

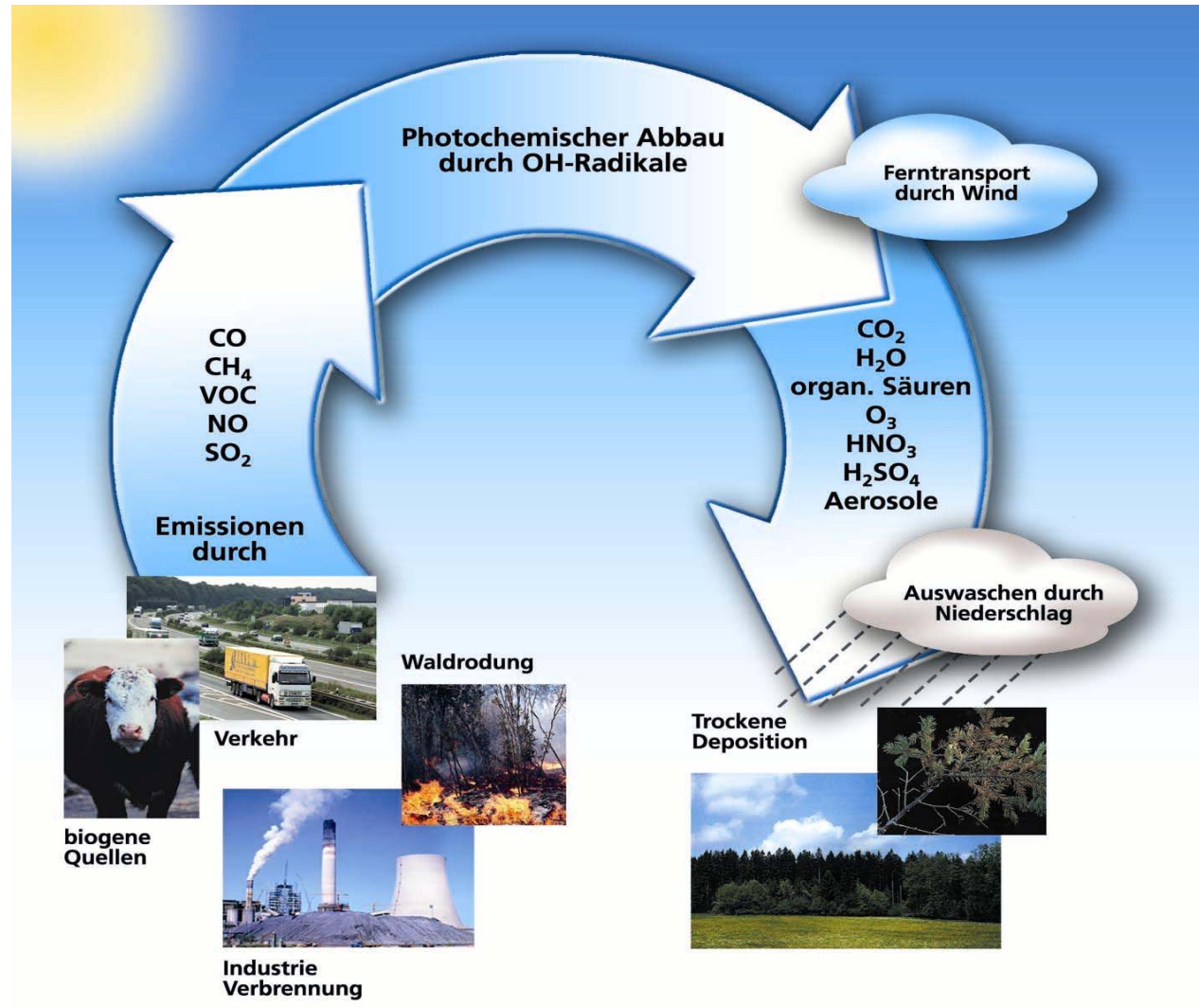


Airborne photochemistry measurements during the COPS/TRACKS field campaign

Frank Holland, Heiner Geiß and the TRACKS team



Die „chemische Waschanlage“: Der Selbstreinigungsmechanismus der Atmosphäre mit Hilfe des OH-Radikals

