



# Update on GRUAN data flow

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12<sup>th</sup> GRUAN Implementation and Coordination Meeting (ICM-12)

Virtual

Session 1, 16 November 2020

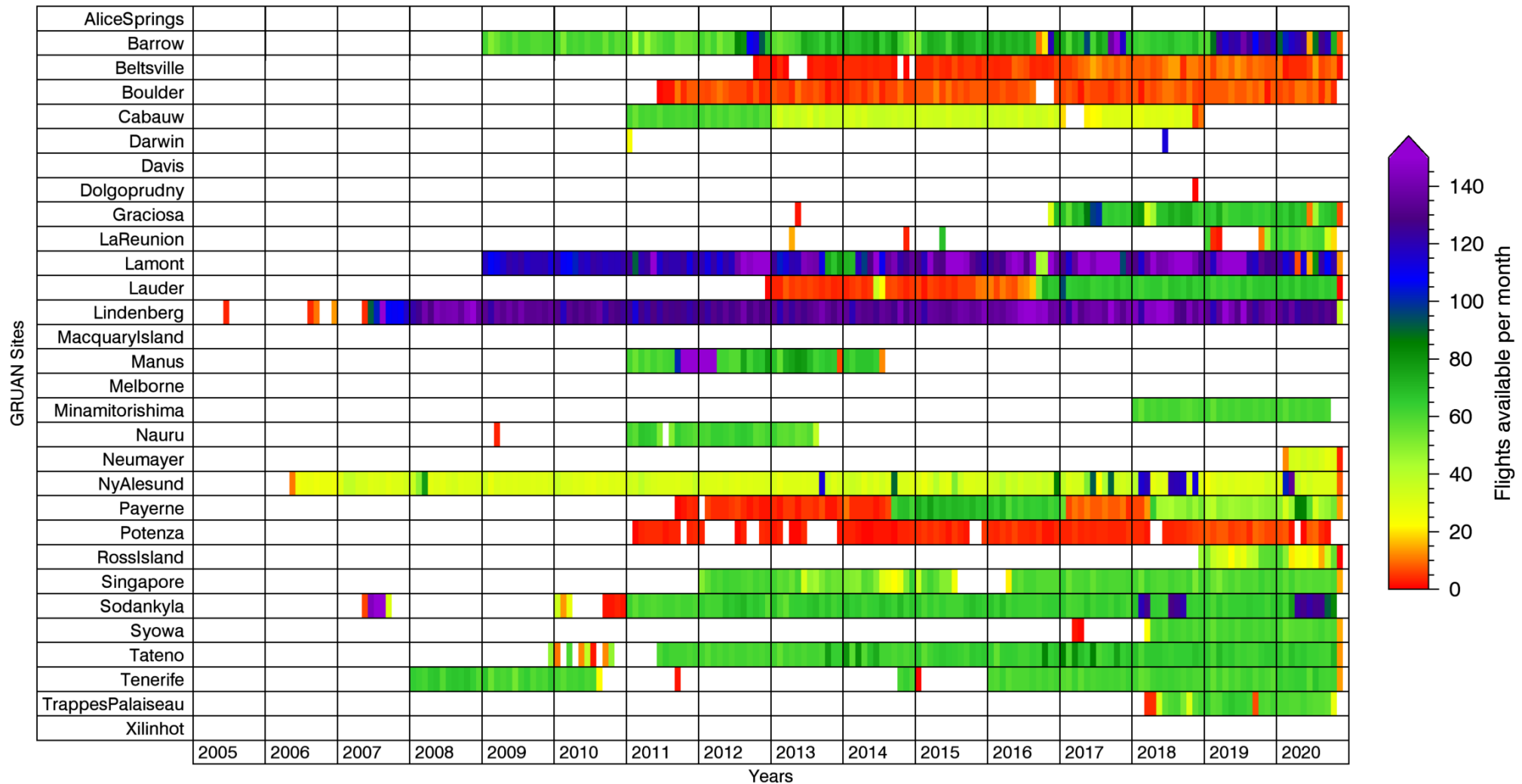
- Data flow & archive
  - Radiosonde data streams
  - GNSS data stream
- Monitoring information
  - Plots, tables and documents
- Conclusion

