

Fachbereich "IMR & Umweltphysik"

A selection of projects:

- **Instrument development & validation:**
 - Development of a PTR-TOF-MS
 - Development of a CI-AMS
 - PTR-MS adaptation for fast NH_3 measurements
 - Quality assurance of OVOC measurements
- **Research**
 - Air quality in the River Inn Valley
 - Cabin air quality in passenger airplanes
 - BioVOC synthesis & release
 - BioVOC signaling
 - VOC emissions from food and bacteria



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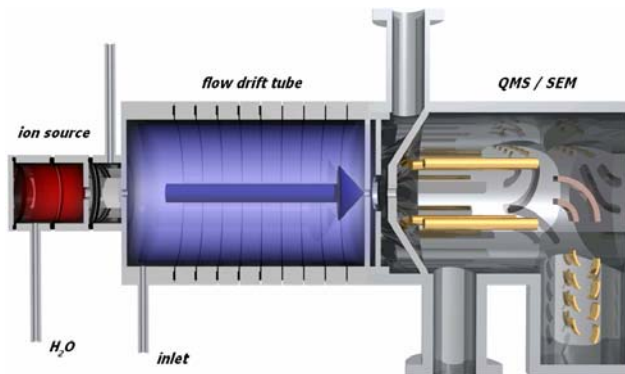
Dr. Pawel Cias



Markus Müller

Mag. Andrea Schaub

Proton-Transfer-Reaction Mass Spectrometry



A fast and highly sensitive sensor for measuring volatile organic compounds (VOCs).

Development of a PTR-TOF-MS

Two Main Advantages:

- Considerably faster

Quad-MS: 1s → a few compounds

TOF-MS: 1s → full mass spectrum

- Significantly higher mass selectivity

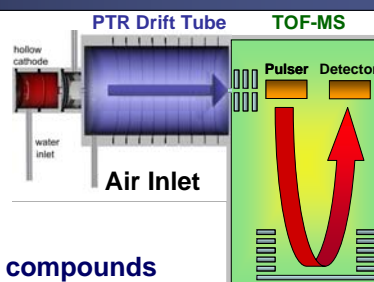
Allows identification of isobaric molecules

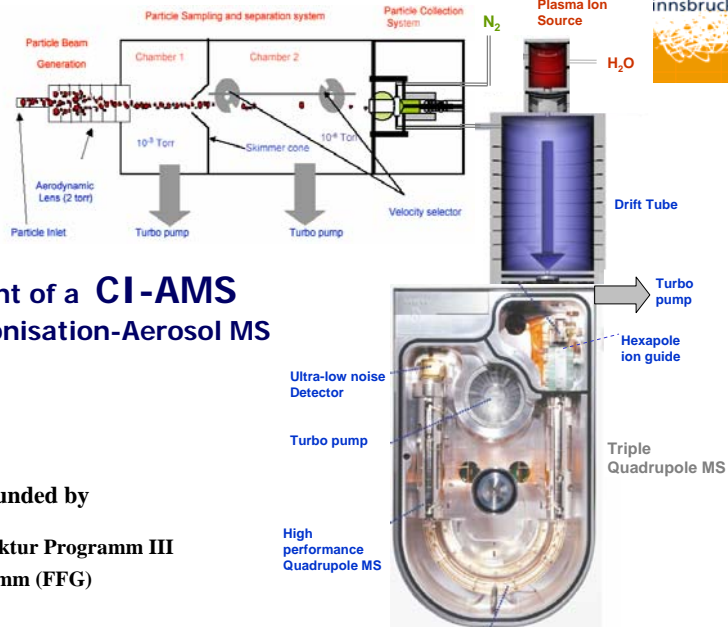
Example: TOF-MS can resolve

Formic acid 47,01 amu and Ethanol 47,05 amu

This project is funded by

- Uni-Infrastruktur Programm II
- Bridge Programm (FFG)



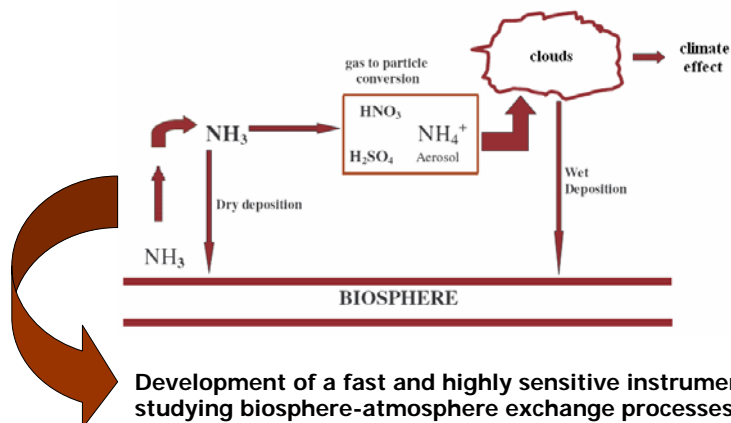


Development of a **CI-AMS**
Chemical Ionisation-Aerosol MS

This project is funded by

- Uni-Infrastruktur Programm III
- Bridge Programm (FFG)

NH₃ Measurements using PTR-MS



Development of a fast and highly sensitive instrument for studying biosphere-atmosphere exchange processes of NH₃

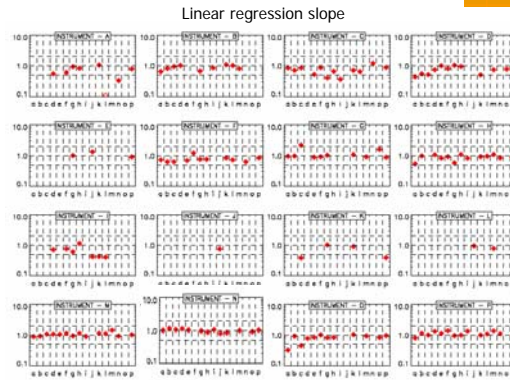
This project is funded by FORMAS
The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning



Quality assurance of OVOC measurements



12 state-of-the-art instruments for OVOC measurements participated in an intercomparison exercise at the atmosphere simulation chamber SAPHIR



ACCENT is a Network of Excellence funded by EC, FP6, PRIORITY 1.1.6.3 Global Change and Ecosystems



Air quality in the river Inn Valley I

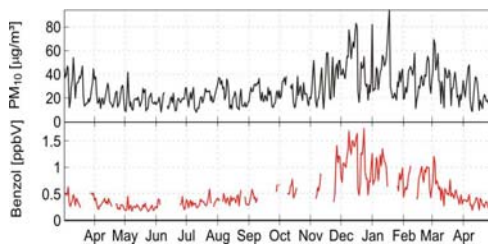
- Long-term (Feb. 2004 – May 2005) air quality measurements at the Luftmeßstelle Vomp
 - Monitoring of diurnal and seasonal variations of NO_x , PM_{10} and VOCs
 - Study of the influence of meteorological conditions on pollutant levels



day / summer



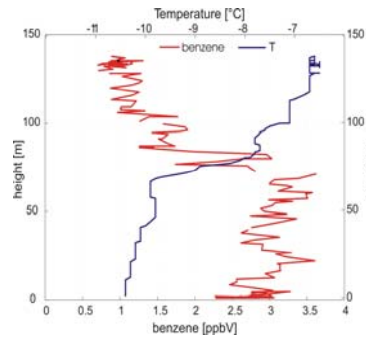
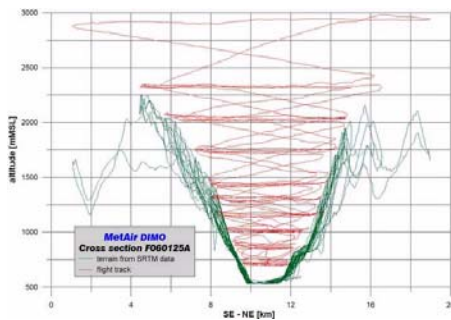
night / winter



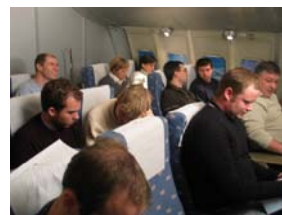
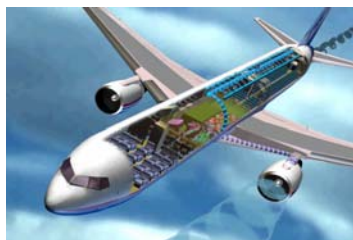
in collaboration with Abteilung Luftgüte / Waldschutz, Amt der Tiroler Landesregierung

Air quality in the river Inn Valley II

- Vertical profiling of pollutants in the Inn Valley during high air pollution (INNOX, Jan-Feb 2006)
 - aircraft profiling
 - balloon profiling



Cabin Air Quality in passenger airplanes

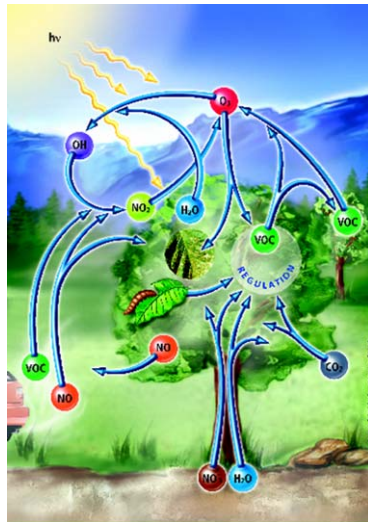


Simulated Boeing 767 aircraft cabin at ICIEE (DK)

- Influence of ozone on cabin air quality
- Influence of air purification on cabin air quality



BioVOC Synthesis & Release



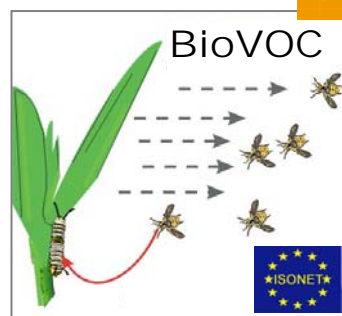
PTR-MS measurements of biogenic VOC...

- reveal biosynthetic pathways
- uncover emission capacity
- track their fate in the atmosphere



BioVOC Signaling

Communication between
plants and insects
via BioVOCs

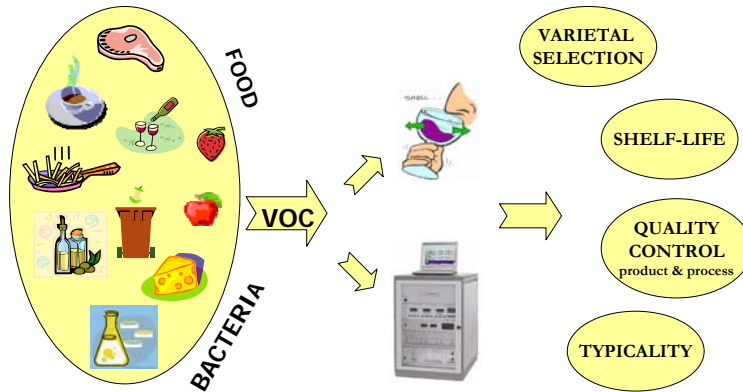


BioVOC monitoring by PTR-MS:

- Monitoring herbivore induced emission from poplar in a field campaign
- Lab study on plant-pest-predator interaction in an olfactometer



VOC emissions from food and bacteria



nestlé Research Center