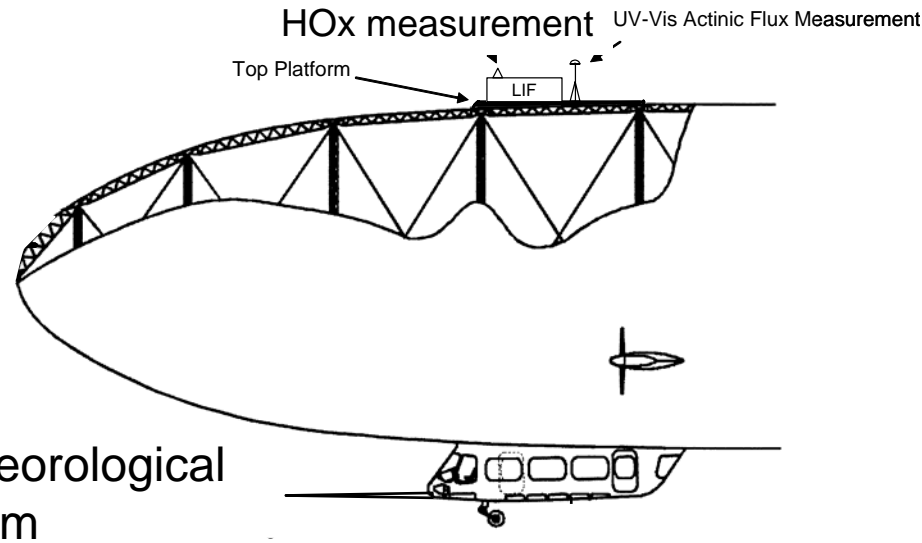
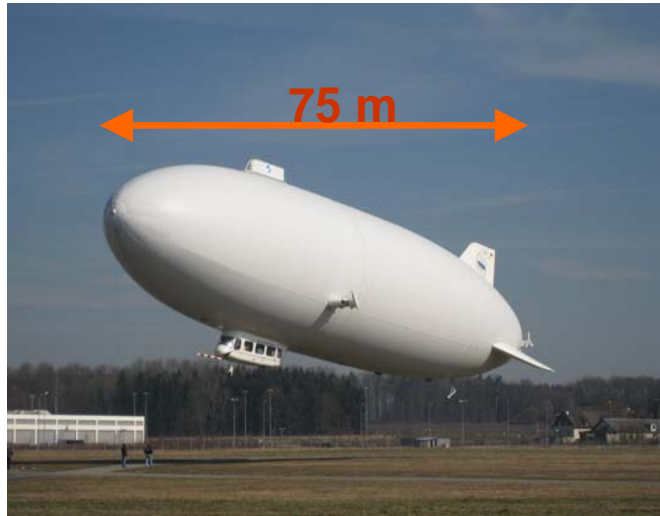




Scientific missions in the PBL

- **Entrainment of trace gases into convective systems**
- **Lagrange experiment to investigate the chemical development of a plume originating from a city / region**
- **Vertical profiles of HO_x radicals and trace gases**

Zeppelin NT



- OH and HO₂ (LIF)
- HONO (LOPAP)
- HCHO (Hantzsch)
- NO, NO₂ (Chemiluminescence)
- O₃ (UV photometer)
- VOC (canister sampling, Online GC)
- Actinic flux (SR)
- Trace gas profiles of NO₂, O₃ (MaxDOAS)
- Aerosol data (CPC, SMPS)
- CO (Resonance fluorescence)

Dimona HK36 TC ECO HB-2335

Wing Span	17 m
Length	7 m
Speed	100-240 km/h
Max. Cruising Height	4000 m
Payload	310 kg
Endurance	4 - 5 h



CO, VOC

Alternatively:

Hyper spectral scanner
High speed video camera

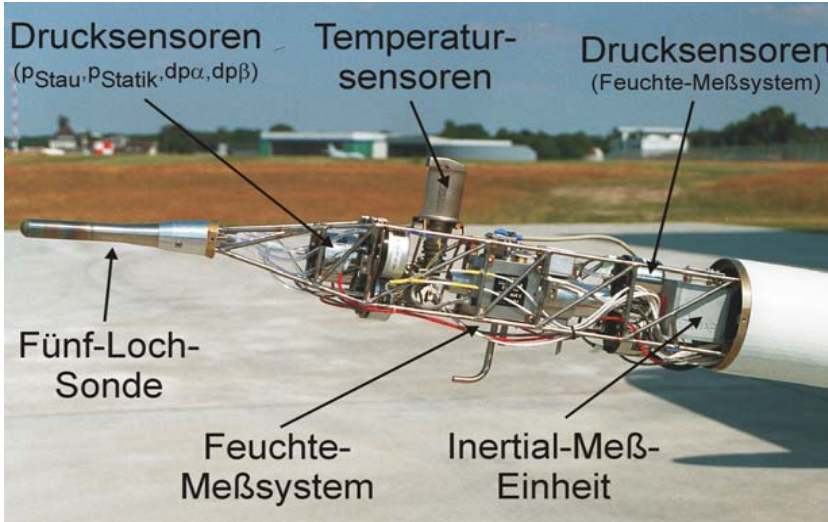
Temperature, Dew Point,
Pressure, Wind

NO₂, NO_x, NO_y,

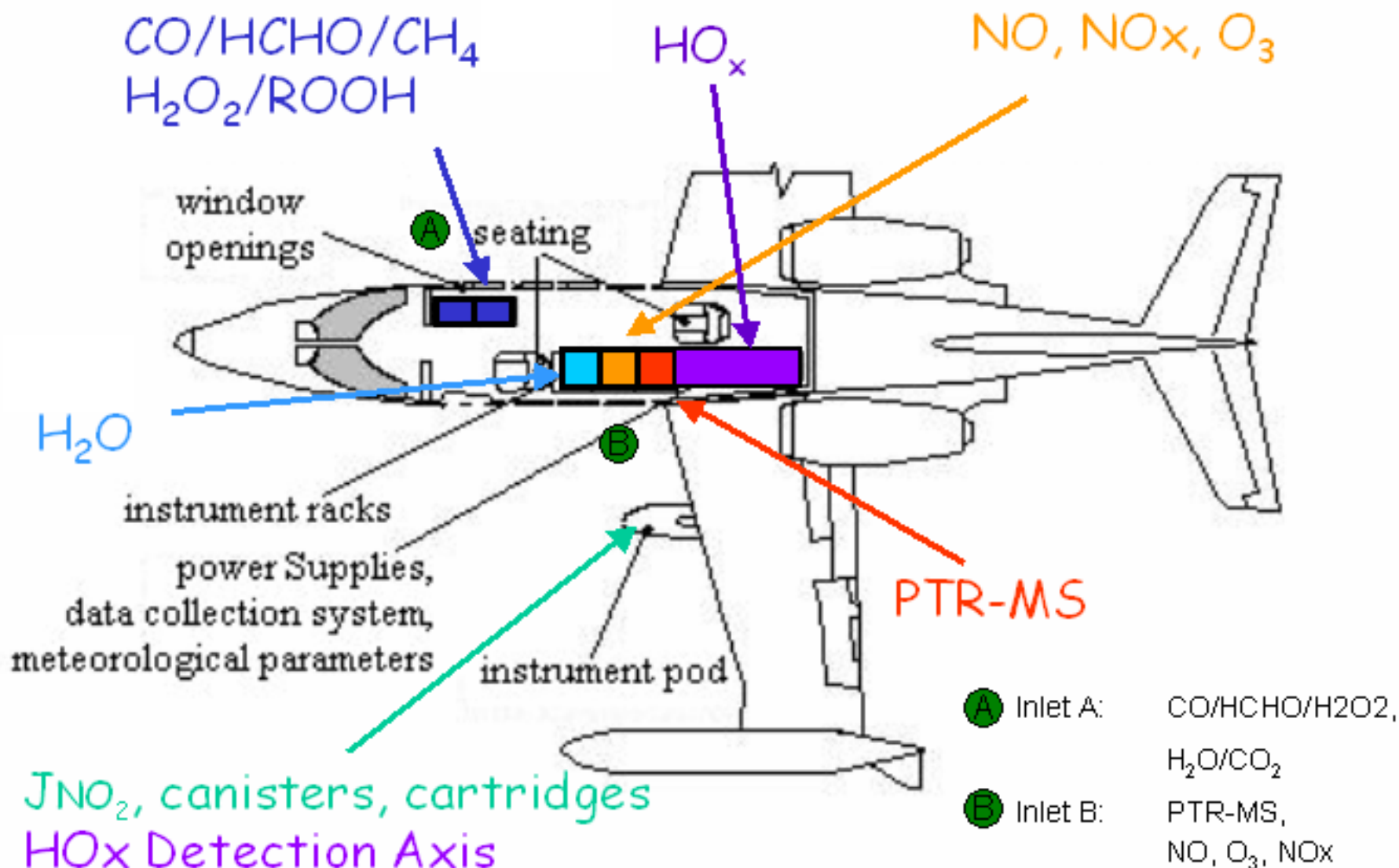
HNO₃, PAN, O₃,

CO₂, H₂O, Aerosoles >0.3 μm

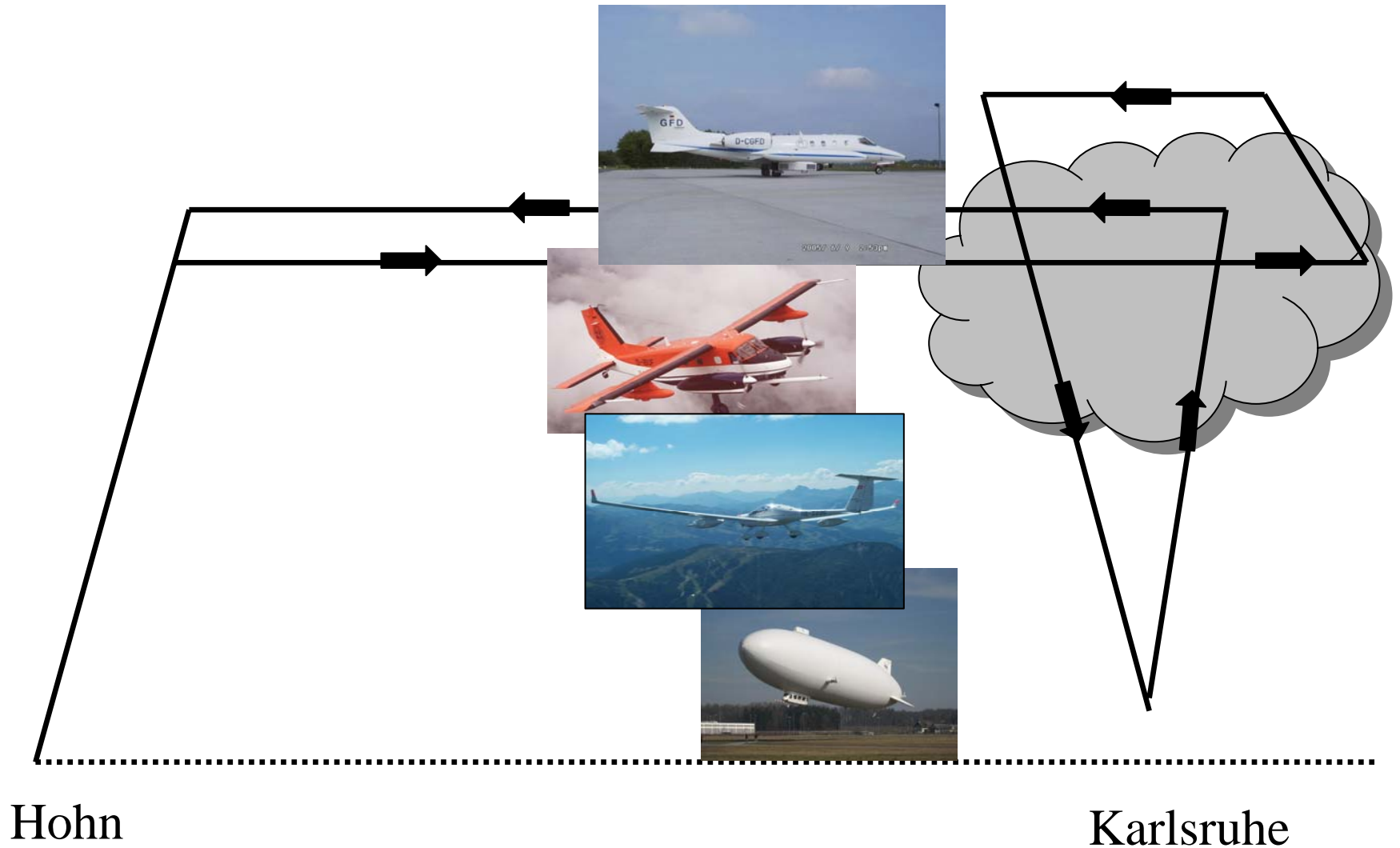
