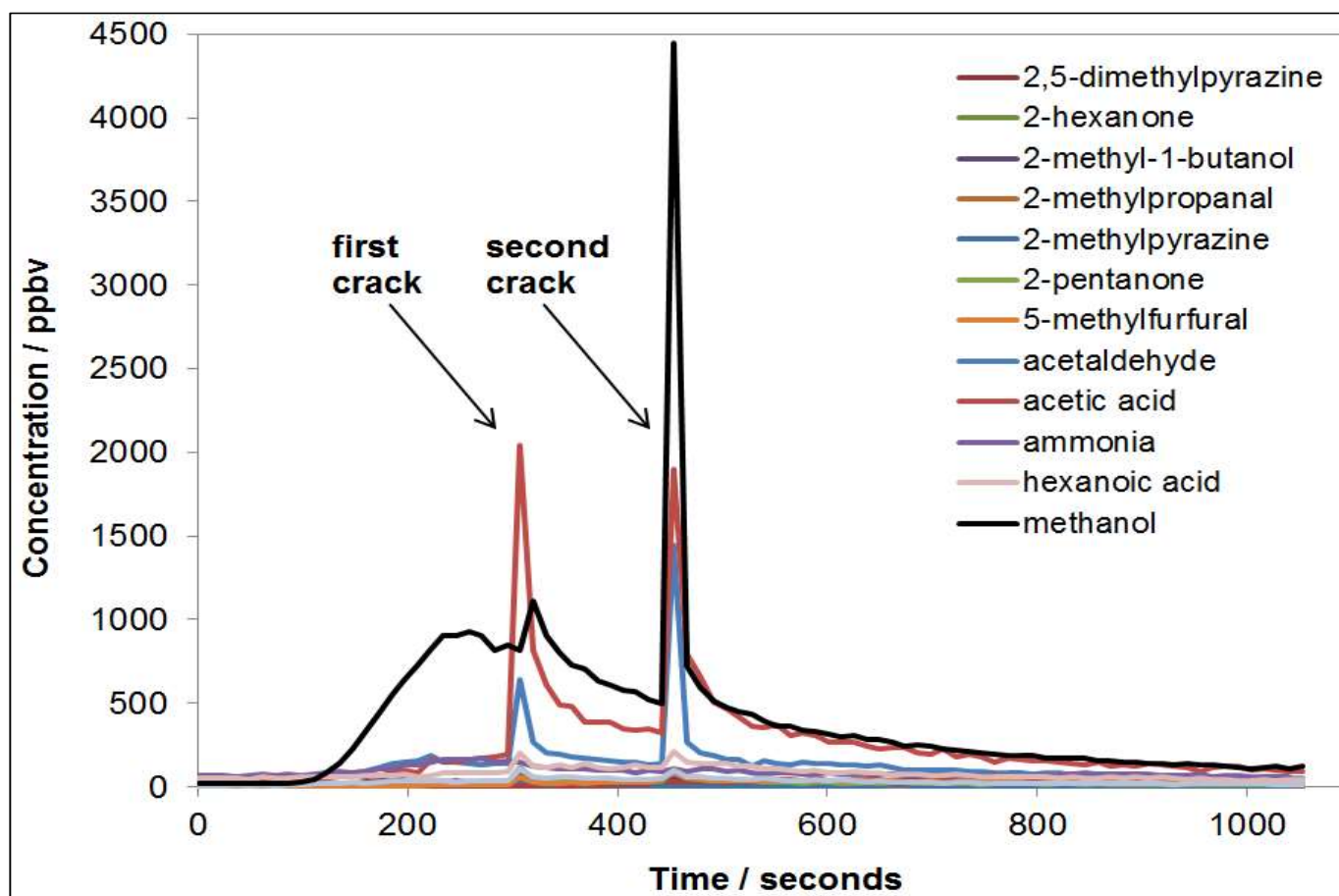
SIFT-MS can measure most VOCs and inorganic compounds

hydrocarbons	alkanes, alkenes, aromatics, monoterpenes
oxygenates	alcohols, aldehydes, ketones, esters, ethers, carboxylic acids, formaldehyde
nitrogen compounds	amines, amides, nitriles, nitrated organics
sulfur compounds	mercaptans, thioethers, carbonyl sulfide
halogenated compounds	aliphatic and aromatic fluorides, chlorides, bromides and iodides
inorganics	ammonia, hydrogen cyanide, hydrogen sulfide, nitrogen dioxide, phosphine, hydrogen chloride, hydrogen fluoride, carbon dioxide, sulfur dioxide, ozone

