Update on GRUAN data flow

Michael Sommer
GRUAN Lead Centre, DWD

12th GRUAN Implementation and Coordination Meeting (ICM-12)
Virtual
Session 1, 16 November 2020
Outline

- Data flow & archive
  - Radiosonde data streams
  - GNSS data stream

- Monitoring information
  - Plots, tables and documents

- Conclusion
Sounding data in GRUAN – Network

GRUAN Radiosonde Launches (total: 113982 at 2020-11-08)

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Flights available per month

Years

Lindenberg Meteorological Observatory
Richard Aßmann Observatory
Sounding data in GRUAN – RS types

GRUAN Radiosonde Launches (total: 113982 at 2020-11-08)

- RS92 (63645)
- RS41 (33285)
- RS-11G (4947)
- IMS-100 (4082)
- DFM-09 (2539)
- M10 (2366)
- SRS-C34 (1882)
- Other (1236)
Current data streams (RS) → period Nov 2019 to Oct 2020

- Radiosondes (13,704 launches at 20 sites)
  - Vaisala RS41 → 10,292 launches at 16 sites
  - Modem M10 → 1,320 launches at 2(3) sites
  - Meisei iMS-100 → 1,161 launches at 2 sites
  - Meisei RS-11G → 731 launches at 3 sites
  - Vaisala RS92 → 127 launches at 8 sites
  - Other (e.g. Intermet IMET-1, Graw DFM-09, …)

- Other in-situ instruments & sensors
  - Stratospheric humidity → 75 launches at 6 sites
    - Frost-point hygrometer with cryogen: CFH, FPH
    - Frost-point hygrometer with Peltier: SKYDEW, PCFH
    - Fluorescence Lyman-Alpha hygrometer: FLASH-B
  - ECC ozone → 334 launches at 8 sites
New data streams (RS)

- Ross Island (ROS) – new GRUAN site
  - RS41 – twice a day

- Neumayer (GVN) – new GRUAN site
  - RS41 – once a day
  - ECC – once a week
  - Dual RS92+RS41 – once a week

- Tateno (TAT)
  - RS41 – twice a day
    (change from iMS-100 by 29 June ’20)

- Trappes Palaiseau (TRP) – renamed GRUAN site → former Paris (SIR)
  - M10 – twice a day

- La Reunion (REU)
  - M10 – twice a day
**Upcoming data streams (RS)**

- **Hong Kong (HKO) – new GRUAN site**
  - RS41 – twice a day (+ad hoc)
  - ECC – once a week
  - CFH – once a month

- **Dakar (DAK) – new GRUAN site**
  - RS41

- **Paramaribo (PMO) – future GRUAN site**
  - RS41 – twice a week
  - ECC – once a week

**In preparation – new GRUAN sites**

- **Cabauw (CAB)**
  - RS41 – restart of data stream is pending

- **Australian sites (ALC, DAR, DVS, MAQ, MEL)**
  - RS41 – start of data streams are pending

- **Dolgoprudny (DLG)**
  - ? – start of any data steam is pending

- **Xilinhot (XIL)**
  - ? – start of any data steam is pending

**Still pending – GRUAN sites since long-time**
Current status of data flow (RS)
Data processing of radiosoundings

- Converting of original raw data files to NetCDF
  - RS92 (MWX, DC3DB) → @ LC (Lindenberg, DE)
  - RS41 (MWX) → @ LC
  - M10 → @ IPSL (Trappes/Palaiseau, FR)

- Processing of GRUAN Data Products (GDP)
  - RS92 GDP.2 → @ LC
  - RS41 BETA.1 (GDP.1 in prep.) → @ LC
  - RS-11G GDP.1 (GDP.2 in prep.) → @ JMA (Tateno, JP)
  - iMS-100 BETA.1 (GDP.2 in prep.) → @ JMA
  - M10 ALPHAMA.1 (GDP.1 in prep.) → @ IPSL