Do128 - I-BUF Karlsruhe



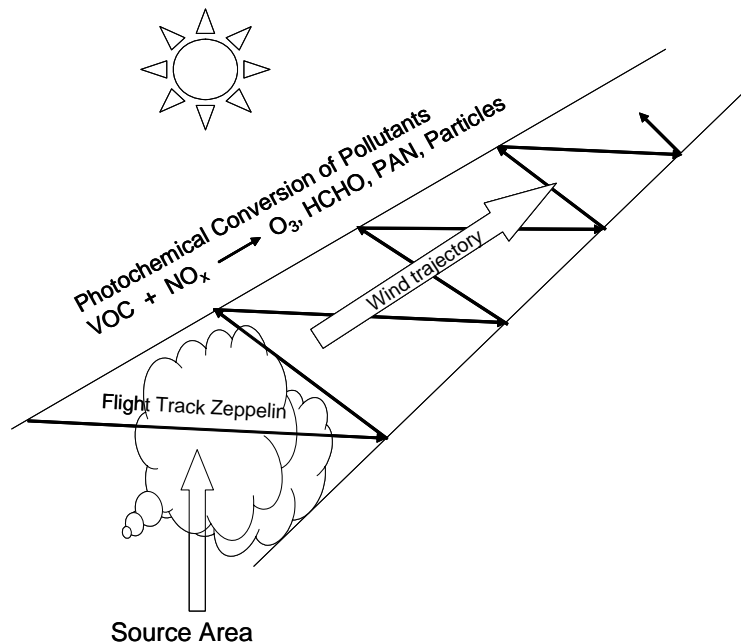
HOOVER: Lear-Jet Payload



Transport and chemistry in convective systems



Lagrange experiment

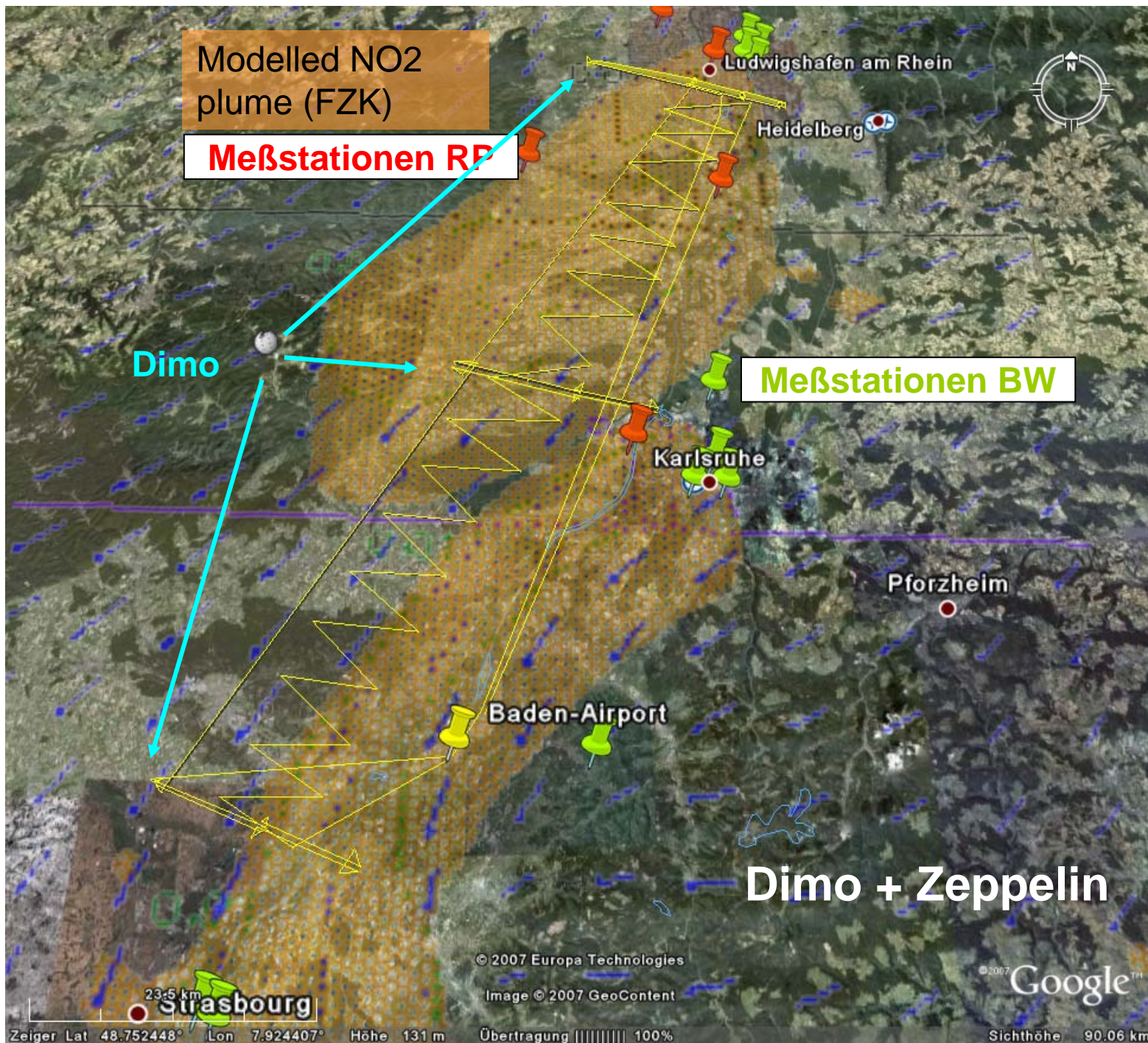


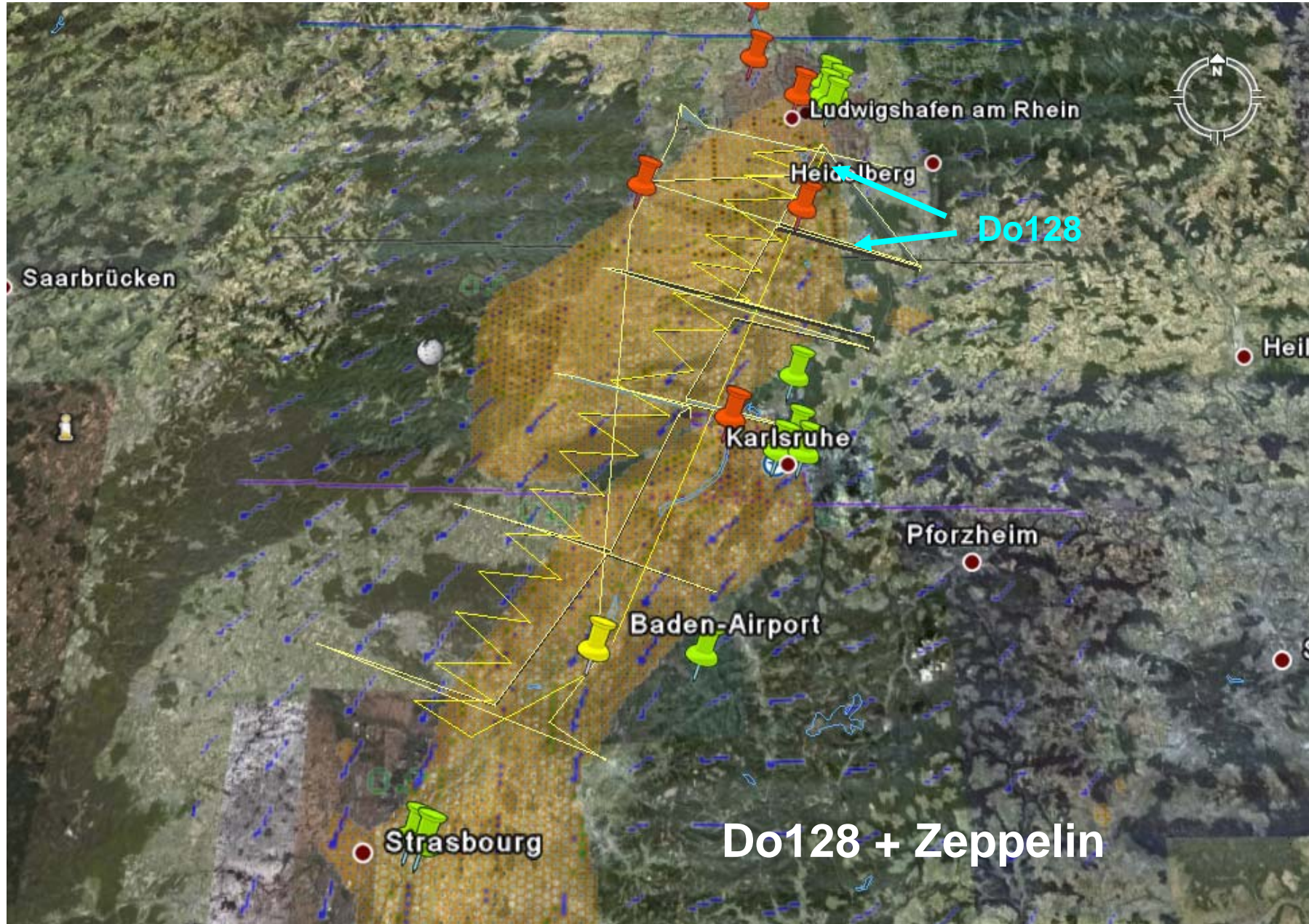
- Follow a plume for some hours and measure its chemical development.
- Source:
Ludwigshafen – Mannheim region
- Northerly winds will transport the plume up the Rhine valley



What processes determine the composition of a plume ?

- **Meteorological conditions (radiation, cloudiness, wind, turbulence)**
- **Emissions (anthropogenic, biogenic, spatial distribution, land use)**
- **Chemical processes (destruction of hydrocarbons by OH and formation of Ozone, formaldehyde and aerosols)**







Aims for TRACKS/COPS field campaign in 2007

- Investigate **gas-phase oxidation processes** involving free radicals that directly affect the abundances of reactive gases.
- Study **processes that form aerosols** either directly or indirectly f. gaseous precursors.
- Explore **transport processes** that distribute emissions and secondary oxidation products by advection and turbulent diffusion.