# Sounding data in GRUAN – Network

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand



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

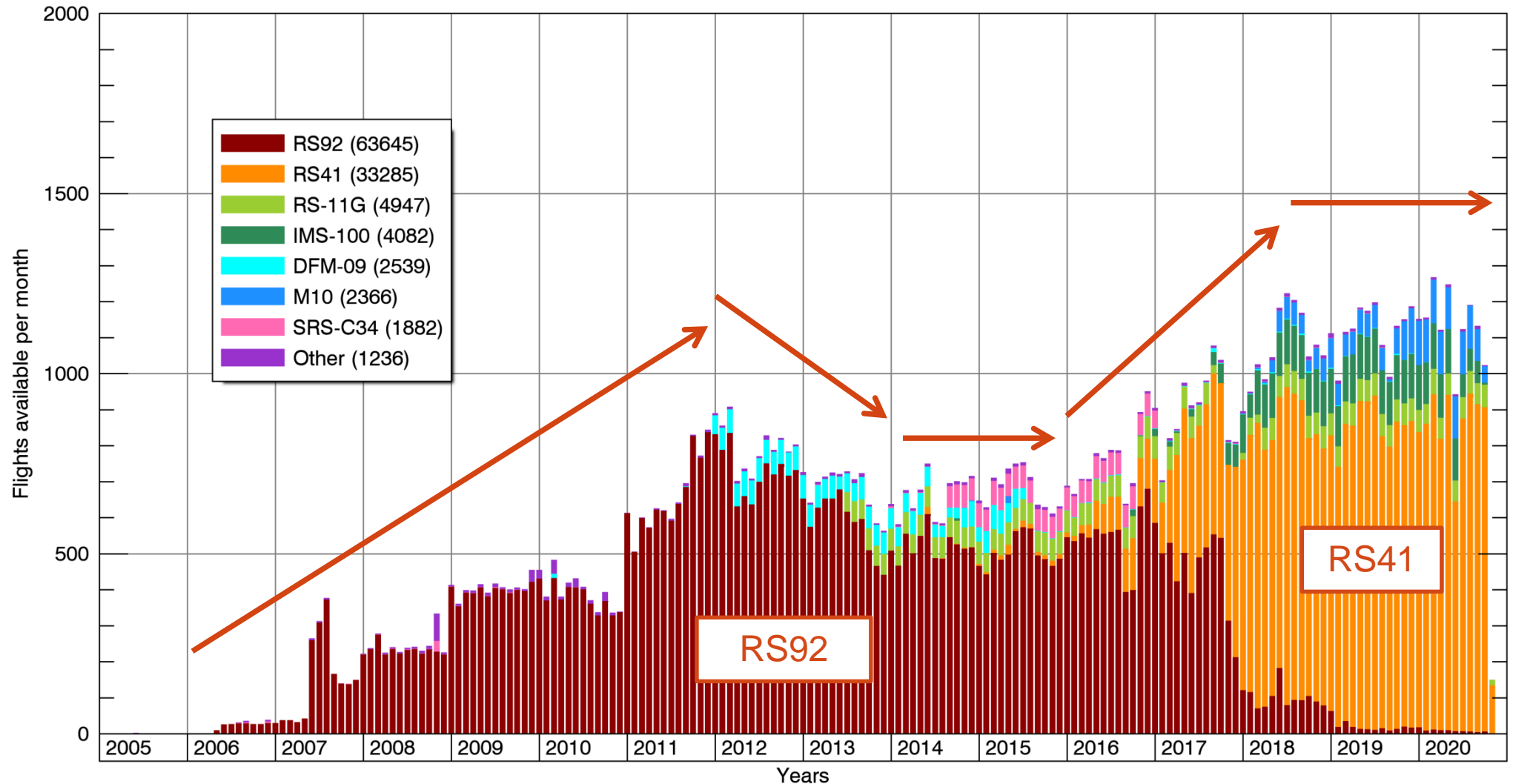


# Sounding data in GRUAN – RS types

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



# Current data streams (RS)

## → period Nov 2019 to Oct 2020

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### ➤ 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



- 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
- Tatenos (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



➤ 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 stream is pending

➤ Xilinhote (XIL)

- ? – start of any data stream is pending

Still pending – GRUAN sites since long-time

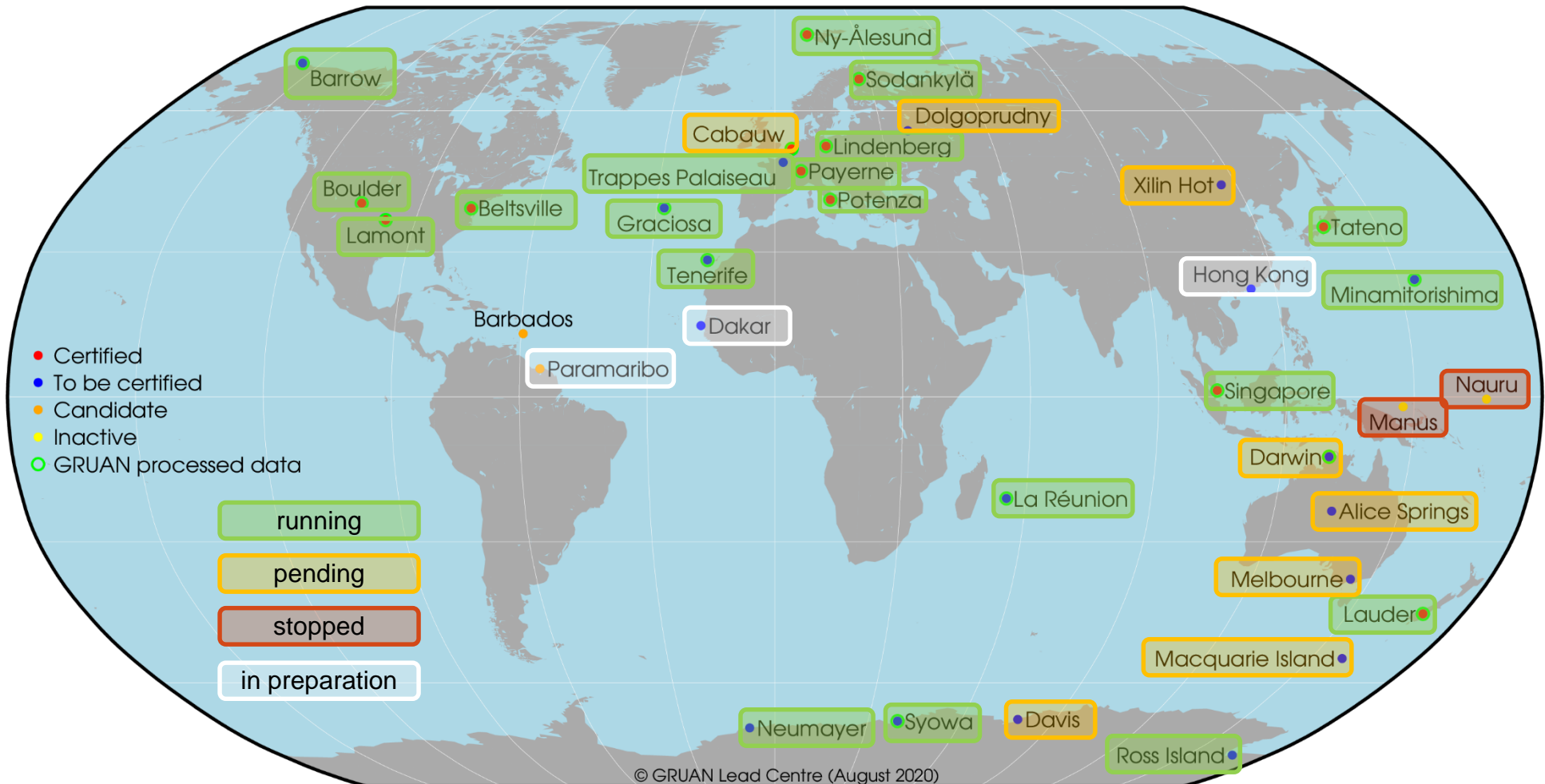


# Current status of data flow (RS)

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## GCOS Reference Upper-Air Network