The Voice200Ultra for ultra sensitive measurements

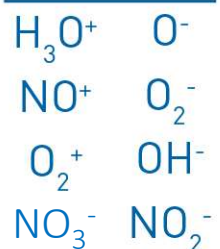
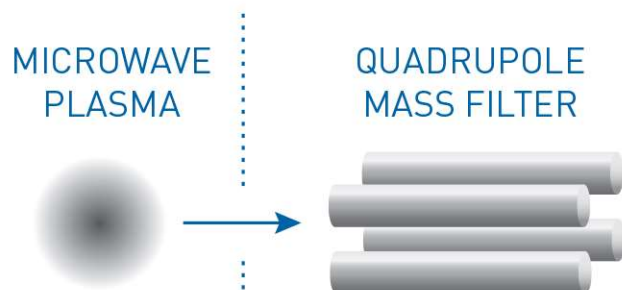


Concentrations can be monitored in real time



SIFT-MS – how this soft chemical ionization technique works

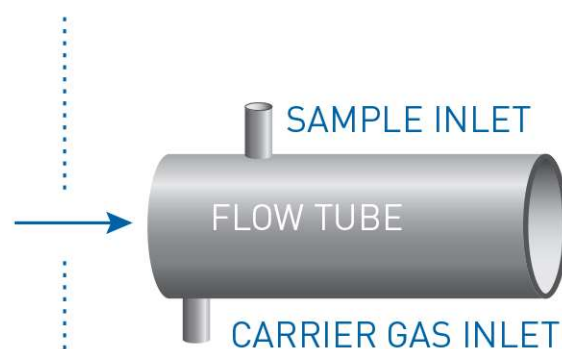
Reagent Ion Selection



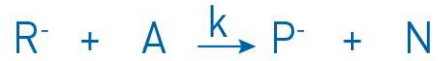
Select **one**
 R^+ **or** R^-

Multiple
Reagent ions

Analyte Ionisation



or



Reagent
ion

Analyte

Product
ion

Neutral
products

Ultra soft sample ionization

Analyte Quantitation

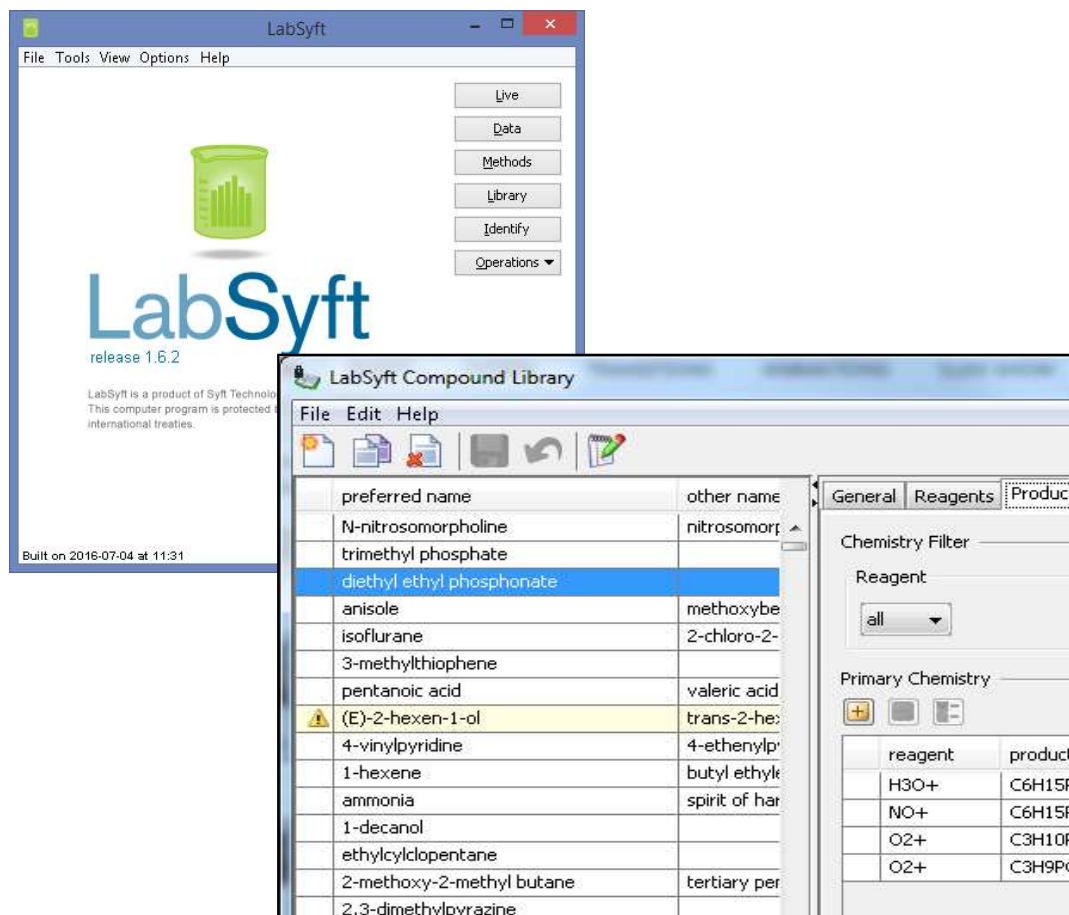


$$[\text{A}] = \gamma \frac{[\text{P}^+]}{[\text{R}^+]k} \quad \text{or} \quad [\text{A}] = \gamma \frac{[\text{P}^-]}{[\text{R}^-]k}$$

γ = instrument calibration factor

Mass Spectrometer

Syft's compound library is chiefly responsible for the variety of deployment



The predictability that comes for the highly controlled nature of the SIFT ionization process results in quantitative measurements without compound-specific calibrations using Syft's compound library.

