# Lead Centre report for 2024-2025

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16th GRUAN Implementation and Coordination Meeting (ICM-16)
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17-21 November 2025

# Lead Centre operations

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

- GRUAN data archive
  - Operationally running GRUAN meta-data data base - GMDB (24/7)
  - Operationally working GRUAN file archive - GFA (24/7)
  - Data streams RS41-GDP.1, RS92-GDP.2, RS-11G-GDP.1 iMS-100-GDP.2
- Ongoing development and optimization of all GRUAN server software components, GDMS, GMDB, GFA
- Ongoing development on GRUAN software tools for use at sites
  - RsLaunchClient, LidarRunClient, gt92, gtRsl, gm41
- Regularly update of data flow statistic plots (available at website)
- Lists of comparison soundings available at website,
  - RS92-RS41, iMS-100 – RS41, DFM-17 – RS41, M10-RS41, …
- Operational data processing of RS41-GDP.1 and RS92-GDP.2

# Network status

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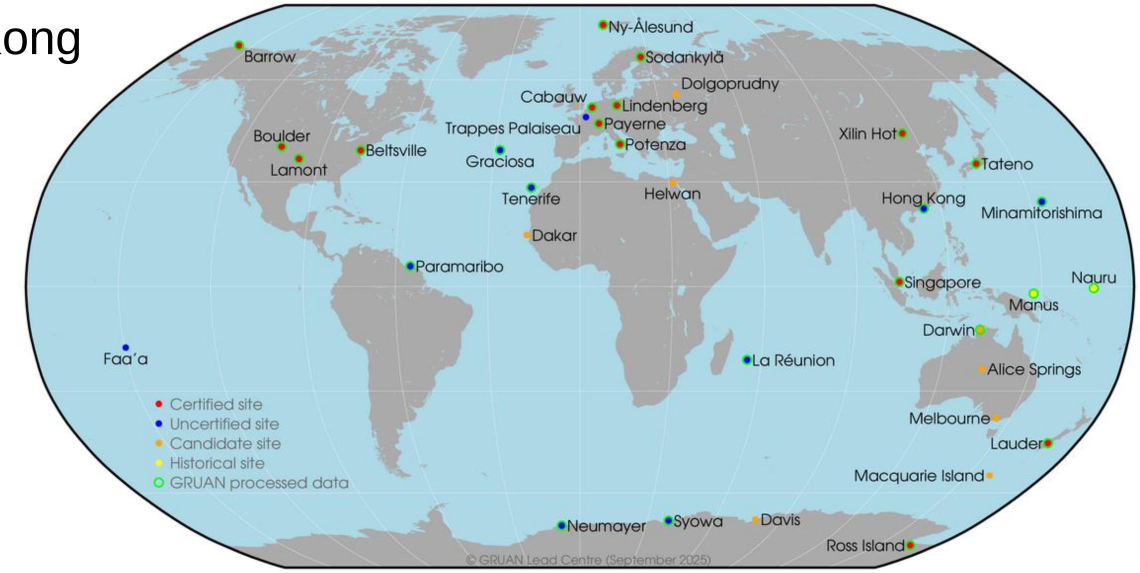
- Recertified:
    - Beltsville, Ross Island (CAB pending)
- Certified
    - Xilinhot, Tenerife
- Certification initiated/in progress:
    - La Reunion, Neumayer, Hong Kong
- In total
    - 33 sites
    - 16 GRUAN-certified sites

GCOS Reference Upper-Air Network



# Data flow



- 24 sites with operational radiosonde data stream
- XIL data stream established
- BoM sites no data stream; working on resolving this
  - IT-security related issues
- DLG silent site policy initiated
  - Lack of funding, suitable radiosonde
- HEL slow progress initiating data stream
- GNSS data
  - NetCDF file format defined