## ➤ 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)

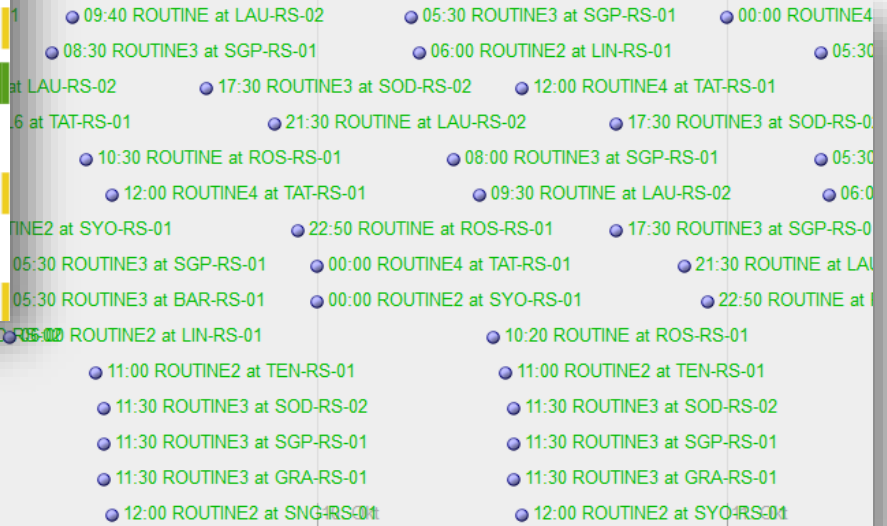
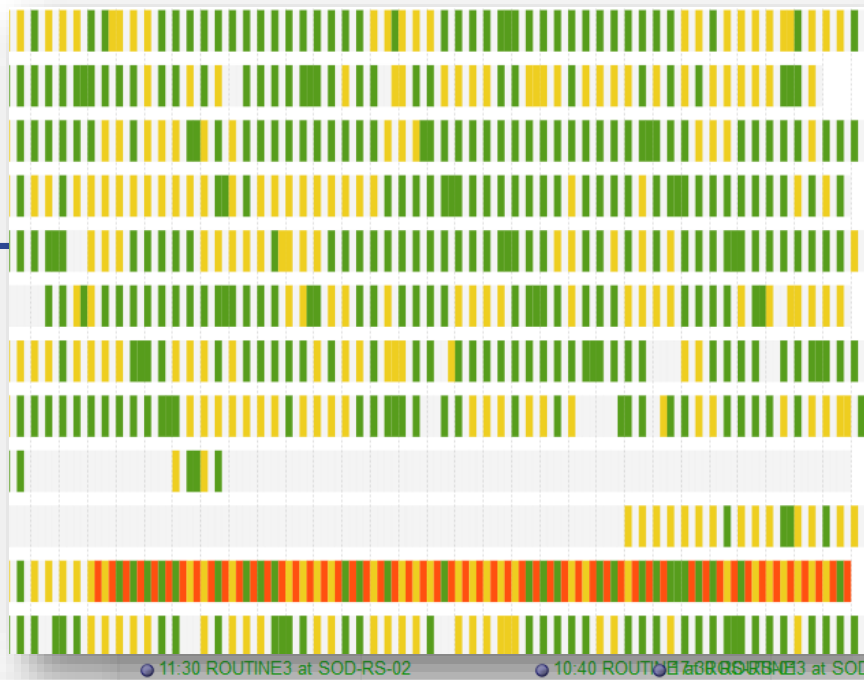
- RS92 GDP.2 → @ LC
- RS41 BETA.1 (GDP.1 in prep.) → @ LC
- RS-11G GDP.1 (GDP.2 in prep.) → @ JMA (Tateno, JP)
- iMS-100 BETA.1 (GDP.2 in prep.) → @ JMA
- M10 ALPHA.1 (GDP.1 in prep.) → @ IPSL