The library contains over one thousand compounds and new target species can be routinely added.

SIFT-MS for field campaigns

A Voice200 is robust and can be operated by non-technical users



Syft instruments have been deployed in industrial environments for nearly a decade and operated by non-technical, front-line staff.

Instruments can be placed at the point of testing, allowing faster response times.

Built-in Automatic 10-point Instrument Validation

Instrument Validation **voice²⁰⁰**

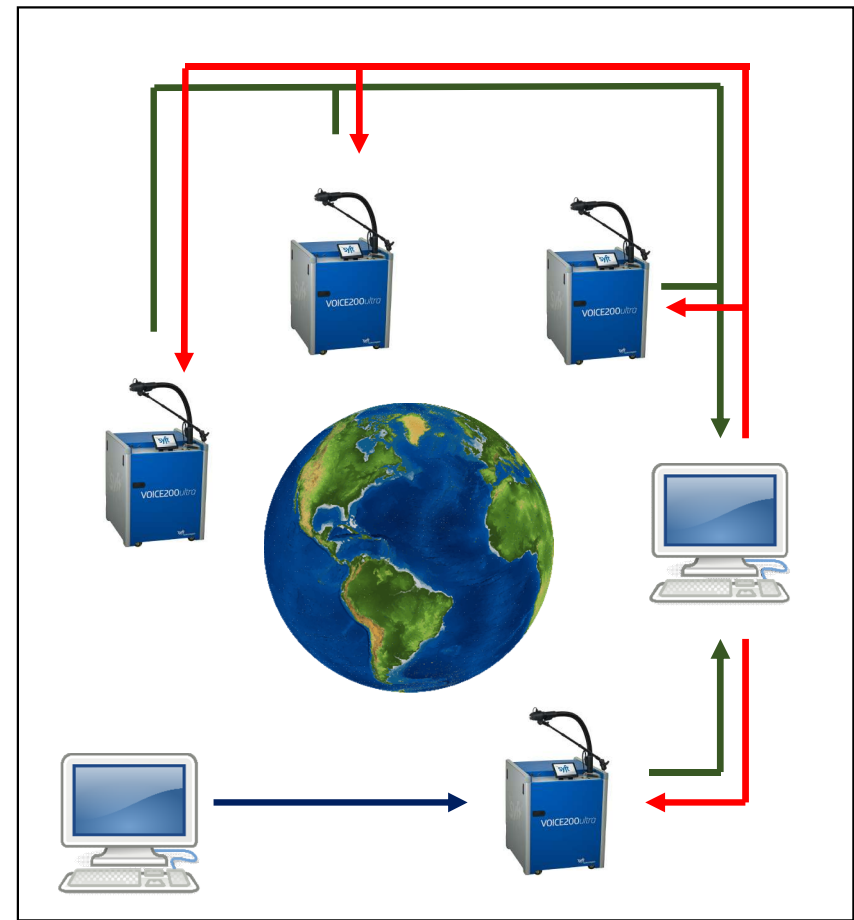
Reset Quadrupole	✓	Menu
Carrier Gas Validation	✓	
Downstream Pressure Validation	✓	
Sample Flow Validation	✓	
Upstream Scanline Validation	✓	
Downstream Scanline Validation	✓	Next
Detector Signal Verification	✓	
Detector Linearity Validation	✓	
Syft Standard Validation	✓	
Background Verification	✓	

Syft's instruments automatically run a battery of tests at regularly scheduled intervals, which constitute the Instrument Validation consists

The Instrument Validation tests all aspects of the instrument performance and culminates in the measurement of a certified analytical standard, which provide and end-to-end test of the overall instrument performance.

The Instrument Validation provides an assurance of the quality of the data collecting by the Syft system.

State-of-the-art networking capability



SIFT-MS for Odor Analysis

Objective odor assessment is very challenging



1. Odor compounds are chemically very diverse. This makes analysis very difficult for conventional analytical technologies.
2. Odors are dynamic, requiring fast response, whereas odor panels and/or lab-based analyses are expensive and based on time-averaged samples.
3. Human response to odors is very subjective; objective response typically requires extensive training.
4. Odor thresholds are often too low for low-cost instruments (human noses are very sensitive to these compounds).

SIFT-MS analyzes all odor compounds in one simple analysis



Hydrogen sulfide and other reduced sulfur compounds (e.g. COS, methanethiol...)

