

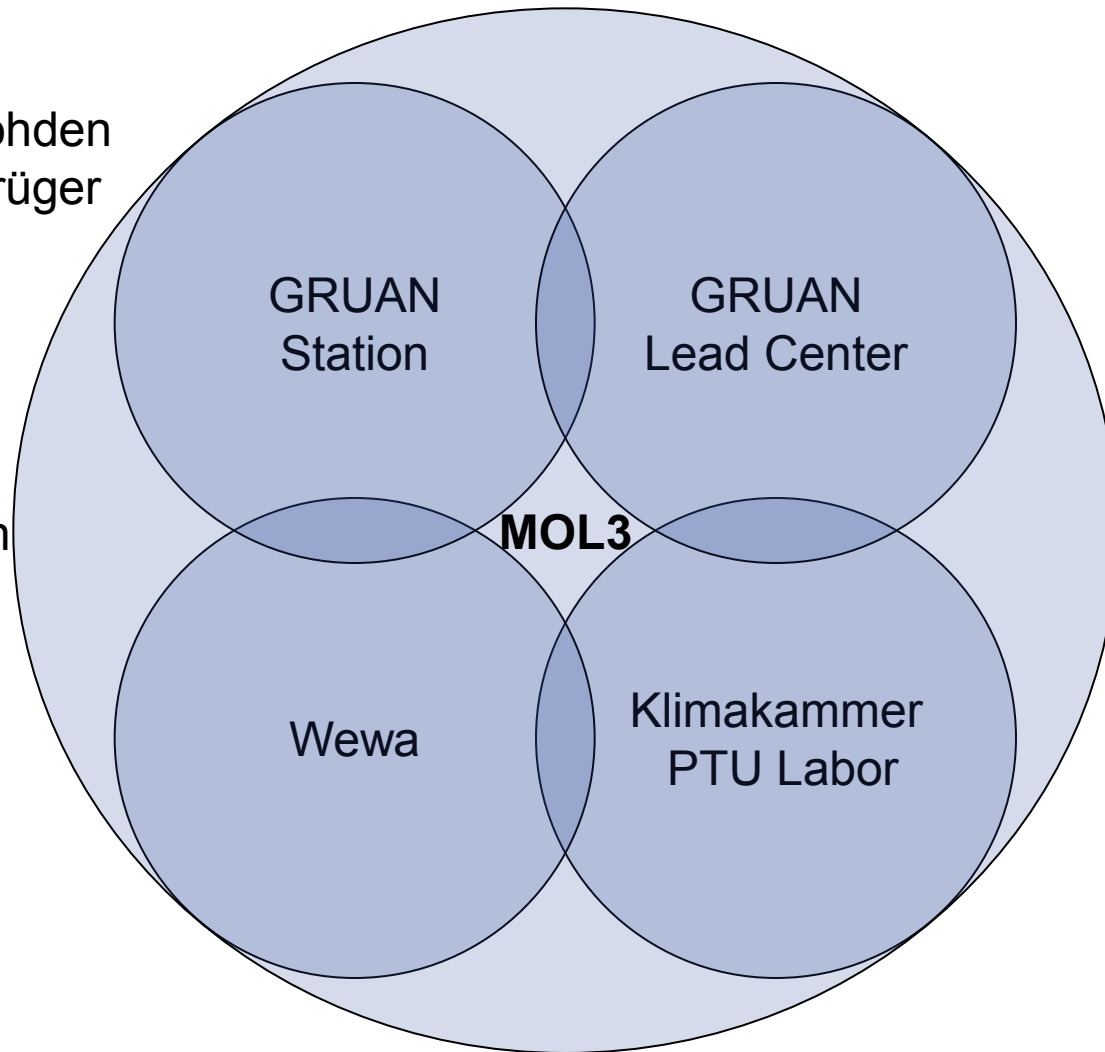
# Lindenberg Observatory: In-situ sounding (MOL3)

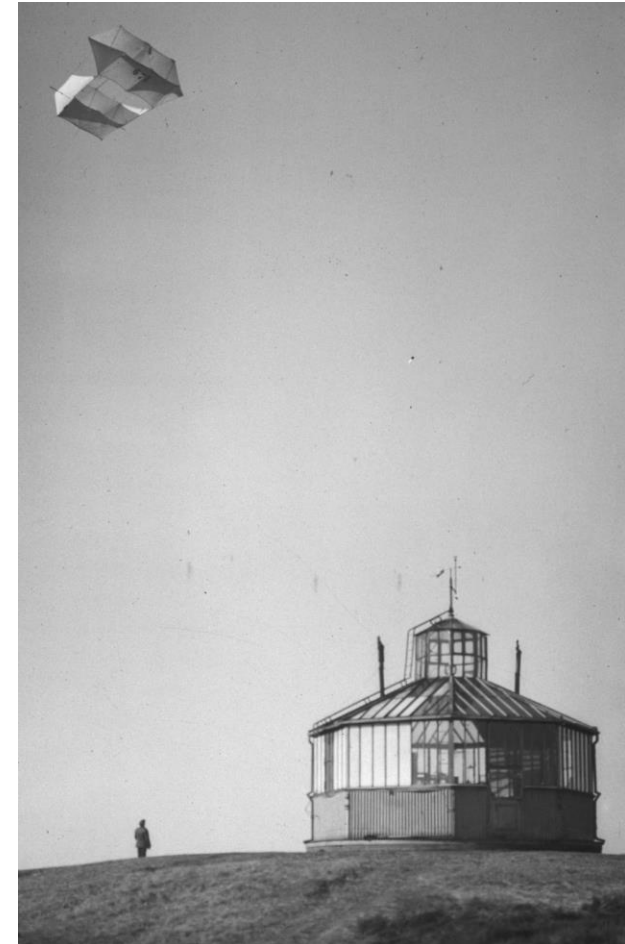
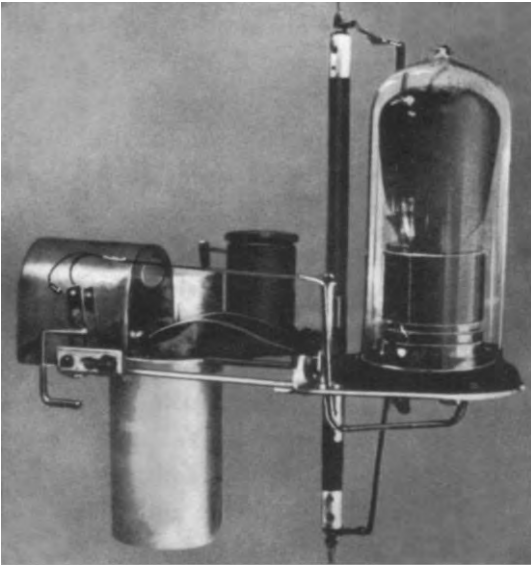
Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

