



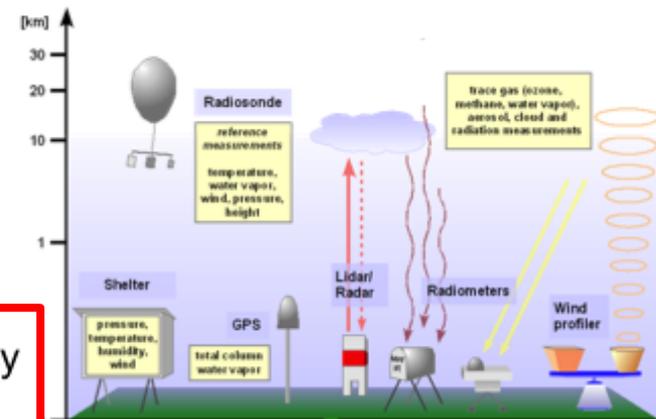
## GDP parallel soundings

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15<sup>th</sup> GRUAN Implementation and Coordination Meeting (ICM-15)  
Bern, Switzerland  
11-15 March 2024

## GRUAN goals

- Maintain consistent observations over decades
- Validation of satellite systems
- Understanding of atmospheric processes
- **Deliberate measurement redundancy**
- Standardization and traceability
- Quality management and managed change



Priority 1: Water vapor, temperature, (pressure and wind)

Priority 2: Ozone, ...

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The extent to which a site	

coefficient, or as large as using a completely new technique with completely different calibrations, time constants etc. The expected impact of a managed change must be assessed and a recommendation should be given as to how to best validate this expected change and how to best address new traits that were not present in the old system. The expected change impact will guide how the change is managed and the level of detail that needs to be documented as part of the metadata.

*Instrument **intercomparisons***: Formal instrument **intercomparisons** will be essential for developing the in-depth understanding required to manage changes from one instrument to another and for informing decisions on the relative advantages and disadvantages of changing instrumentation. For this reason, participation in formal **intercomparisons** is expected before the adoption of any instrument within the GRUAN network. Outcomes from such **intercomparisons** will form an important component of the metadata archived at the GRUAN Lead Centre. Such **intercomparisons** need not necessarily be organized by GRUAN. WMO and partner networks (e.g. NDACC) often run instrument intercomparison campaigns and GRUAN should participate in these and share the data where possible. Such participation would be mutually beneficial to both communities. GRUAN needs to work closely with CBS and CIMO to gain maximum benefit for all parties from these **intercomparisons**. In addition to **intercomparisons** of similar instruments (e.g.

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radiosondes), intercomparisons between different instruments measuring the same ECV will also

➤ GRUAN manual:

Laboratory tests and **intercomparisons** are fundamental methods for establishing and confirming uncertainty estimates for GRUAN data products.

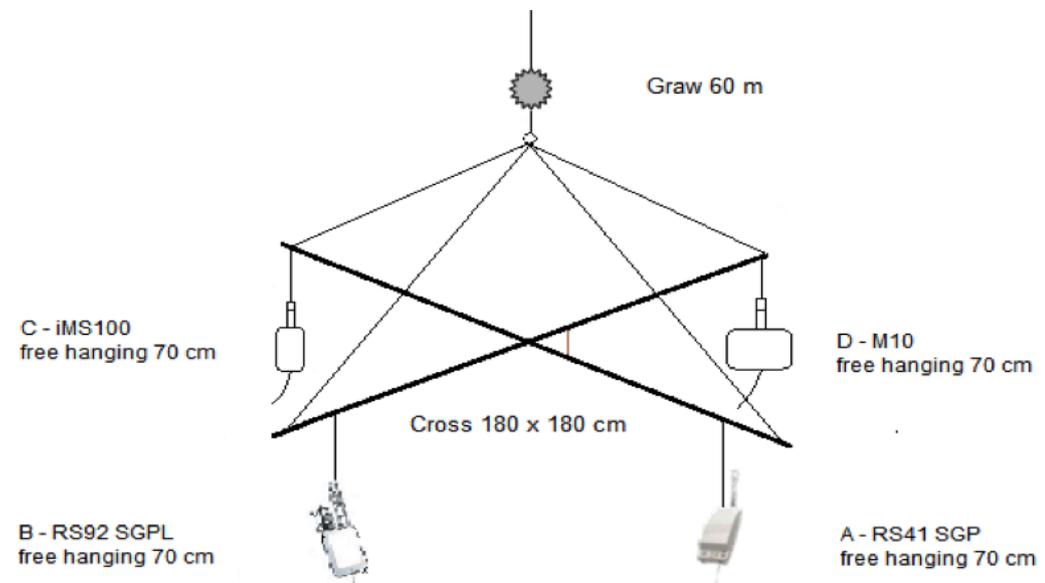
➤ GRUAN guide:

[Requirements for a site] Periodic **intercomparison** of a large range of sonde types

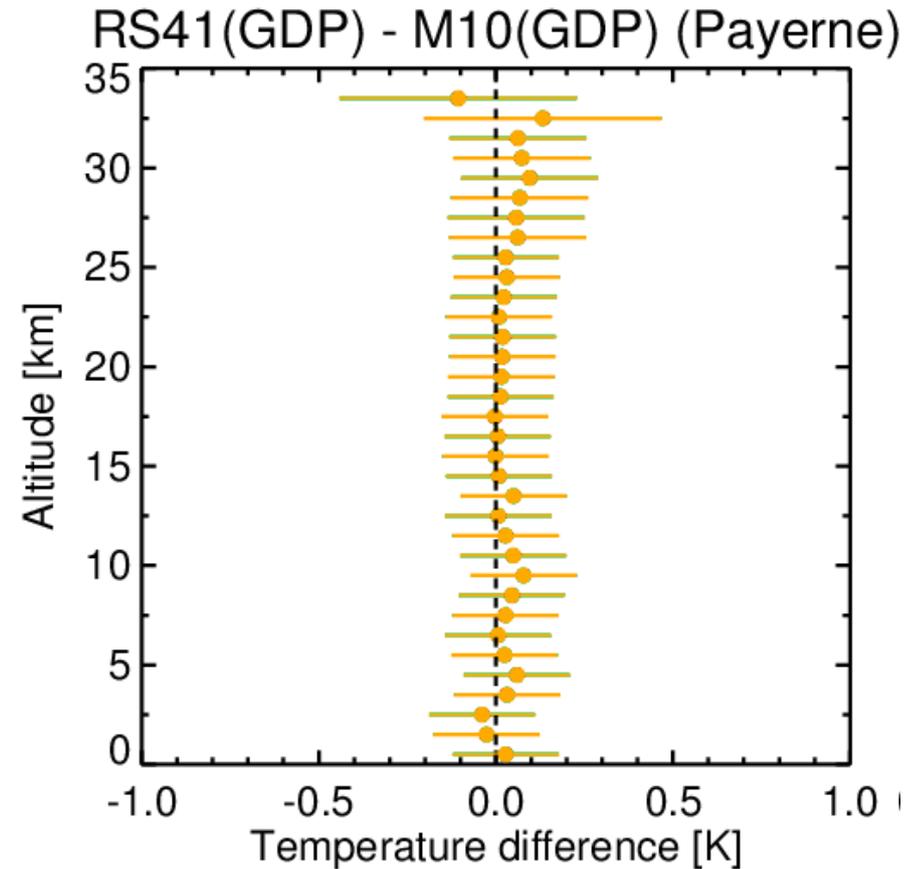
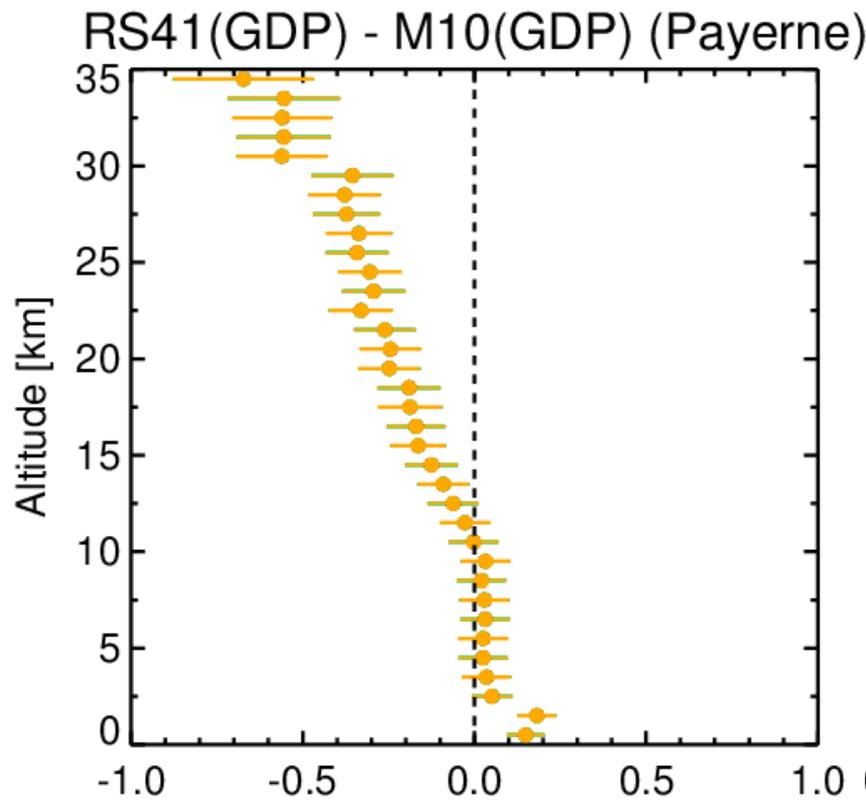
[selection of GRUAN-relevant publications]