## ➤ Future GDPs

- DFM-09 (experiments ongoing) → @ LC
- DFM-17 (experiments ongoing) → @ LC

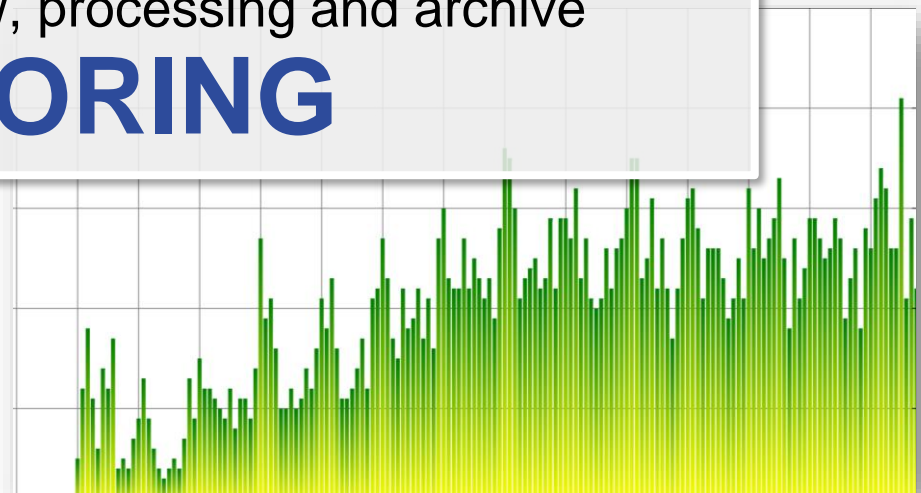
Site	Meta data	Raw	Binary	Rinex	Rinex Meteo	Product	Sinex-Trop	Cost-716	GDP
CBW1 – Cabauw	x					2019-08	X (zpd)	X	
ENAO – Graciosa	x	2019-07	x	x	x	2019-08	x	x	x
(LDB0) – Lindenberg → LIN0 (2020-10)	x	2015-10	x	x		2016-07	x	x	
LDB2 – Lindenberg						2016-07	x	x	x
LDRZ – Lauder	x	2012-04	X (2018-06)	x	X (2018-10)	2017-08	x	x	x
MSS1 – Singapore	x	2019-02	x	x	x	2019-03	x	x	x
NYA2 – Ny-Ålesund	x	2013-09	x	x	x	2016-07	x	x	x
PAYE – Payerne	x			x		2018-10	X (zpd)	x	
SCTB – Ross Island	x					2019-03	x	x	x
SGPO – Lamont	x	2020-08	x			2019-02	x	x	x
SODF – Sodankylä	x	2015-02	x	x		2017-02	X (zpd)	x	
(TATN) – Tateno	x	2009-12	x	x	x				
(TMS3) – Boulder	x	2016-02	x	x		2017-02	x	x	
TSK2 – Tateno	x					2020-01	X (zpd)	x	
UTQI – Barrow	x	2017-07	x	x	x	2018-04	x	x	x
More will be added...									

PC @ GFZ (Potsdam, DE)



Live overview of data flow, processing and archive

# MONITORING



- 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.***

GRUAN

Monitor of GRUAN Measurement Events

## ➤ GRUAN Meta-data Data Base

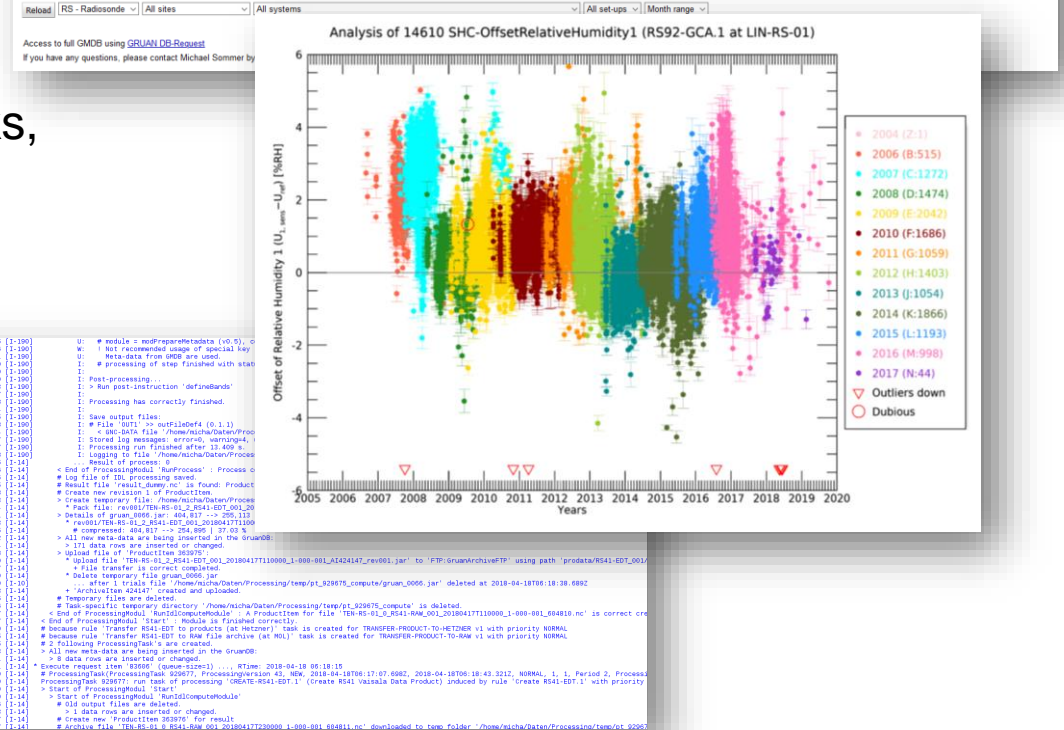
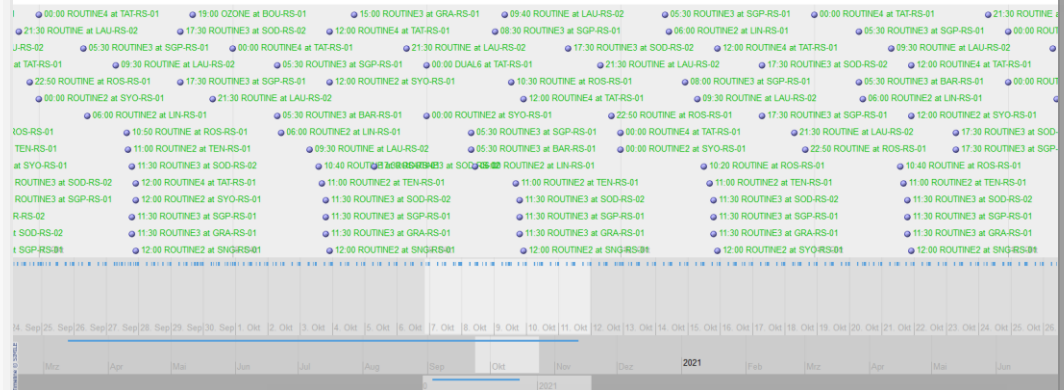
- Timeline view (the gate to GMDb)
- Dashboard with relevant queries
- DB-Request page