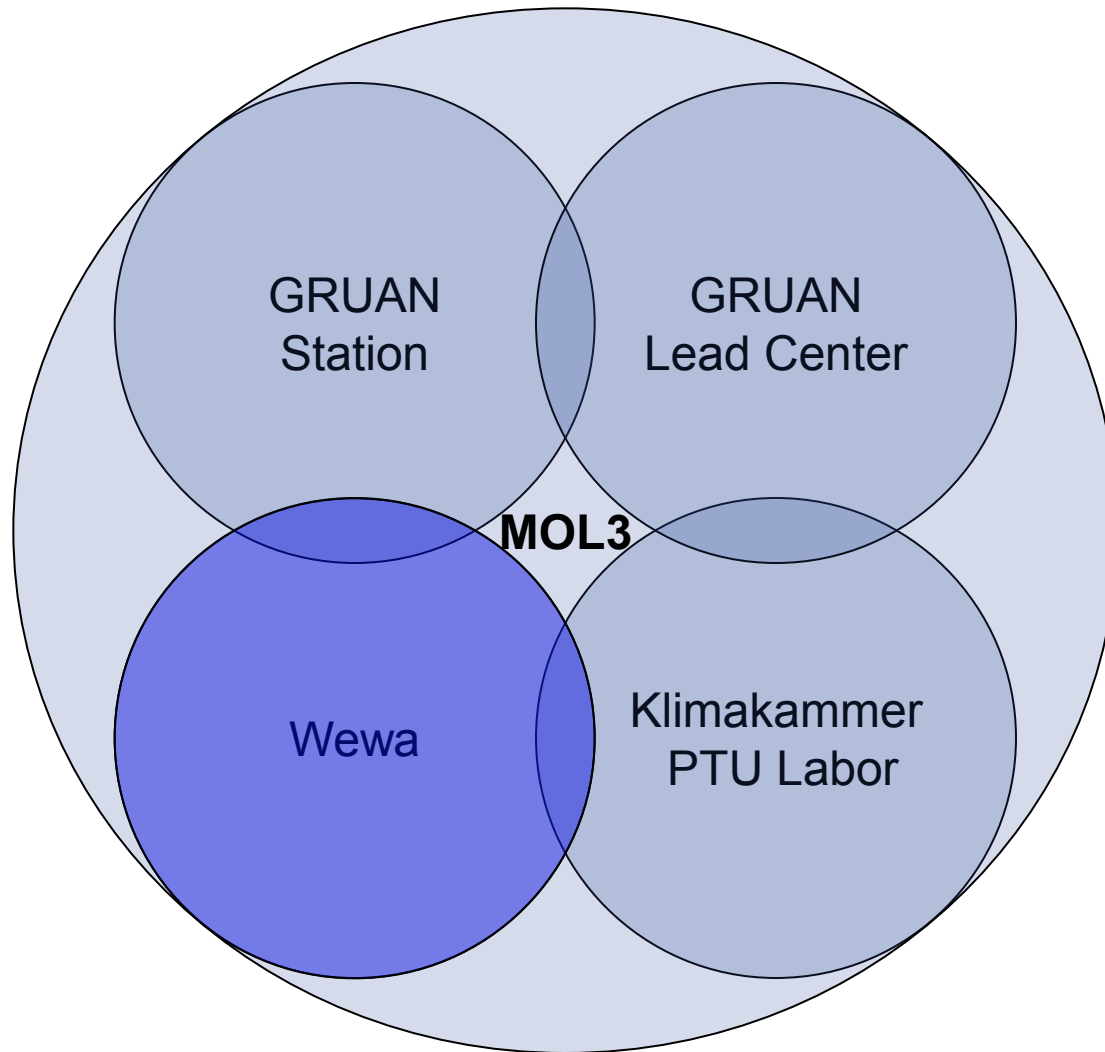


Michael Sommer  
Christoph von Rohden  
Marion Fiedler-Krüger

Tatjana Naebert  
Susanne Meier  
Peter Oelsner  
Rico Tietz  
Sven Brinckmann







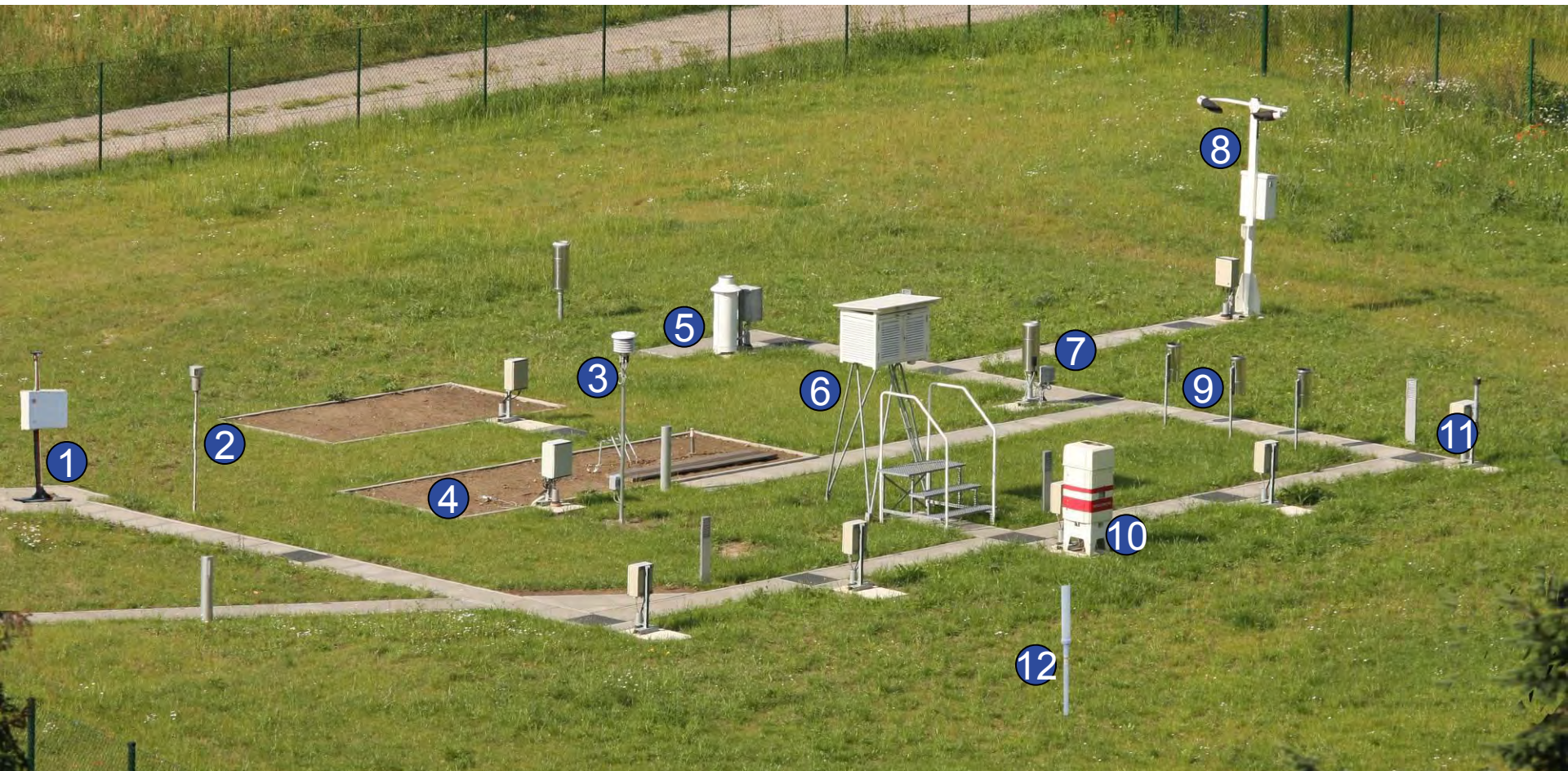


- GSN station
- GUAN station
- GRUAN station
- Climate-reference station within DWD



GCOS = Global Climate Observing System  
GSN = GCOS Surface Network  
GUAN = GCOS Upper Air Network  
GRUAN = GCOS Reference Upper Air Network





1. MiniVS – Sammelgerät zur Bestimmung der Feinstaubkonzentration
2. Sigma2 - Probenahmegerät für Grobstaub und Stickstoffdioxid
3. DWD-Wetterhütte LAM 630 (Lufttemperatur und Luftfeuchte)
4. Erdbodenmessfeld
5. Regenschreiber zur Registrierung des Niederschlages
6. Thermometerhütte (englische Hütte genannt)

7. Niederschlagsmesser PLUVIO Ott
8. DF20+ zur Sichtweitenbestimmung
9. Niederschlagsmesser nach Hellmann
10. Ceilometer zur Bestimmung der Höhe der Wolkenuntergrenze
11. Kroneis zur automatische Erkennung der Niederschlagsdauer
12. Messung der Strahlenbelastung