- Future GDPs
  - DFM-09 (experiments ongoing) → @ LC
  - DFM-17 (experiments ongoing) → @ LC
# GNSS data stream

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More will be added…

PC @ GFZ (Potsdam, DE)
Live overview of data flow, processing and archive

MONITORING
Access to monitoring information

- Lead Centre internal possibilities

- GRUAN website
  - Current data flow → daily → plots (PNG)
  - Sonde launches → weekly → plots (PNG) + tables (CSV)
  - Comparison launches → weekly → plots (PNG) + tables (CSV)
  - Availability of data products → monthly → plots (PNG)

- Site reports as ICM documents
  - Site reports → yearly → documents (PDF)

- Other suggestions?
  - Please discuss it in TT sites and send requests to the LC.
Monitoring at the Lead Centre

➢ GRUAN Meta-data Data Base
  o Timeline view (the gate to GMDB)
  o Dashboard with relevant queries
  o DB-Request page

➢ Quick-look viewer
  o Long-time statistics of ground checks, data gaps, burst points, …
  o Analysis plots of all RS41 launches

➢ Detailed logging
  o of GRUAN server activities
  o of GRUAN data processing
Current data flow: site ➔ LC (daily)

### TAT-RS-01
- **Tateno Radiosonde Launch Site**
- **Last measurement:** 2020-11-08T12:00:00Z
- **Last data input:** 2020-11-09T08:17:16Z
- **69 measurements available within the last 30 days**
- **Available streams are RS41, IMS-100, RS-11G, CFH, SKYDEW**
- **Data flow of last 30 days since 2020-11-09T23:16:45Z:**

### GVN-RS-01
- **Neumayer Radiosonde Launch Site**
- **Last measurement:** 2020-11-09T12:00:00Z
- **Last data input:** 2020-11-09T13:36:50Z
- **30 measurements available within the last 30 days**
- **Available streams are RS41, ECC-SPC**
- **Data flow of last 30 days since 2020-11-09T23:15:58Z:**

### MTS-RS-01
- **Mamtorishima radiosonde launch site**
- **Last measurement:** 2020-09-30T12:00:00Z
- **Last data input:** 2020-10-19T13:27:13Z
- **0 measurements available within the last 30 days**
- **Available streams are <none>**
- **Data flow of last 30 days since 2020-11-09T23:16:11Z:**

### DAR-RS-01
- **Darwin radiosonde launch site**
- **Last measurement:** 2018-06-30T12:00:00Z
- **Last data input:** 2019-04-18T12:05:29Z
- **0 measurements available within the last 30 days**
- **Available streams are <none>**
- **Data flow of last 30 days since 2020-11-09T23:15:50Z:**

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### Plots

Sonde launches (weekly)

https://www.gruan.org/data/measurements/sonde-launches
Comparison launches (weekly)

https://www.gruan.org/data/measurements/comparisons

GRUAN Vaisala RS92 vs. Vaisala RS41 Comparison Launches (total: 1142 at 2020-11-06)

GRUAN Meisei IMS-100 vs. Vaisala RS41 Comparison Launches (total: 51 at 2020-11-06)

Plots
CSVs
Availability of data products (monthly)

Site reports (yearly)

Content of site reports:
- Answers of questionnaire → by site contact
- General meta-data of site and measurement systems
- Data availability of data streams
- Few analysis of ground checks (SHC, RI41, GC25, …) and burst point

Future plans:
- Faster (and more regular) time schedule
  - will be created for sites end of January (regarding last year)
  - should be published in March on the GRUAN website → independent from ICM
- Any ideas for improved content?
Conclusion

- Growing RS archive  ➔ more than 100,000 soundings!
  ➔ approx. 14,000 soundings per year
  ➔ currently RS41 is main radiosonde

- Growing GNSS stream  ➔ GDP available (in certification process)

- Monitoring information  ➔ Available at website

Thank you for your attention.