# GRUAN Data archive

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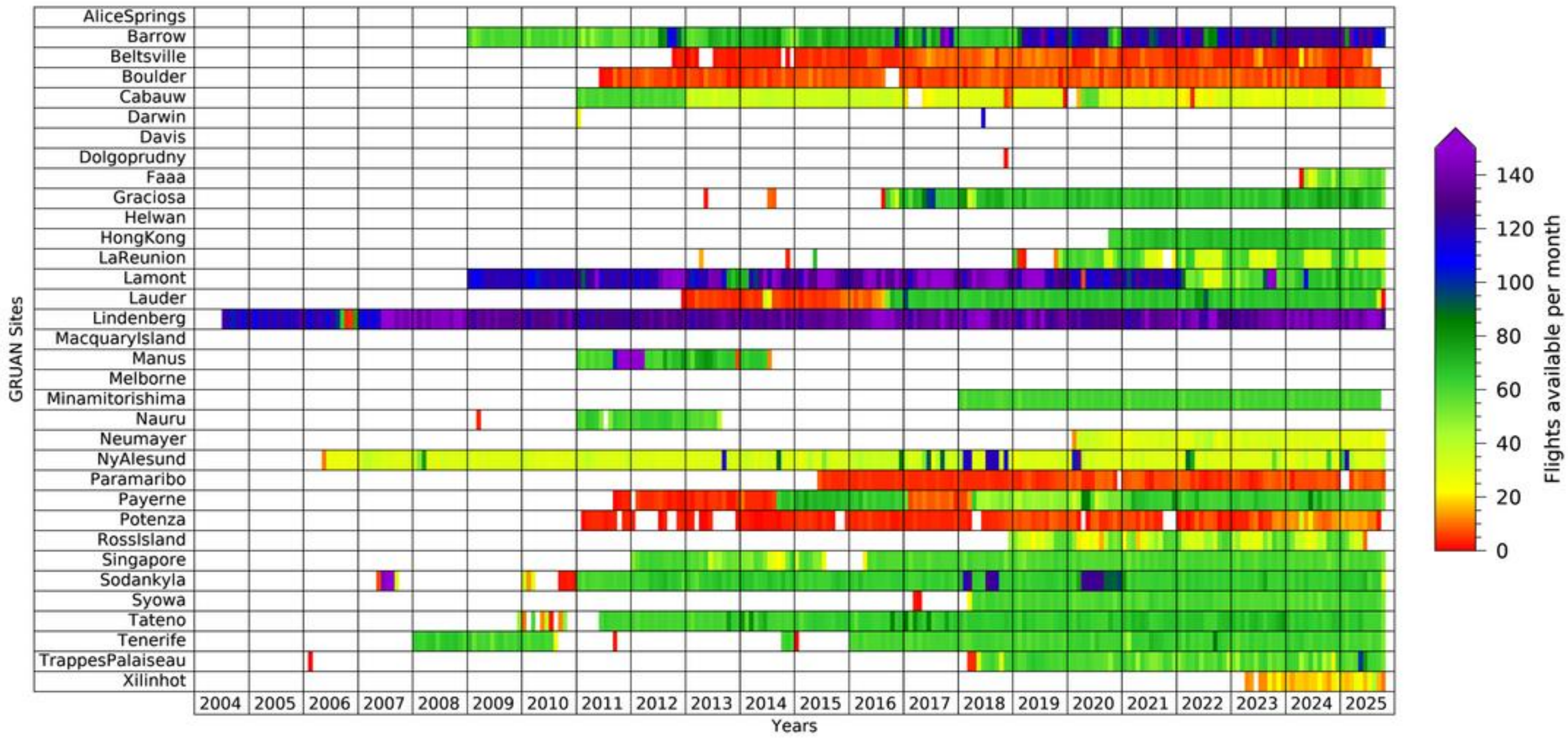
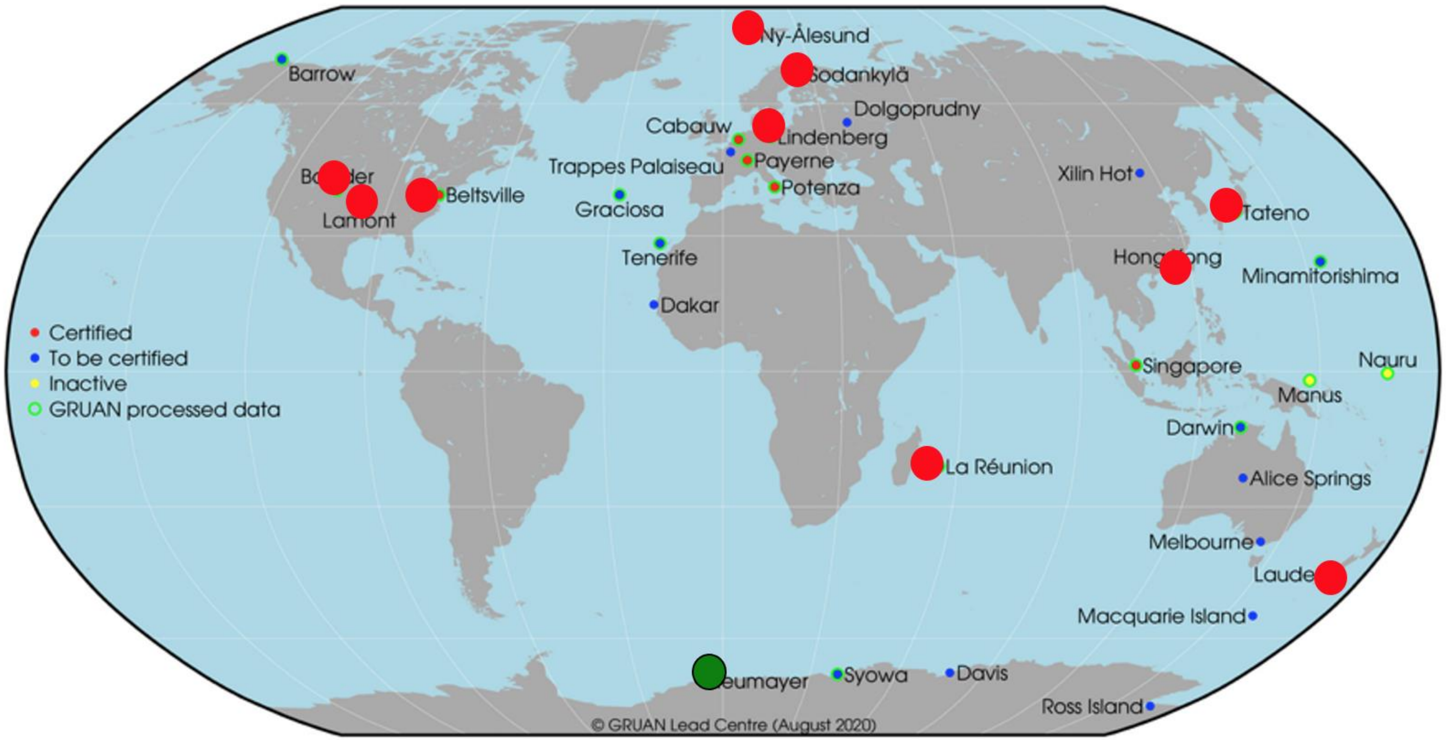