## ➤ Quick-look viewer

- Long-time statistics of ground checks, data gaps, burst points, ...
- Analysis plots of all RS41 launches

## ➤ Detailed logging

- of GRUAN server activities
- of GRUAN data processing



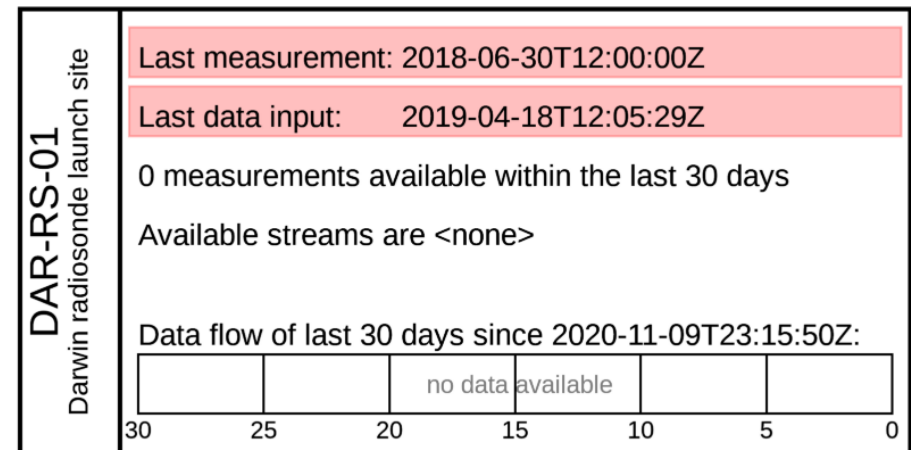
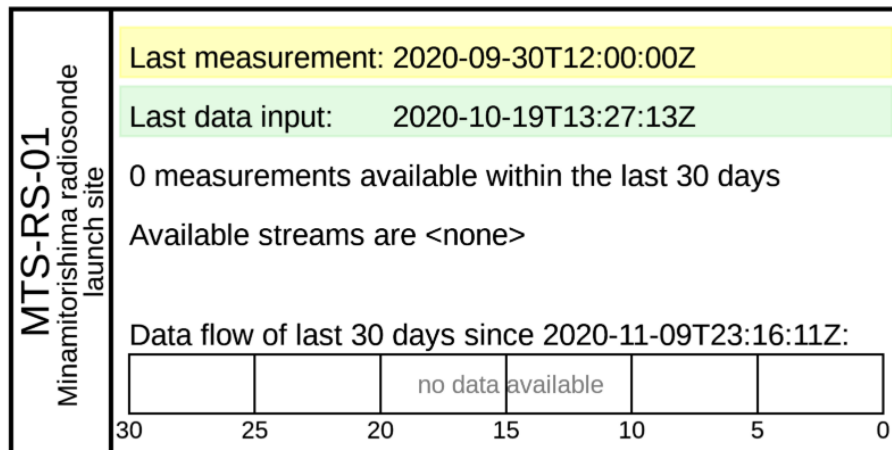
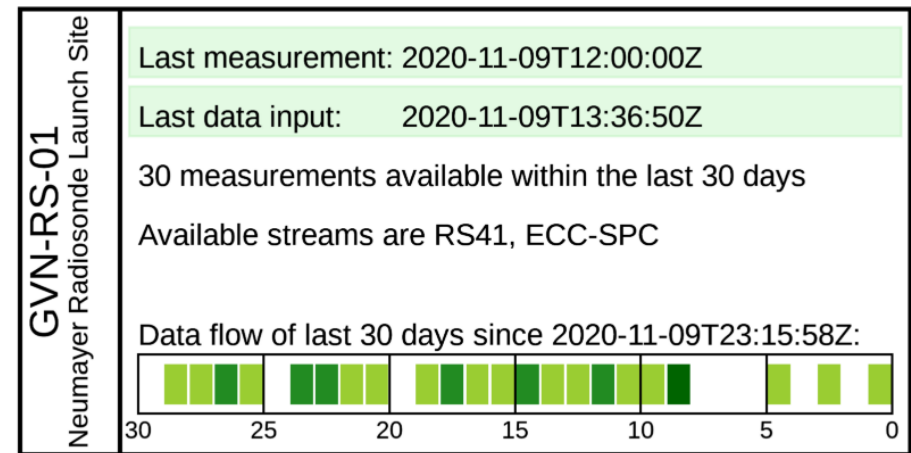
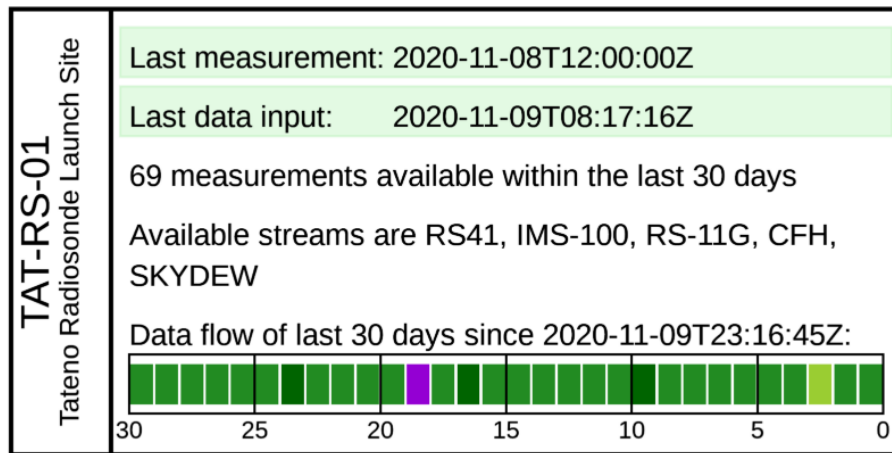


# Current data flow: site → LC (daily)

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➤ <https://www.gruan.org/data/measurements/current-data-flow>