Nitrogen-containing compounds (e.g. ammonia, trimethylamine, indole)

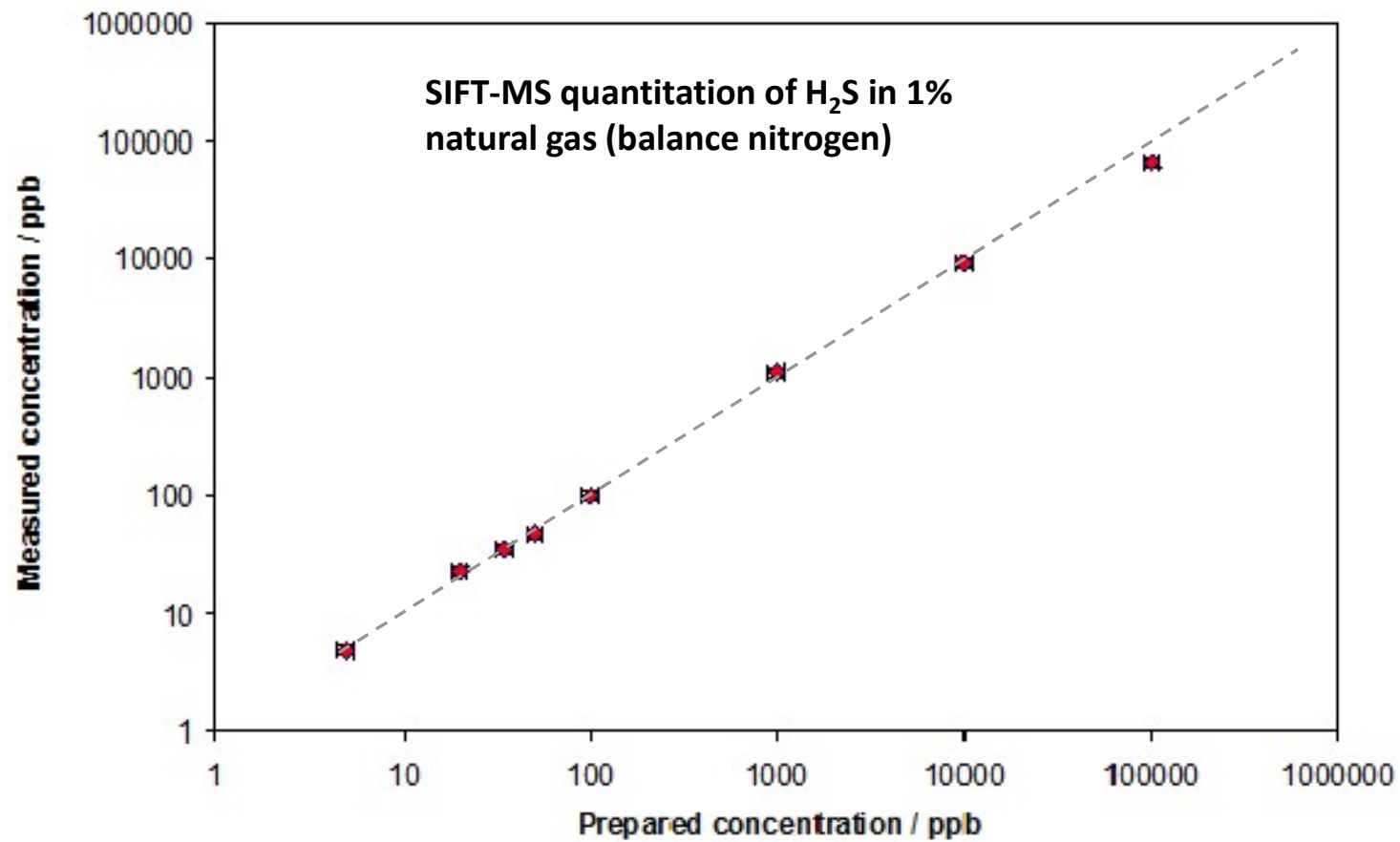
Aldehydes (e.g. acetaldehyde, methylbutanals)

Volatile fatty acids (e.g. formic acid, butyric acid)