Total >197k launches on 2025-11-16

# Strat $H_2O$ measurements



- GRUAN Manual: monthly $H_2O$ measurements to ~30km
- Ban on R23 in EU & Japan in 2020
  - Affected several sites



# Strat $H_2O$ measurements

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- Information letter 2024-5
  - Guidance on continuation of stratospheric water vapor measurements
- Several sites investigating alternatives
- NYA Skydew in 2026
- POT started Skydew

| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|---|
| Beltsville | 7 | 7 | 8 | 11 | 12 | 12 | 10 | 6 |
| Boulder | 13 | 14 | 18 | 20 | 14 | 19 | 23 | 16 |
| HongKong | 0 | 0 | 3 | 10 | 9 | 10 | 11 | 9 |
| Lauder | 11 | 11 | 9 | 10 | 8 | 7 | 6 | 0 |
| Lindenberg | 27 | 38 | 19 | 16 | 14 | 20 | 20 | 8 |
| NyAlesund | 6 | 7 | 10 | 2 | 0 | 0 | 1 | 0 |
| Potenza | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| RossIsland | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 |
| Sodankyla | 4 | 2 | 2 | 3 | 2 | 1 | 0 | 0 |
| Syowa | 1 | 1 | 0 | 3 | 1 | 0 | 0 | 0 |
| Tateno | 3 | 1 | 2 | 1 | 1 | 2 | 2 | 2 |