## CIMO Testbed



Graw DFM09



Vaisala RS41  
4/day



Internet Imet1



Meisei  
RS06G  
MTR

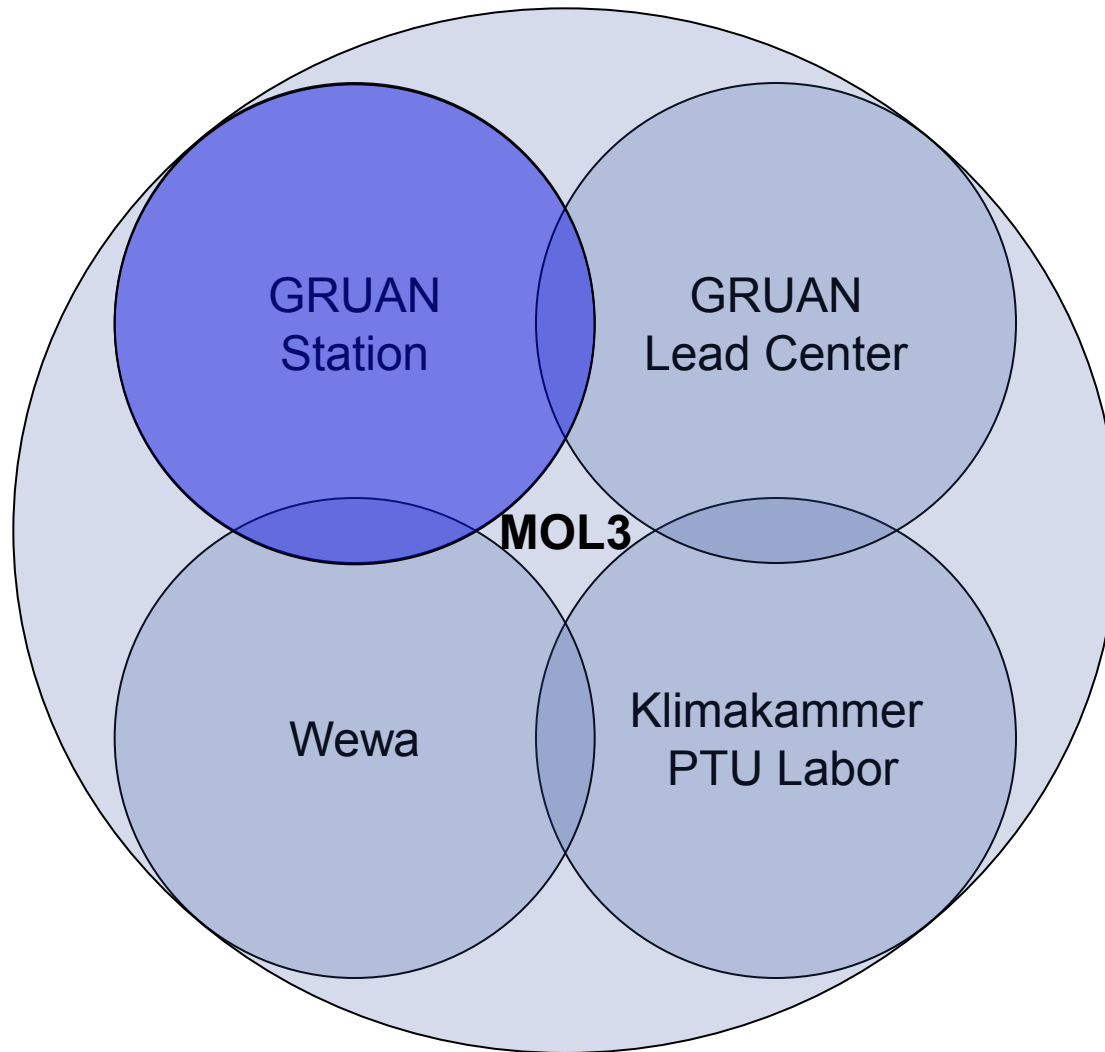


Vaisala RS92



Meteolabor  
SRS-C34

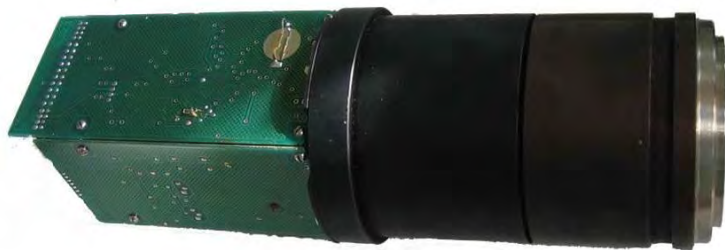


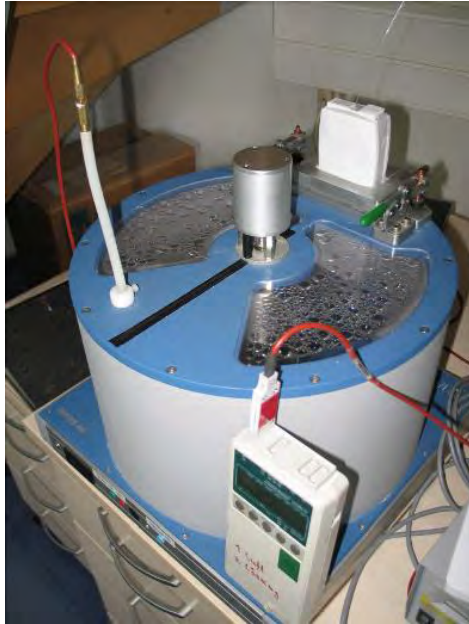




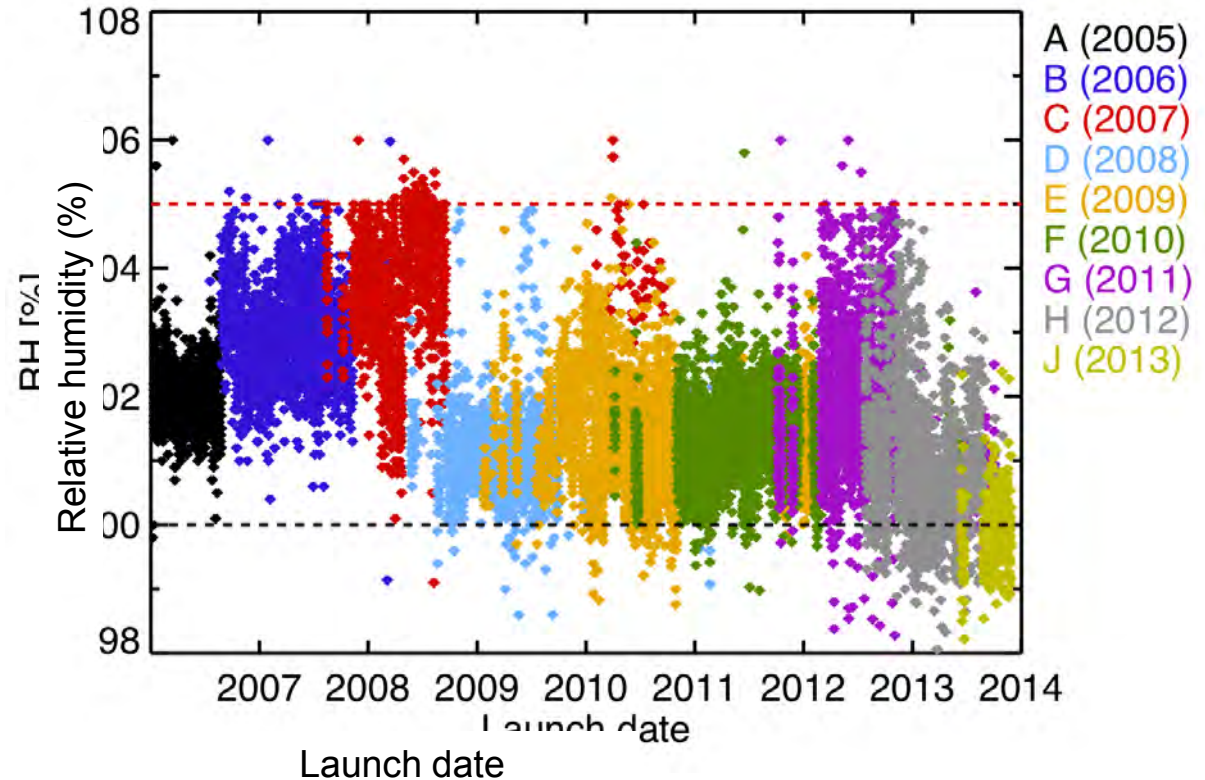