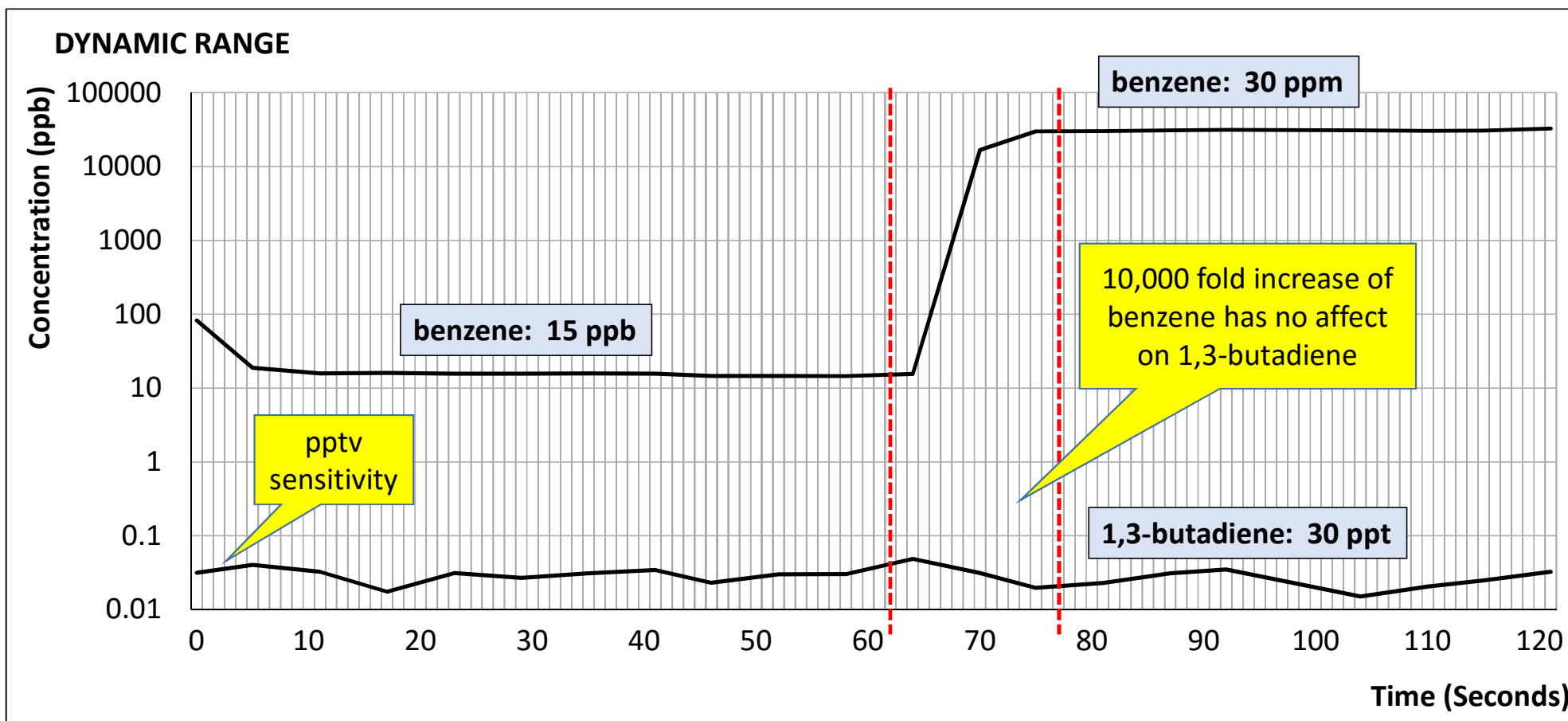
Hydrocarbons (e.g. xylene, monoterpenes)

Sulfur dioxide

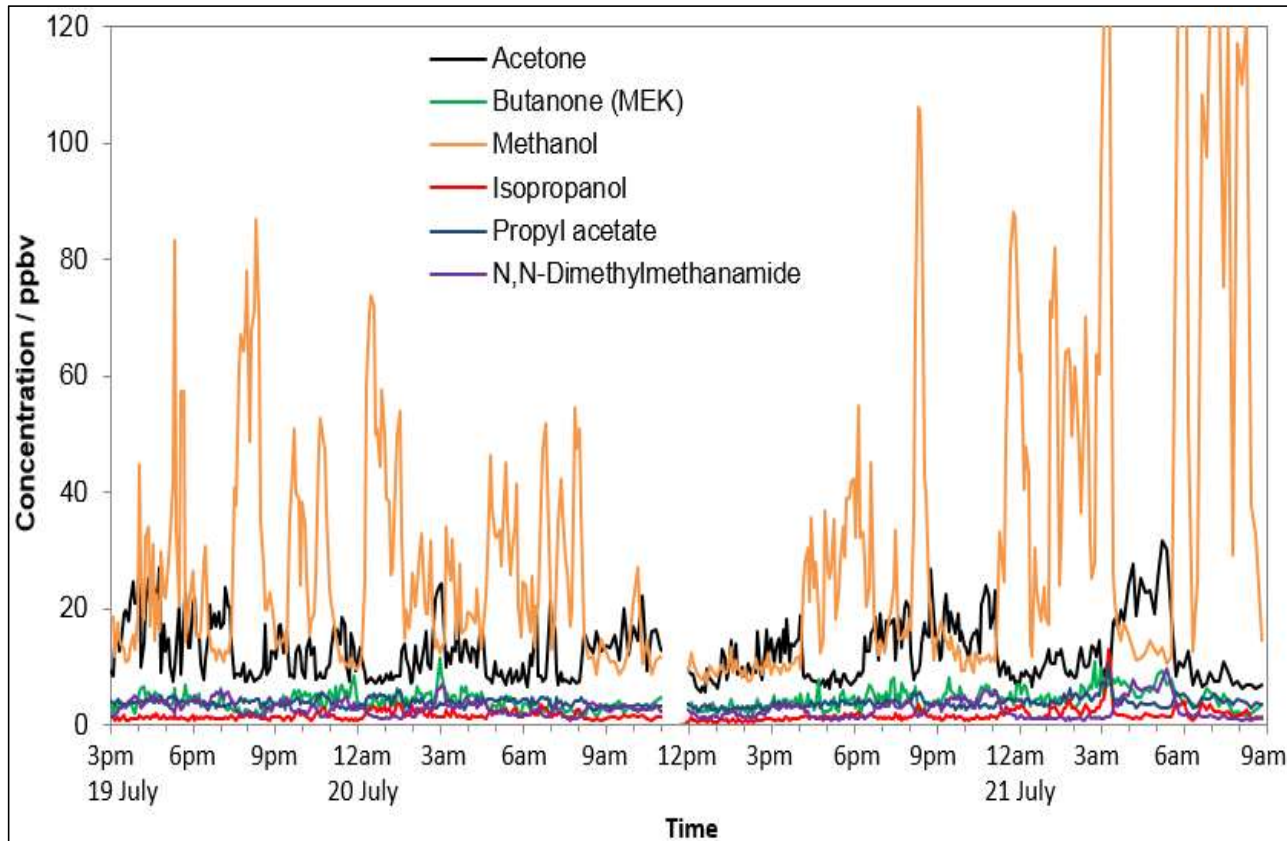
Wide linear range: spans over 5 orders of magnitude