- Not in table: Lamont (SGP), REU

# Instrument research

- Ongoing activities are undertaken in testing, characterization and comparison of research instruments and radiosondes.
- Laboratory characterisation of RS92, DFM-17, RS41, M10 radiosondes. (e.g. pres 7-7)
- Regular intercomparison flights with GDP radiosondes (RS41 / iMS-100 / RS92) and GDP candidate radiosondes M10 and DFM-17. (pres 4-5)
- Evaluation of the Skydew instrument for a long-term measurement program of stratospheric water vapor.

# Lead Centre cooperation



- Visitors
  - Thierry Leblanc, June 2024. Setting up data submission stream for PAY. Installation of GLASS Lidar Data Processor on a centralized server at LC.
  - GCOS-secretariat & co-chairs (Feb 2025)
  - J. Frielingsdorf (Graw), May 2025. Coordination of GDP development
  - Li Huirong (CMA), October 2025. Cooperation for laboratory characterisation of Huayuntianyi GTH3 radiosonde

- Visits/conferences
  - NIMH National Environmental Conference, Sofia, April 2025
  - EGU General Assembly, Vienna (short course ”Reference measurements for climate studies and applications”)
  - NDACC Symposium & SC meeting, (online), Oct 2025
  - Xilinhot (Oct 2024) & GSRN TT-meeting
  - KRISS (Oct 2024) cooperation laboratory characterization humidity sensors

# Lead Centre cooperation



- Participation in ISO TC146 SC5. Test methods for radiosonde temperature and humidity measurements.

- Participation in COST action CA24155, Climate Reference Instruments and Measurements

- Participation ET-UAM (Expert Team Upper Air Observations), revision & update of Chapter 12 of WMO doc 8

- Participation in TT-GSRN

# Achievements

- Publication report IOM-143 on WMO radiosonde intercomparison campaign (UAII2022), cooperation with Payerne (March 2024)
- Beta version of web-based tools for Site Reports, Data Viewer and Satellite collocation viewer (pres 3-9)
- Extensive laboratory characterization of RS92 & DFM-17 (pres 7-7)
- Extensive support GDP development M10 (laboratory, soundings, TD review & editing)
- GRUAN-related peer-reviewed papers (see LC report for complete list):
  - 2024: 4
  - 2025: 11

# Work plan - I

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- Publish result of GRUAN-wide RS92-RS41 comparison
- Establish new sites in relevant regions
- Initiate data streams for currently inactive sites
- Continue testing and assessment of non-R23 frostpoint hygrometers
- (Re)certify sites
- Further development of the GRUAN website
- Continue development of GRUAN data product for RS92 (RS92-GDP.3)
- Support development of GRUAN data products for M10, Graw, and GTH3

# Work plan - II



- Continue development of Beta-version of web-based tools (Site reports, Data viewer and Satellite collocation viewer)
- Operationalize processing of frost point hygrometer data
- Continue operationalisation of Lidar data-processing
- Establish data dissemination via data publisher that supports DOI, data usage statistics (pres 10-3)