# Other (reference) instruments

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand





Additional check of radiosonde at 100% humidity  
More likely to unveil issues









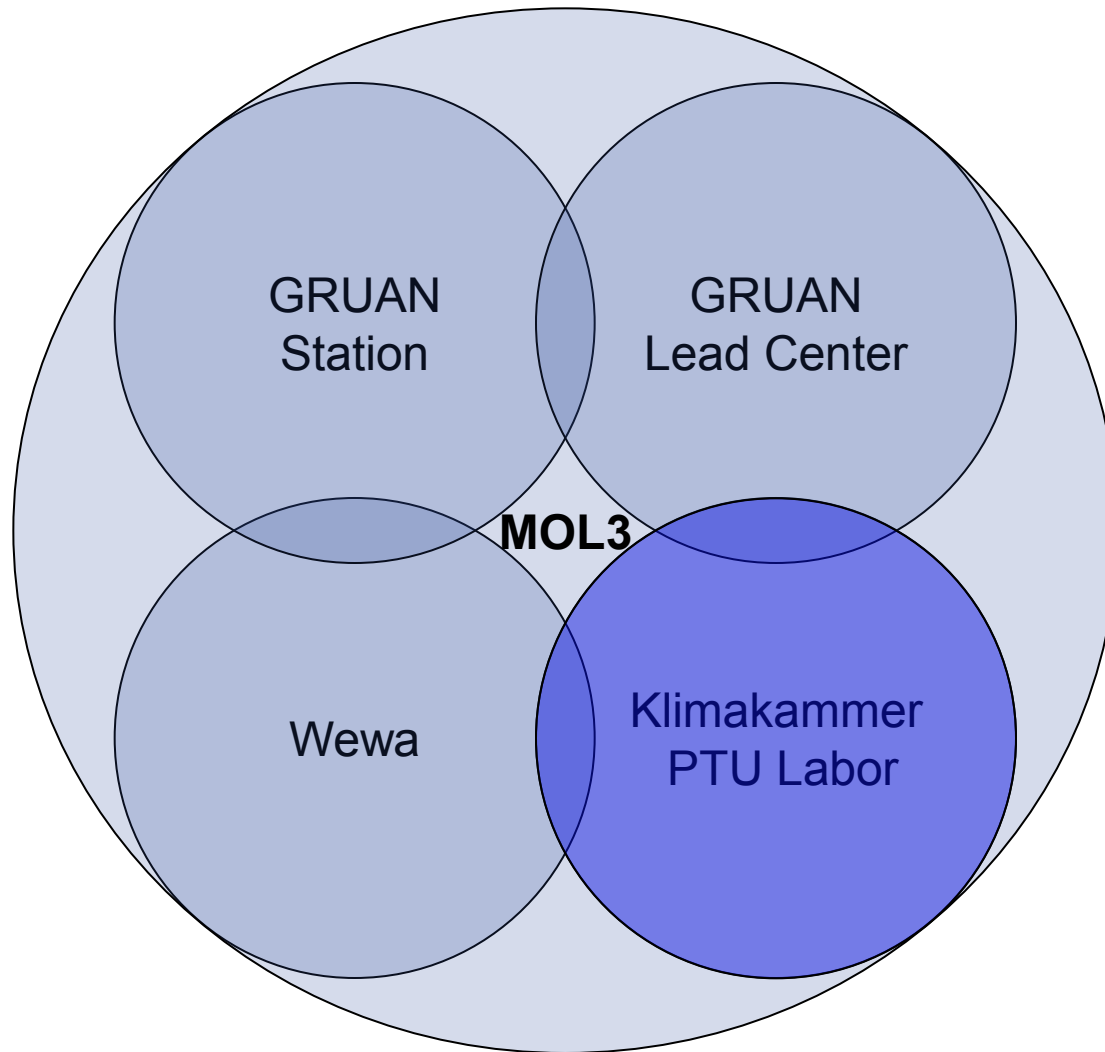




# Recovery

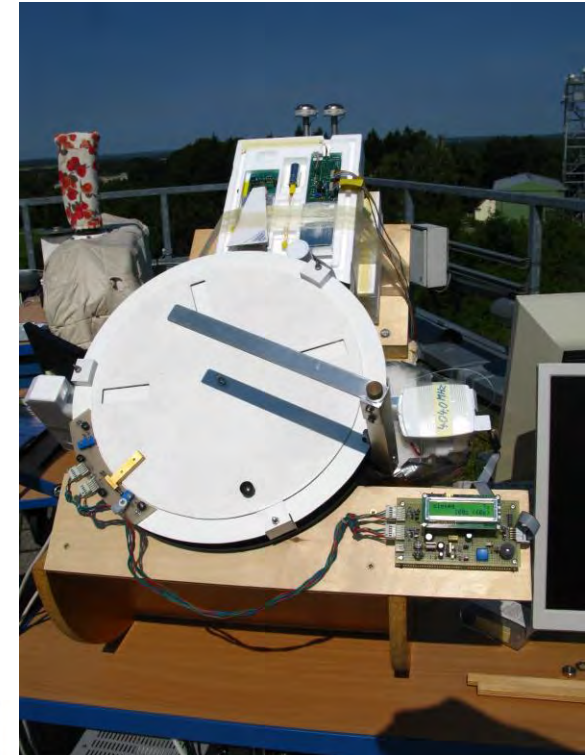
Deutscher Wetterdienst  