- Dupont et al. 2020: M10 GRUAN processing vs RS92 GDP
- Hoshino et al. 2022: iMS-100 GDP vs RS92 GDP
- Kawai et al. 2017: RS41 vs RS92 (both EDT)
- Kobayashi et al. 2019: RS-11G GDP vs RS92 GDP
- T. Simeonov GRUAN-wide RS92-RS41 comparison

- Regular comparisons necessary to keep track of/guard/evaluate consistency of the GDPs
- Lindenberg has initiated long-term program of regular (weekly) multi-GDP comparison soundings
  - RS41, iMS-100, M10, Graw, RS92



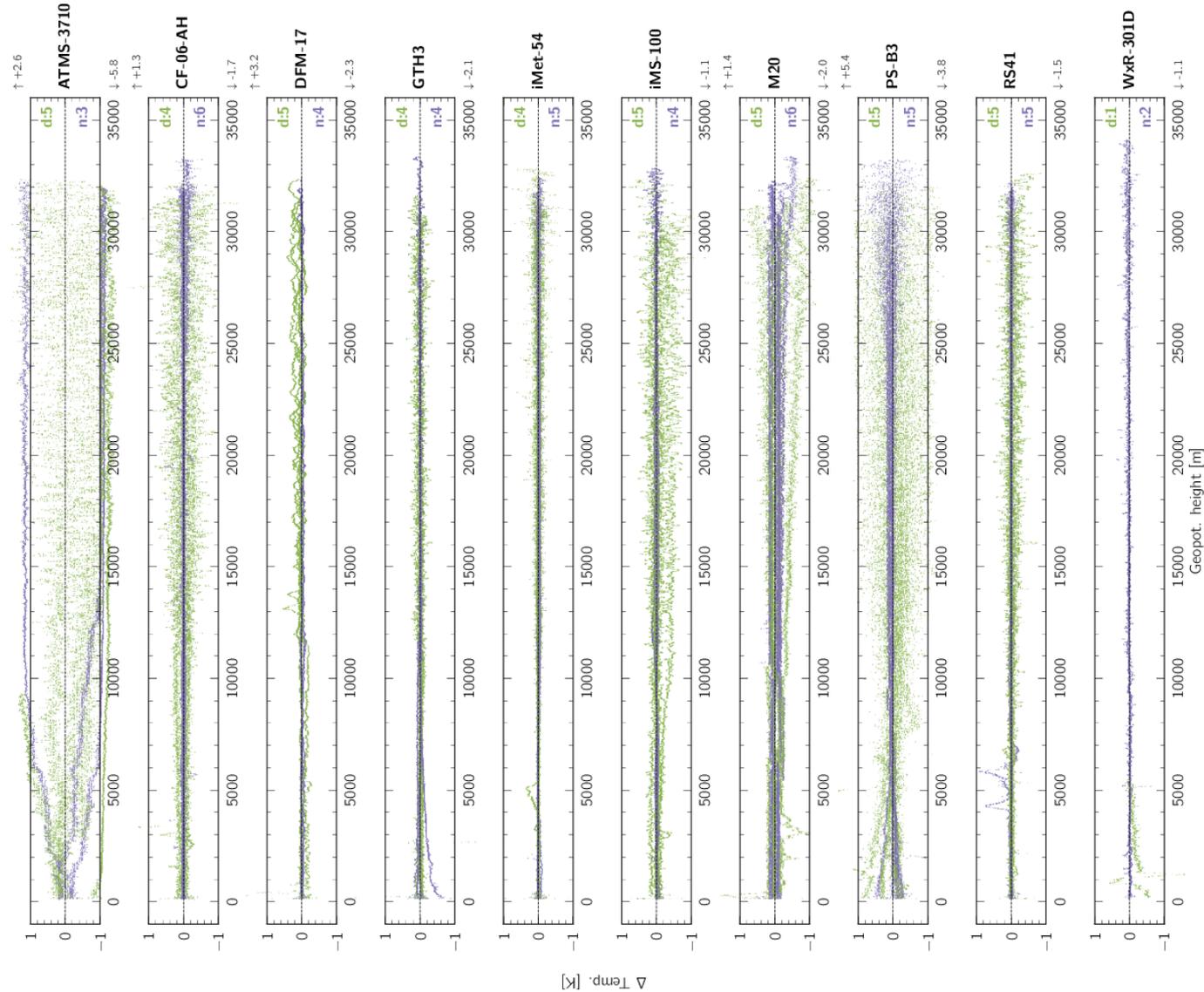