SIFT-MS is extremely sensitive and has a dynamic range of 6 orders of magnitude



Real-time analysis: odor emissions are detected and quantified objectively as they happen



SIFT-MS instruments are ideally suited to continuous monitoring applications at sites where odor compounds and other VOCs are an issue.

Example: Shu-Lin Elementary School (Taipei, Taiwan) is ringed by small industrial facilities.

Odor monitoring at Poultry Farms in Queensland, Australia

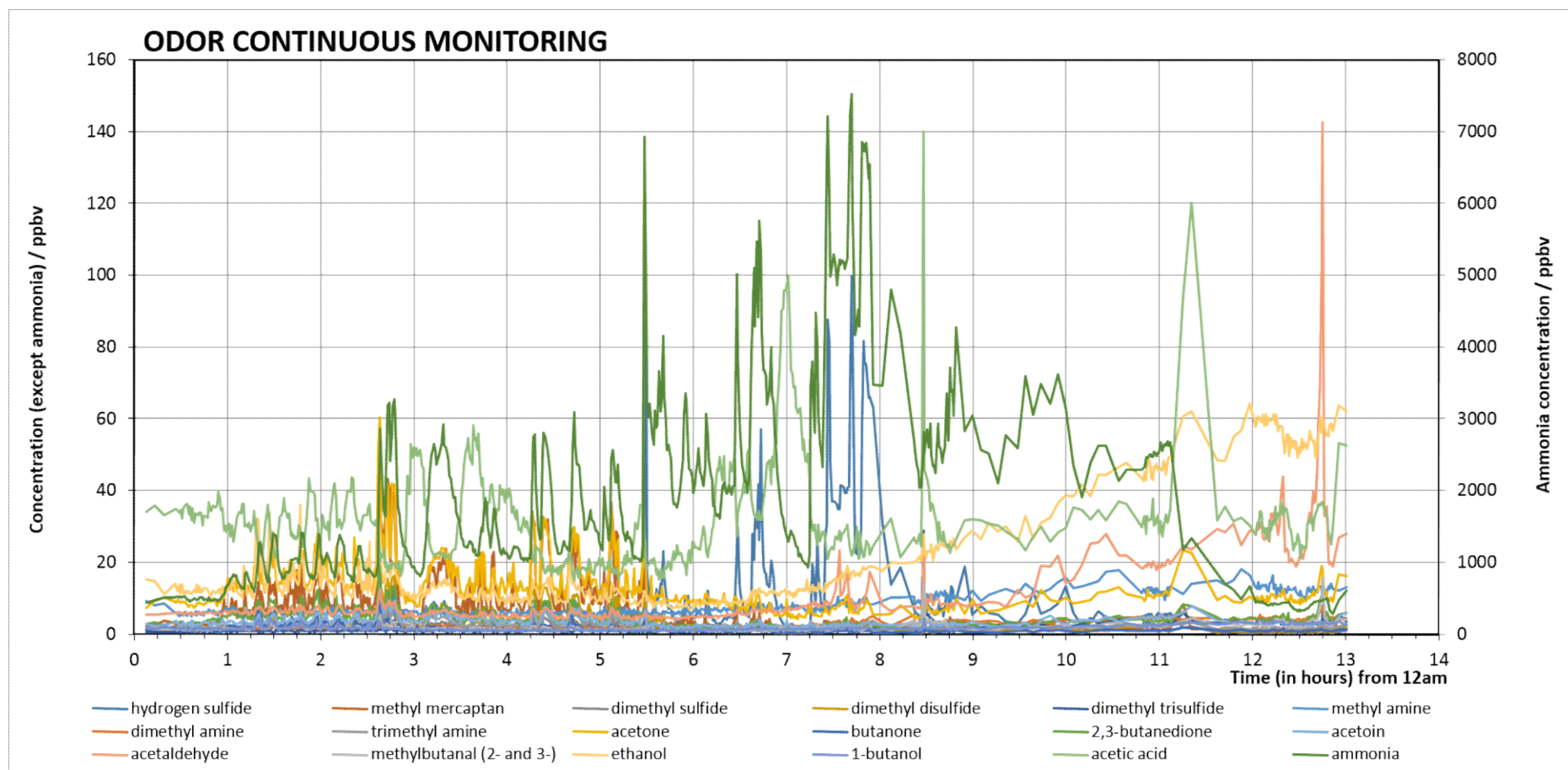
A Voice200 was deployed in a van for outdoor monitoring