Wetter und Klima aus einer Hand







- SHC; calibration (0 to 100 %RH)
- Radiation (3 to 1013 hPa)
- Climate chamber; time lag (-80 to -40° C)



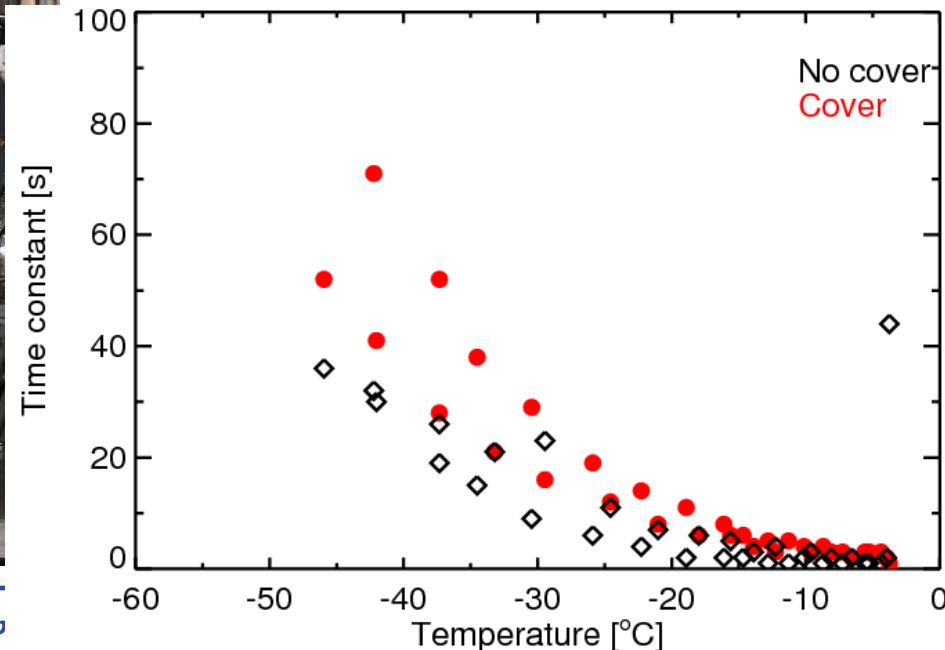
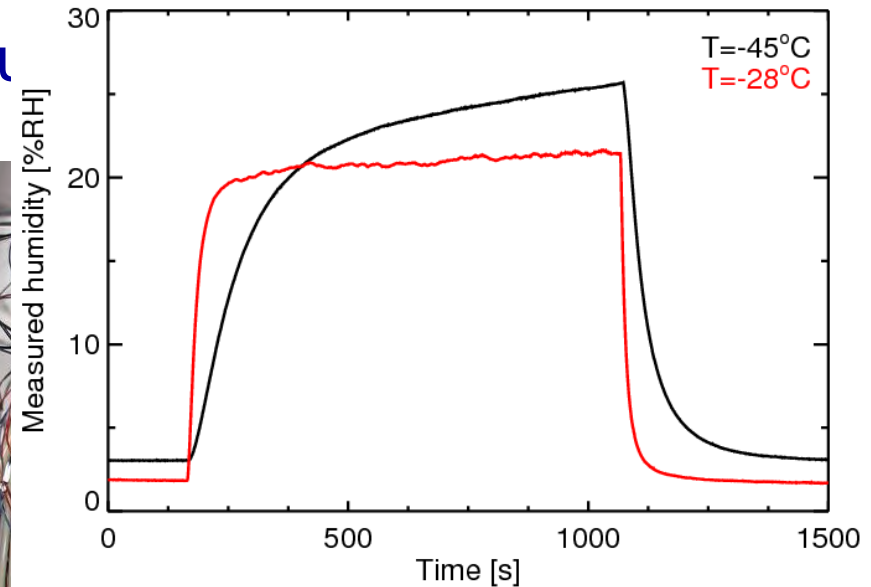
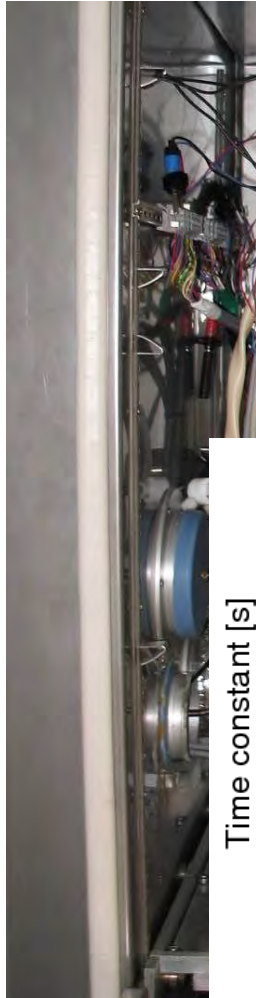
Standard humidity chamber  
0, 11, 33, 75, 97, 100% RH