# Intercomparison - example



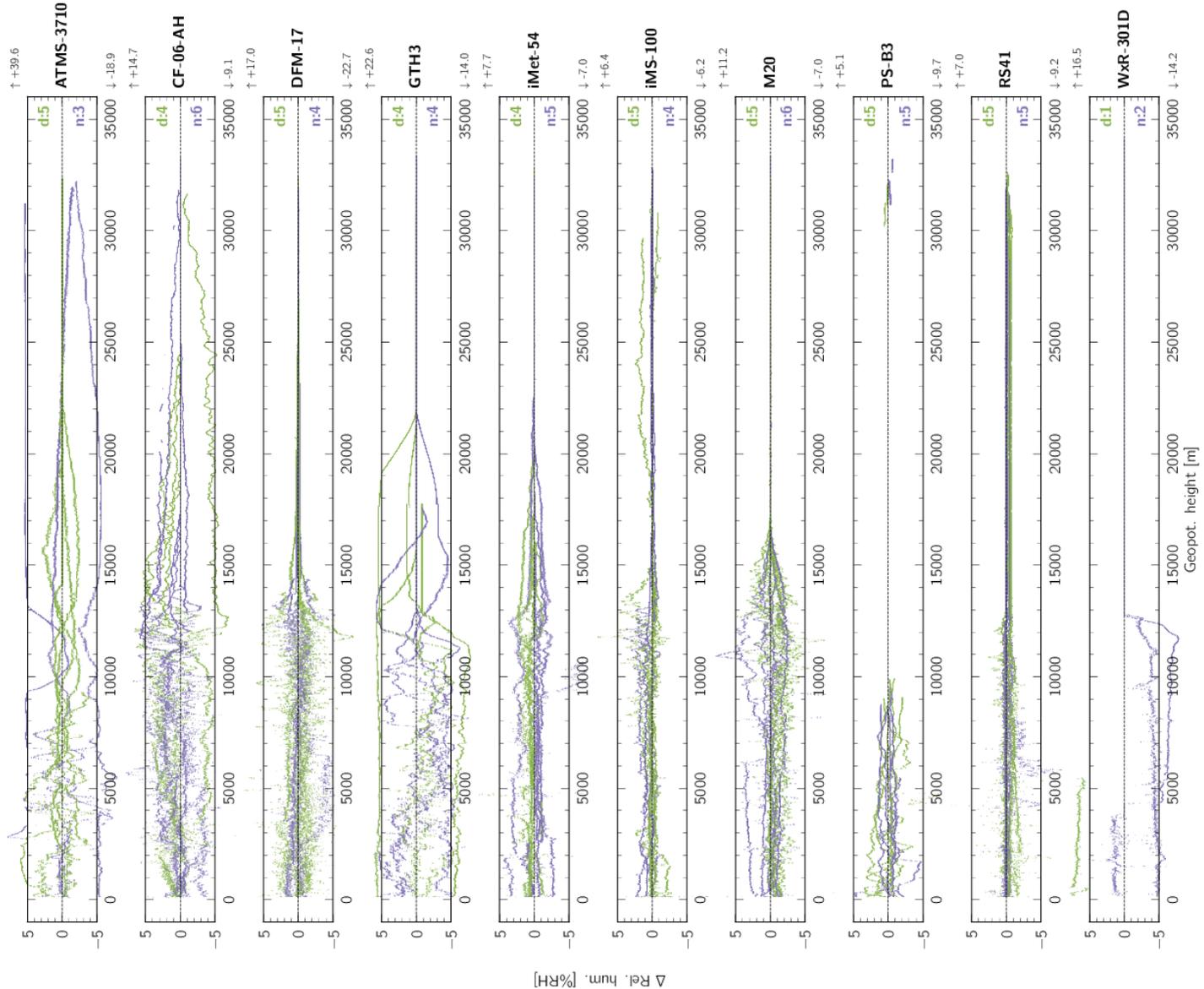
# UAI2022 – Twinsoundings (Temperature)



Altitude



Altitude



- Implement intercomparison programs at selected GRUAN sites
  - Distribute workload/burden
  - Sites with appropriate infrastructure/resources
  
- Long-term effort
  - Cover seasonality & potential long-term drifts
  - Daytime/nighttime soundings
  - Sounding interval: e.g. 1/week
  
- Considerations
  - Availability of (multiple) receiving system
  - Availability of funding for sondes, balloons etc.
  - Inter-site support?