# New SHC adapter for RS41

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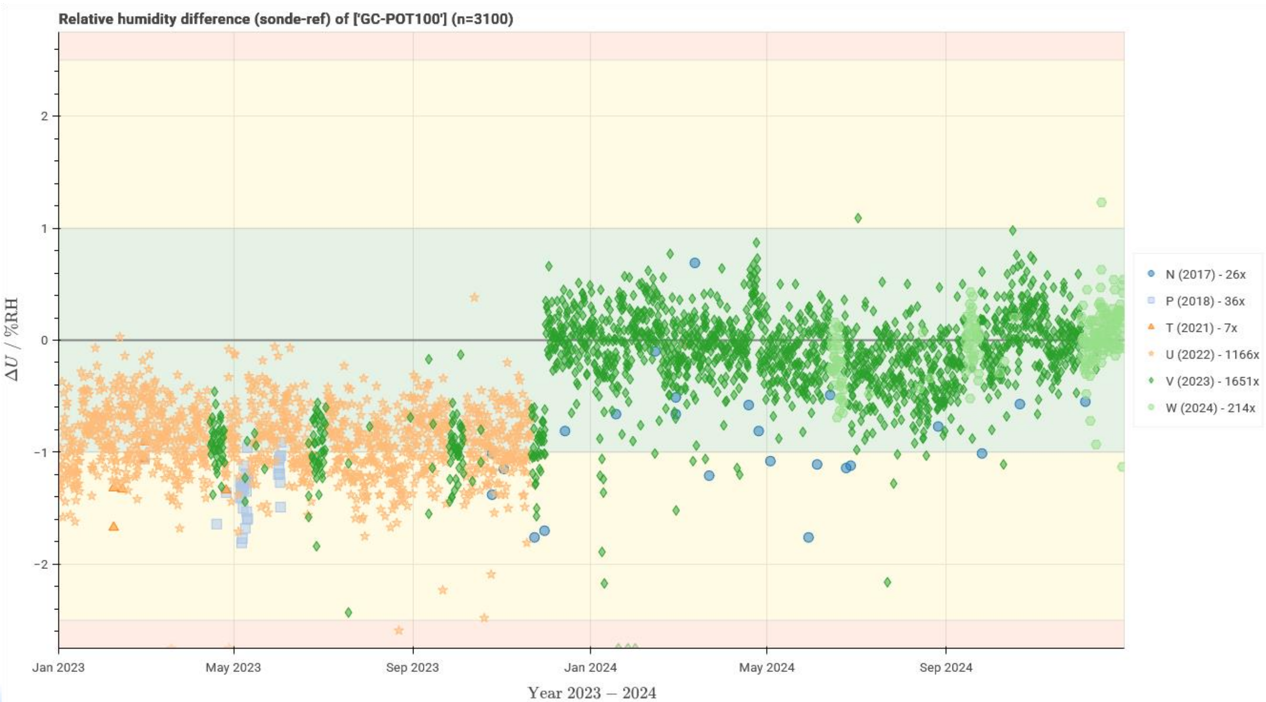
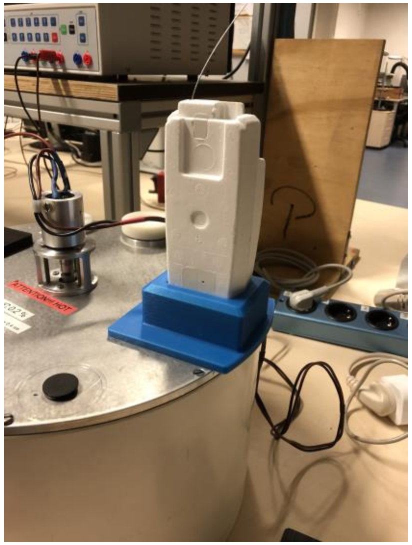
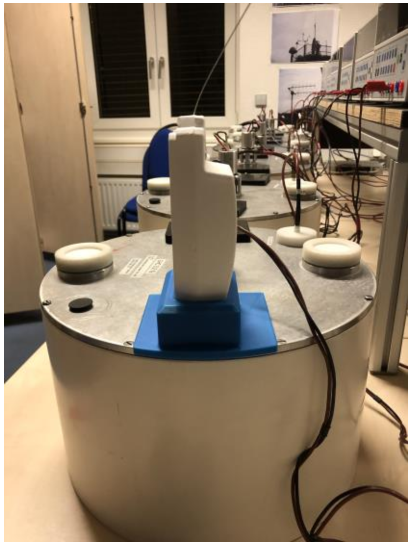
- Orientation of RS41 is relevant for SHC check (1%RH)
- New adapter for airflow configuration similar to in-flight
- Employed in LIN. Available at SHC manufacturer





# GRUAN Website




- Steady development
  - Addition of functionality
  - Regularly updated data flow statistic plots
  - Content: input needed from community (e.g. instrument experts)

**www.gruan.org**