Calibration of  
-RH  
-Temperature



Testing and calibration of in-situ  
-75° C – 20° C  
3 – 1013 hPa

- Pressure
  - DKD certified 2004
  - Cooperation with PTB
- Temperature
  - 0.03 K reproducibility
  - DKD-certification
- Humidity
  - Reference sensors
    - MBW
    - TOROS (CR“)
    - CFH





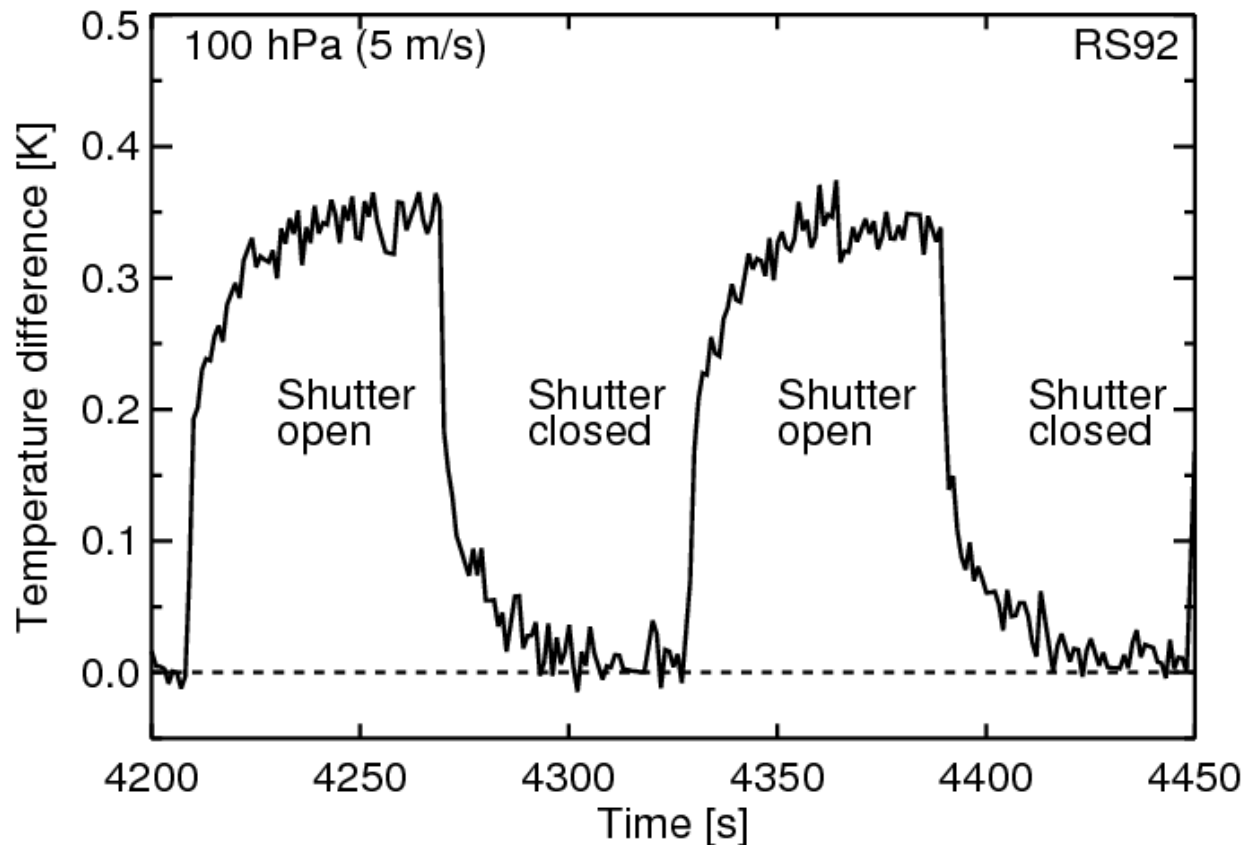
Shadow RS92 records background

temperatu

Simultane

$p=3$  hPa ,

## Difference illuminated – background radiosonde



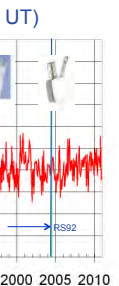
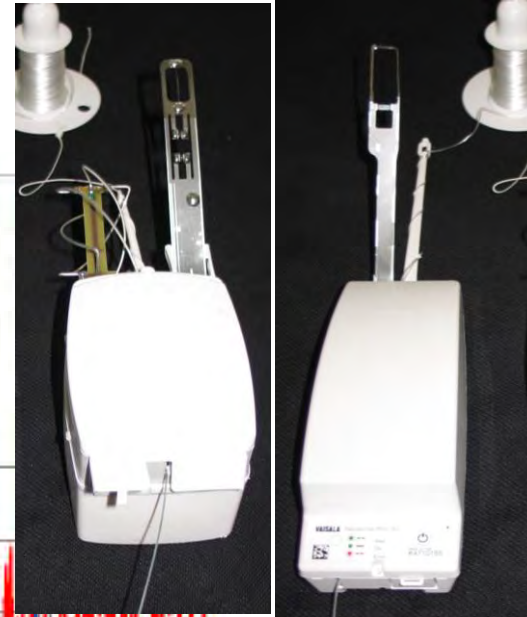
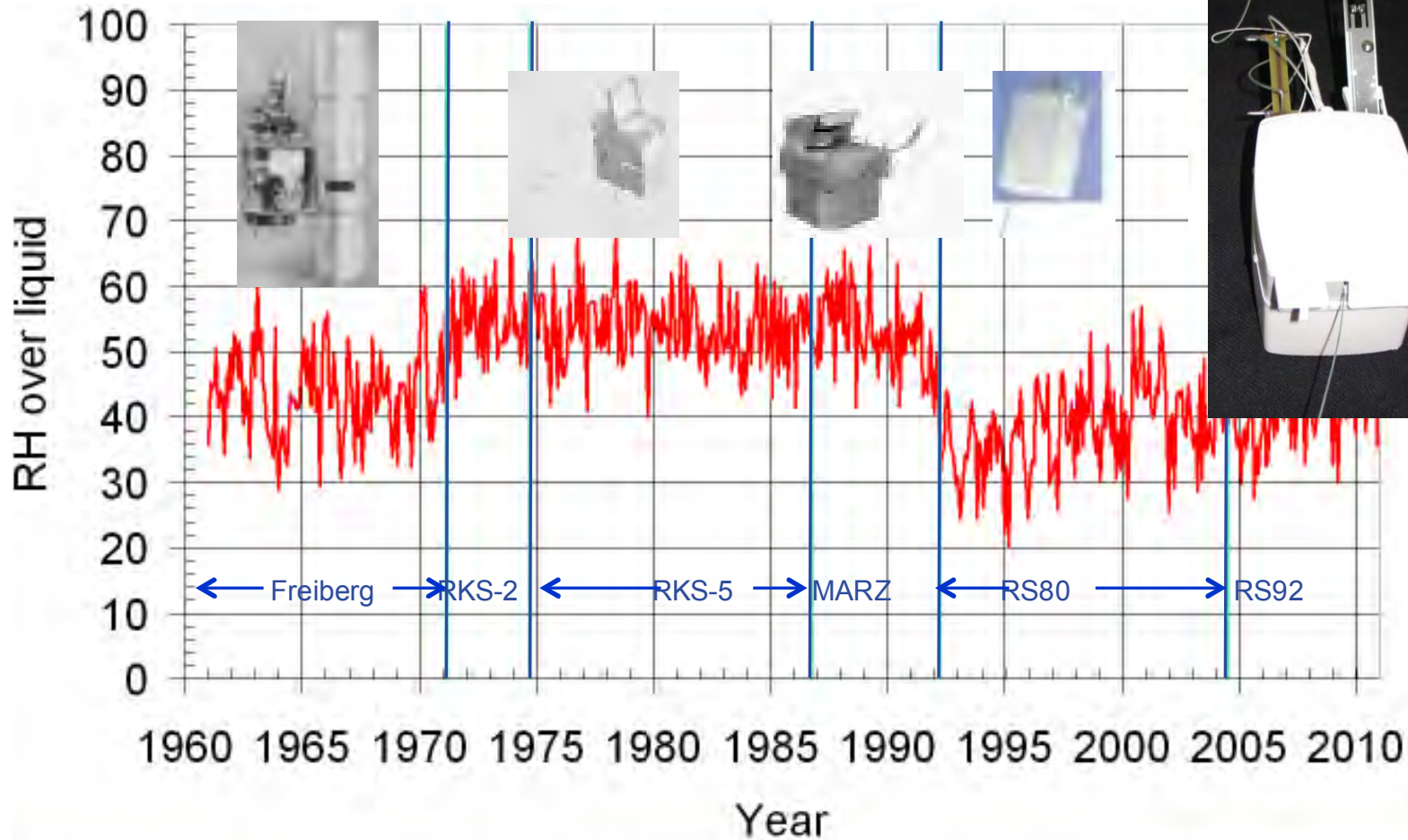
# Radiation error: new set-up