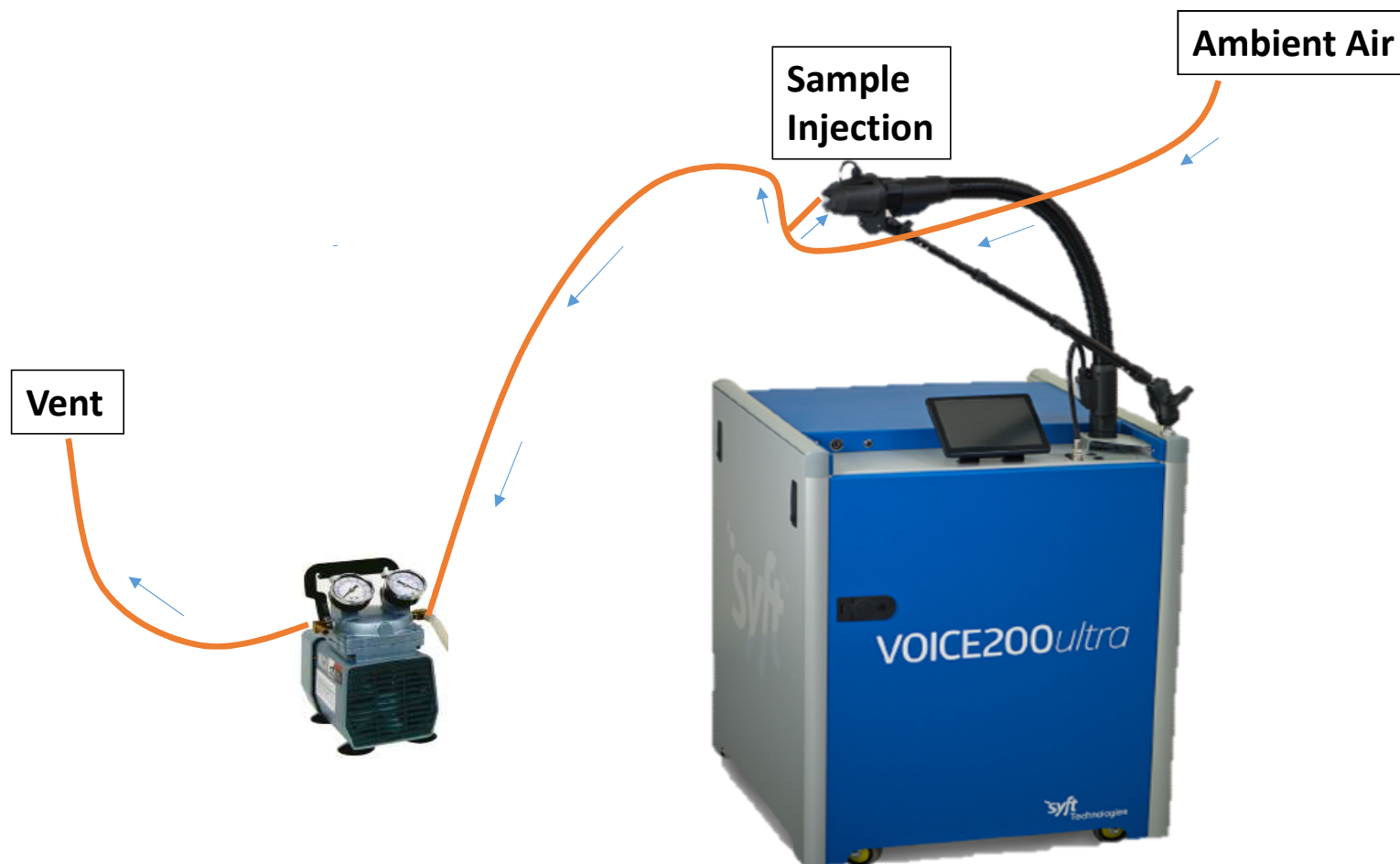
And indoor monitoring



Odor measurements inside poultry shed during cleaning of chicken litter



Flow-past setup for monitoring from remote location

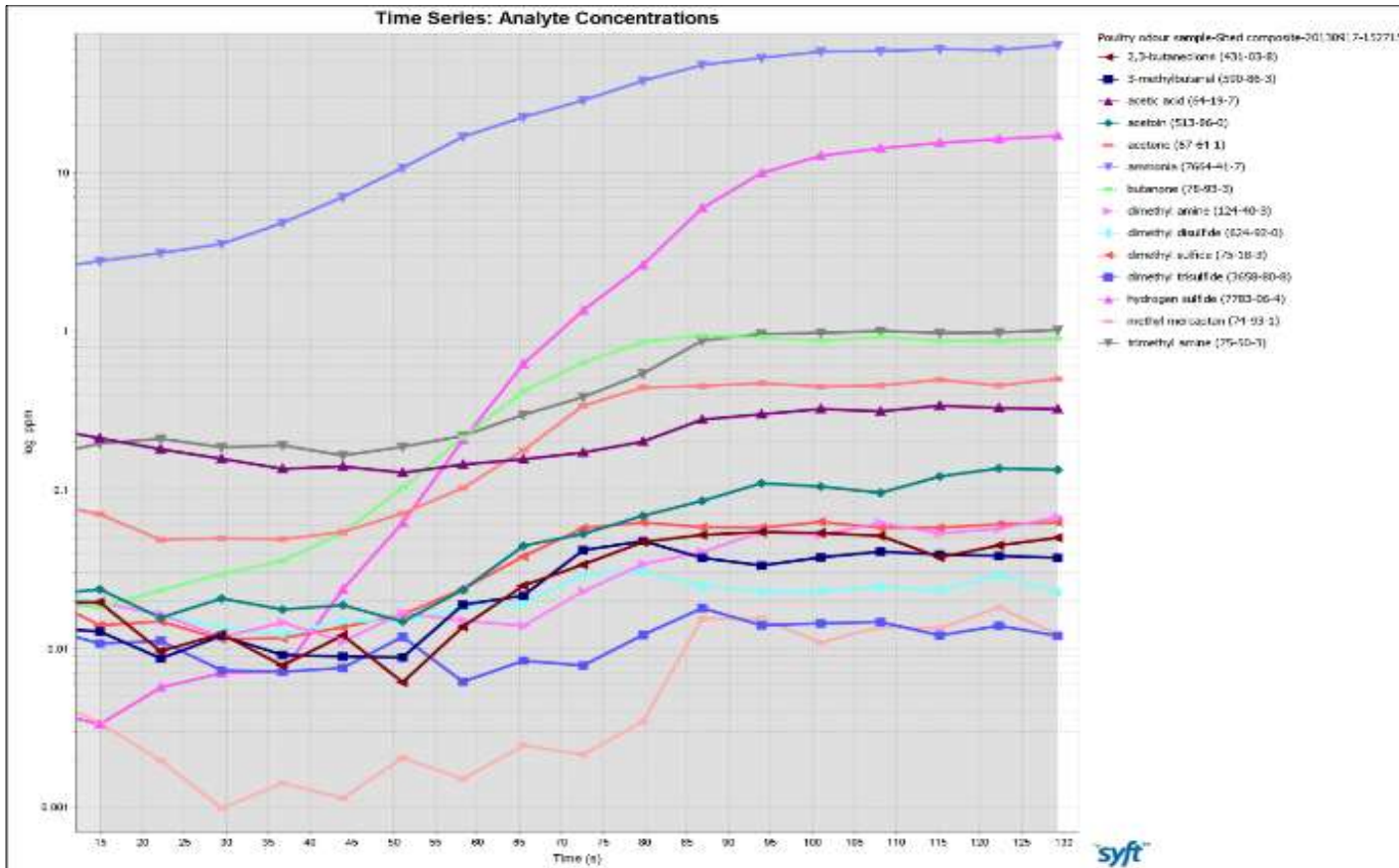


Flux chamber studies



Flux chambers were used to allow researchers to undertake more controlled evaluations of odor sources on a small scale.

Flux chamber studies



The flux chamber measurements highlight the dynamic nature of the odour emissions from chicken litter

Syft provides unique solutions to diverse odor applications

Analysis of diverse odor compounds without discrimination

Real-time analysis of odor events

High sensitivity and selectivity for odor compounds

A proven robust solution for field deployment



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Questions?