Plots



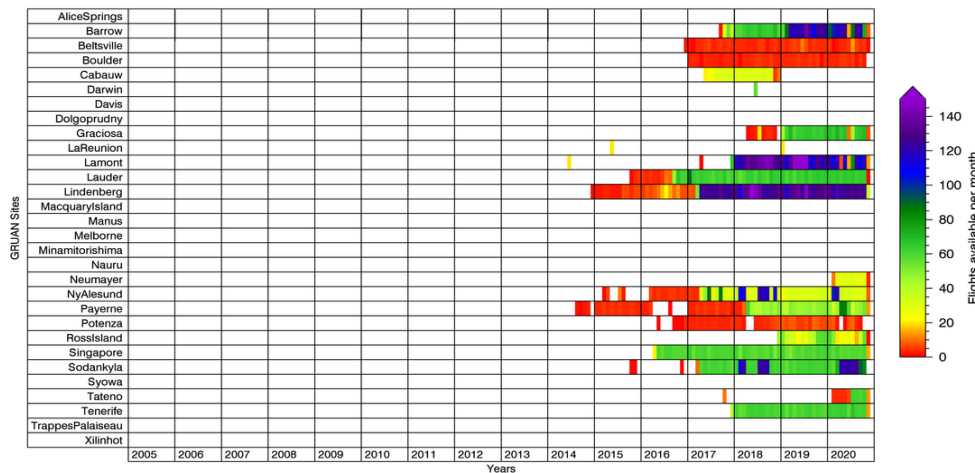
# Sonde launches (weekly)

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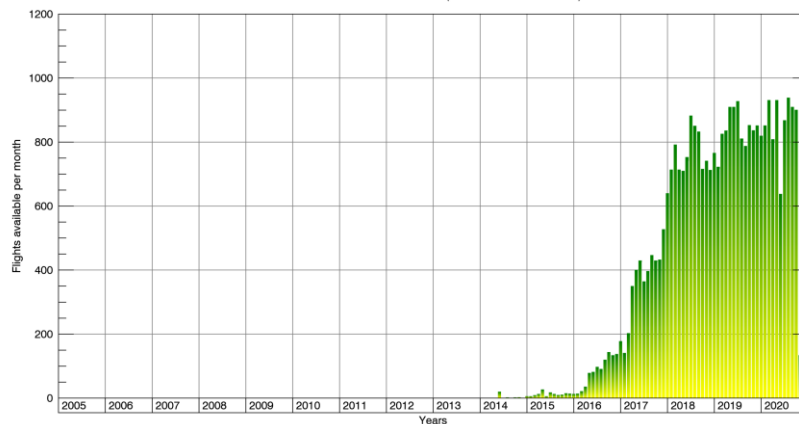
➤ <https://www.gruan.org/data/measurements/sonde-launches>

GRUAN Vaisala RS41 Launches (total: 33285 at 2020-11-08)



RS41

GRUAN Vaisala RS41 Launches (total: 33285 at 2020-11-08)

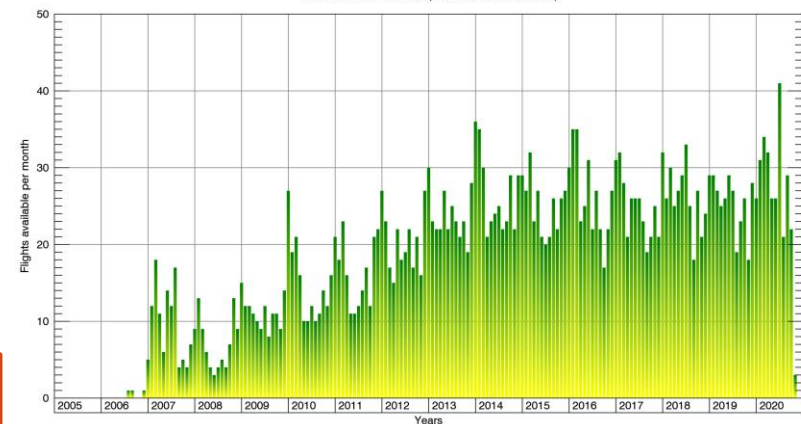


GRUAN Ozone Launches (total: 3392 at 2020-11-08)



ECC Ozone

GRUAN Ozone Launches (total: 3392 at 2020-11-08)



Plots  
CSVs





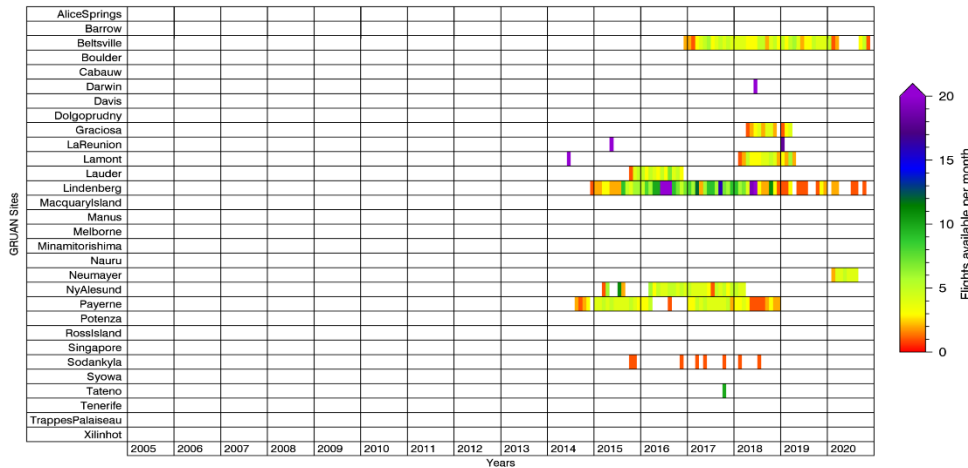
# Comparison launches (weekly)