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand



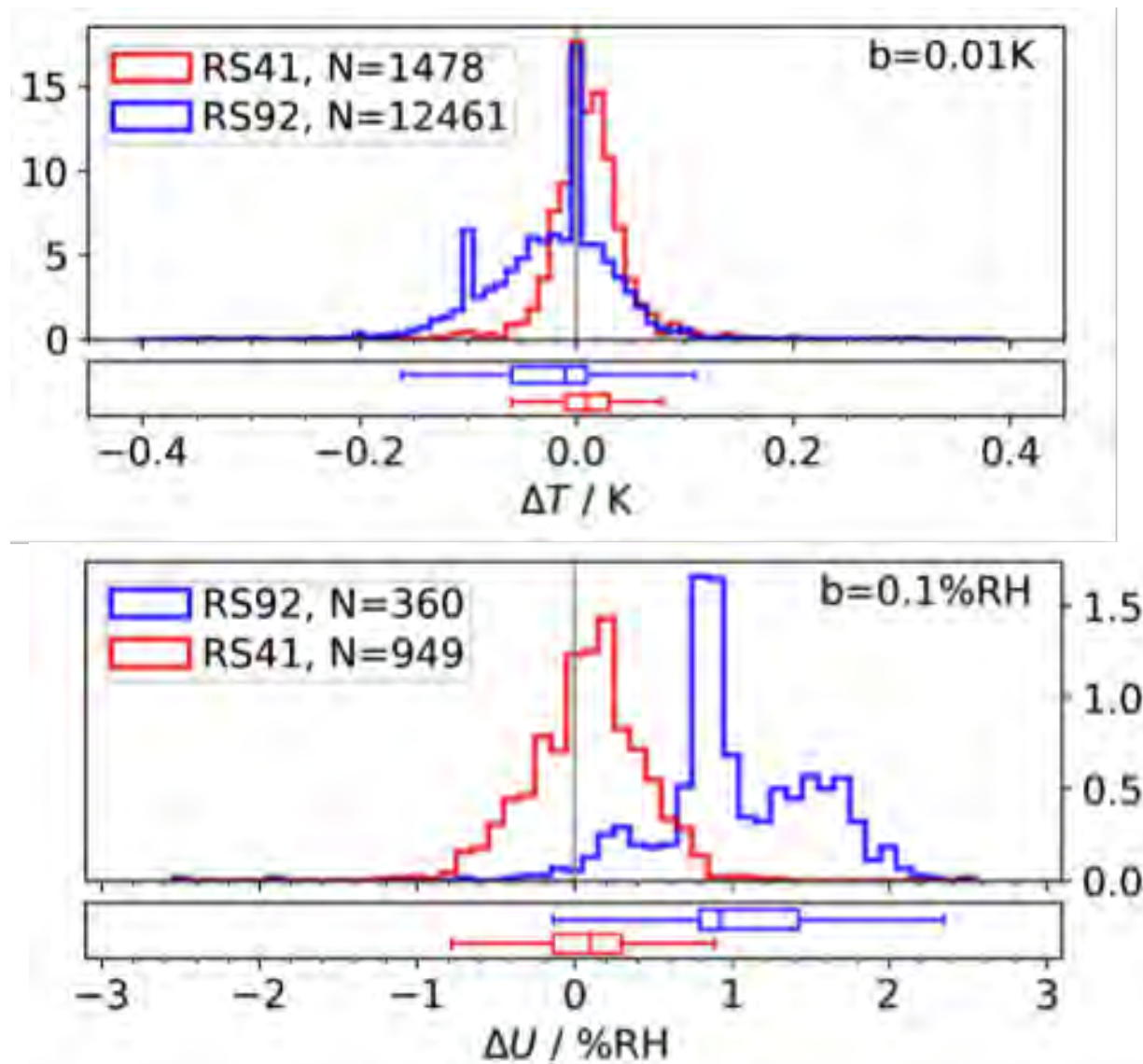
# Trends des Wasserdampfes in der Troposphäre?

Beispiel: Lindenberg 8 km (00:00 UT)

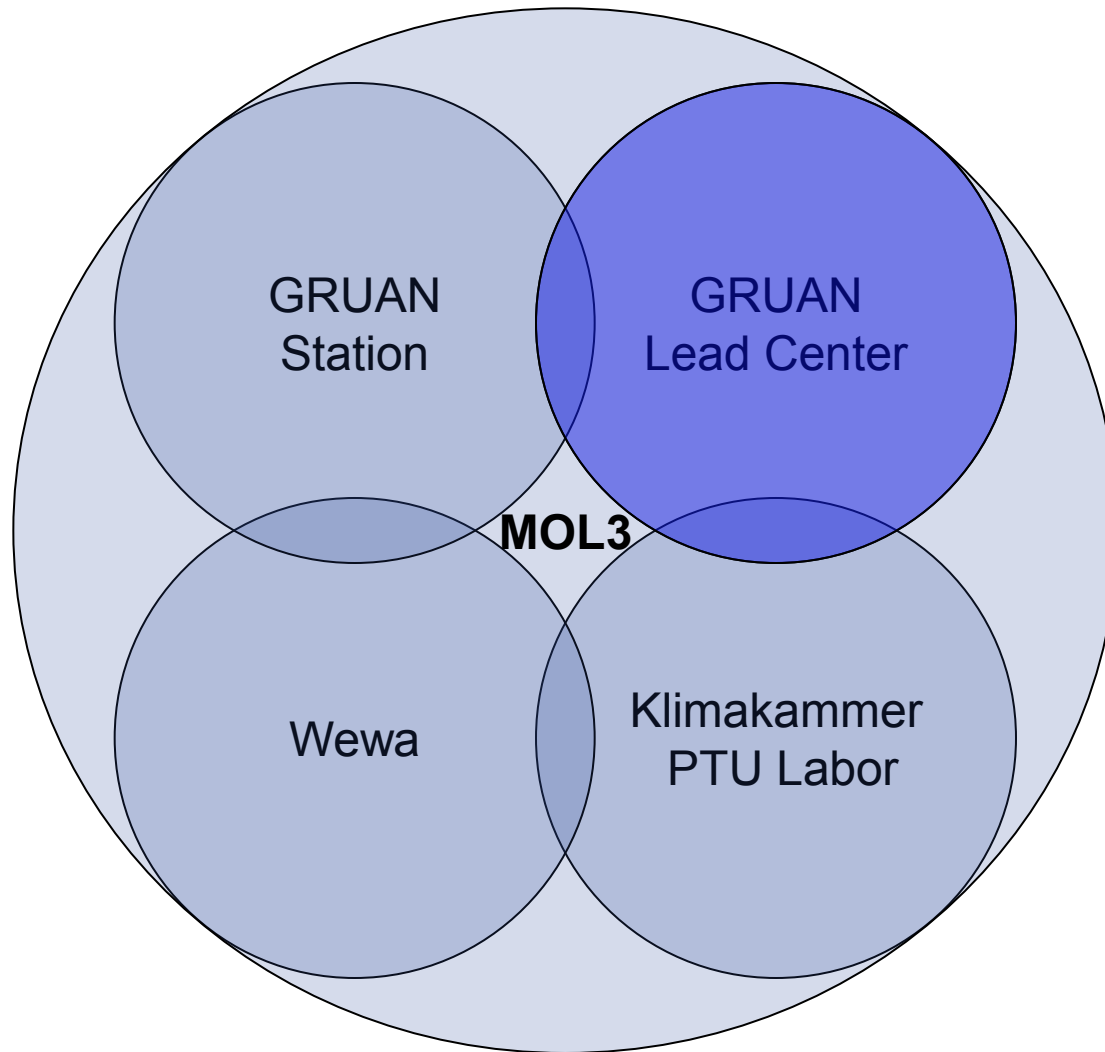




# Preliminary results



P. Oelsner



## Network set-up and management:

- Coordination of stations
- Coordination with WMO and WIGOS
- Management of GRUAN data
- Quality control
- Promoting GRUAN

## Development and maintenance of reference soundings:

- Characterization of measurement uncertainties
- Documentation
- Training of staff