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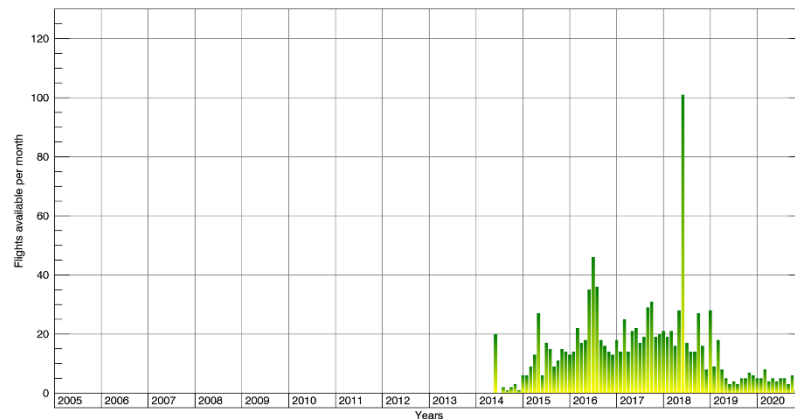
➤ <https://www.gruan.org/data/measurements/comparisons>

GRUAN Vaisala RS92 vs. Vaisala RS41 Comparison Launches (total: 1142 at 2020-11-08)



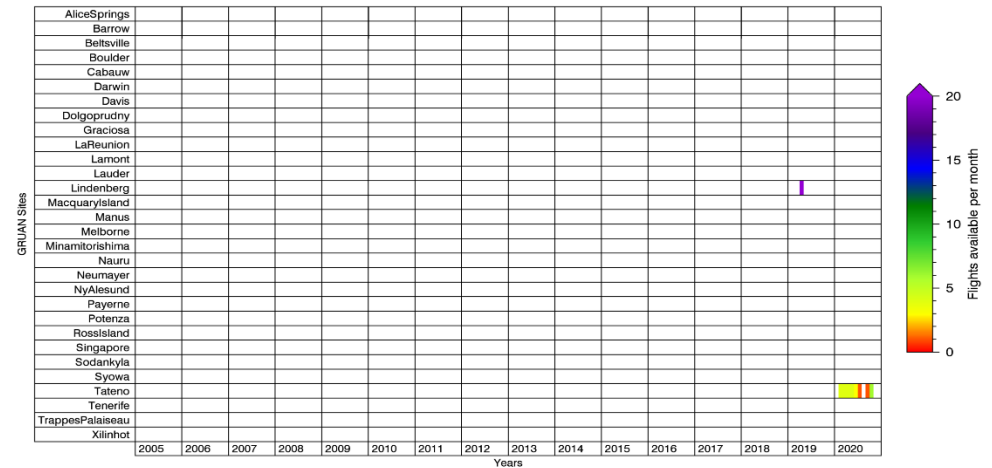
RS92+RS41

GRUAN Vaisala RS92 vs. Vaisala RS41 Comparison Launches (total: 1142 at 2020-11-08)



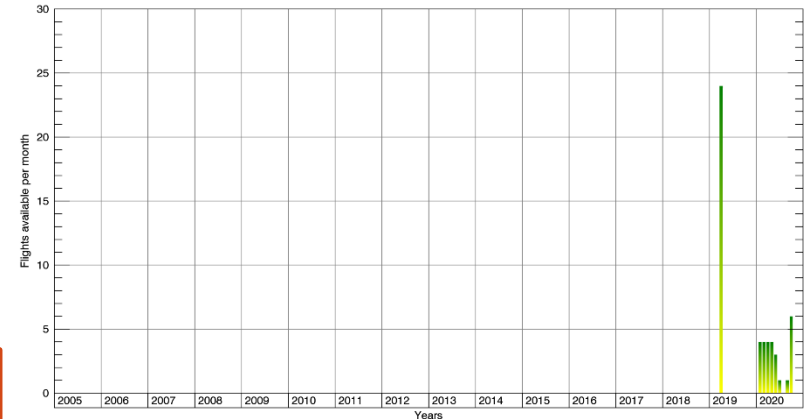
Plots  
CSVs

GRUAN Meisei IMS-100 vs. Vaisala RS41 Comparison Launches (total: 51 at 2020-11-08)



iMS-100 + RS41

GRUAN Meisei IMS-100 vs. Vaisala RS41 Comparison Launches (total: 51 at 2020-11-08)



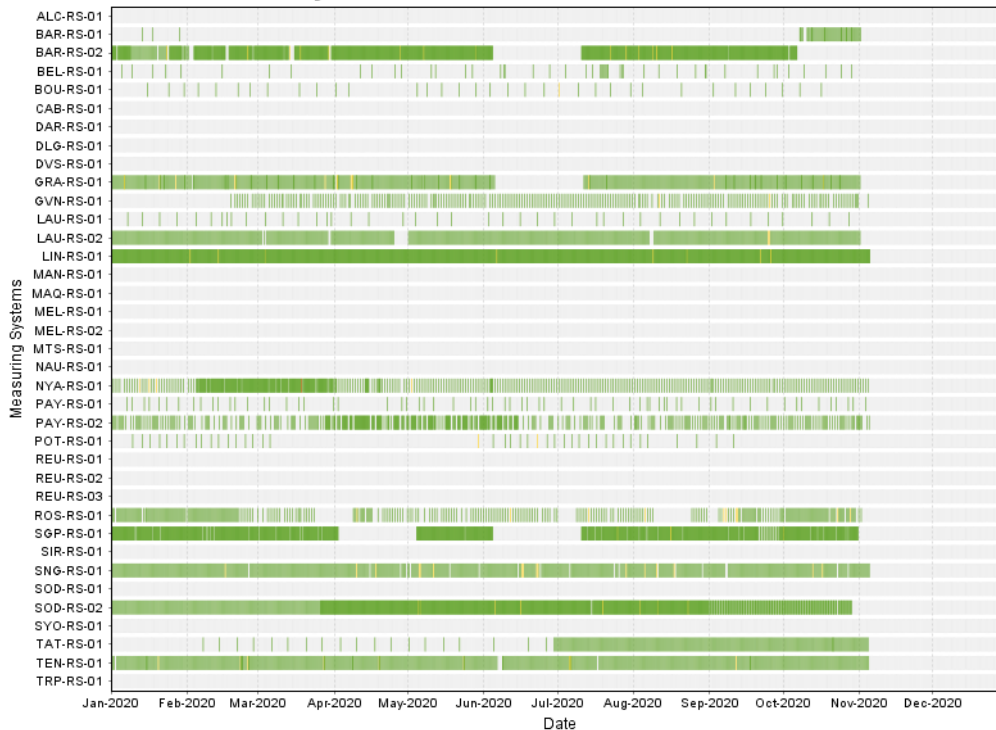
# Availability of data products (monthly)

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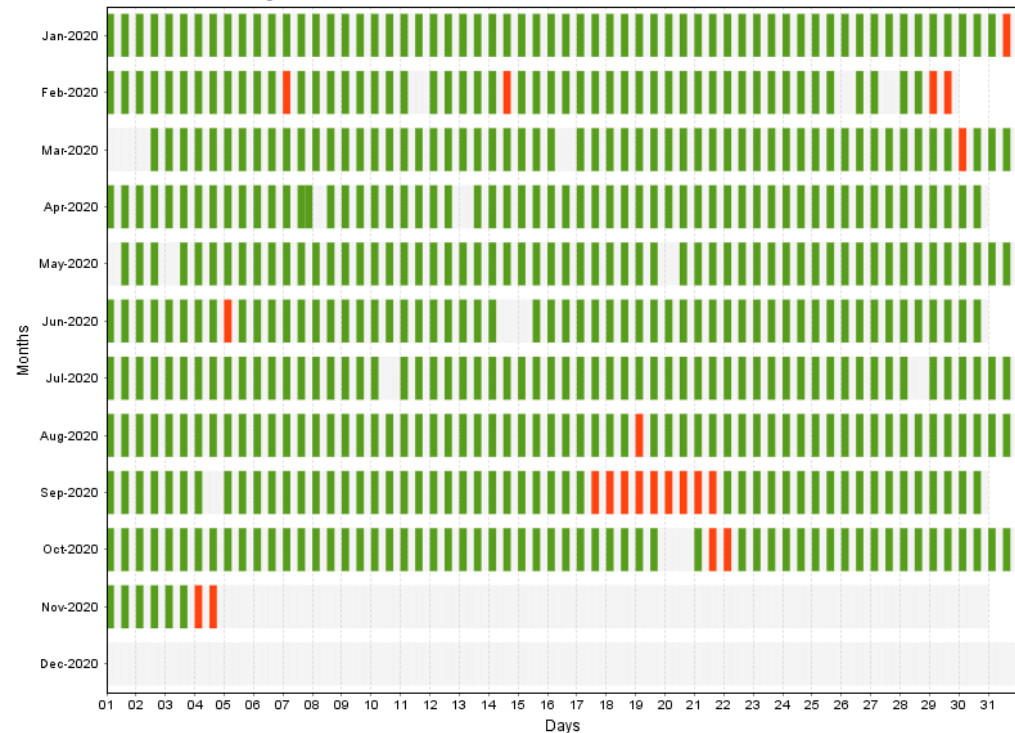


➤ <https://www.gruan.org/data/data-products/data-availability>

Availability of GRUAN Data Product RS41-GDP-BETA.1



Availability of GRUAN Data Product RS-11G-GDP.1 at SYO-RS-01



Plots

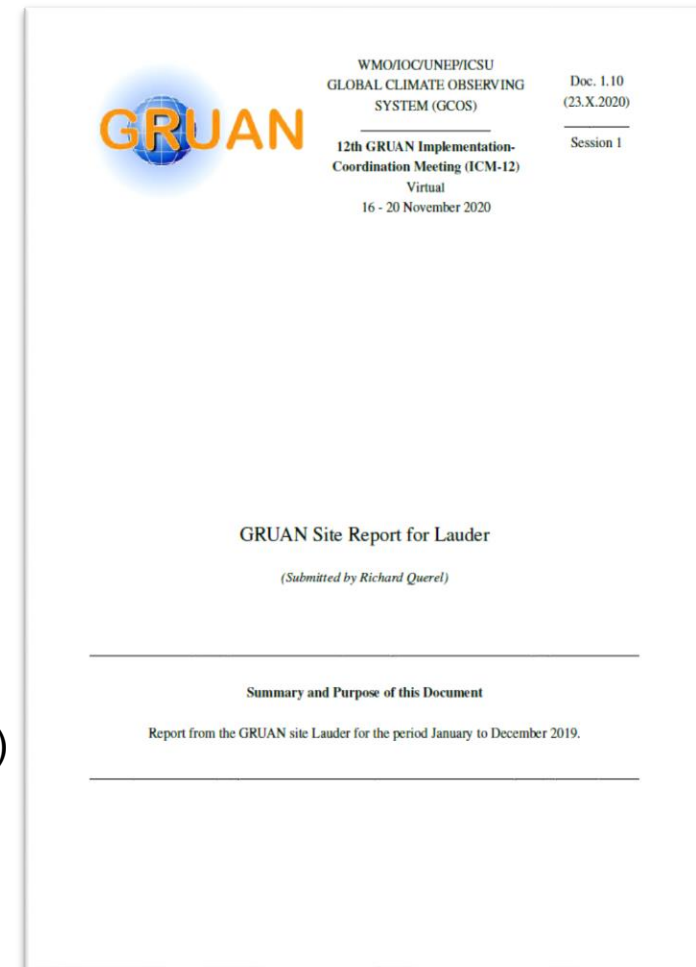


## ➤ Content of site reports:

- 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?



- 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.**