Overview of RS92-RS41 comparison dataset

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GRUAN
Lead Centre

➢ Purpose

➢ Facets of dataset

➢ Some statistics

➢ Conclusion

Purpose

➢ Collect a dataset which fulfils following criteria

- Describe transition from RS92 to RS41 completely

- Sufficient amount that "all" differences can be detected

- Coverage of as many relevant feature combinations as possible

➢ Usage of this dataset

- Diagnose differences of raw data and learn about

- Diagnose differences of manufacturer data products

- Validate GRUAN data product versions → RS92-GDP and RS41-GDP

➢ Long-term goal

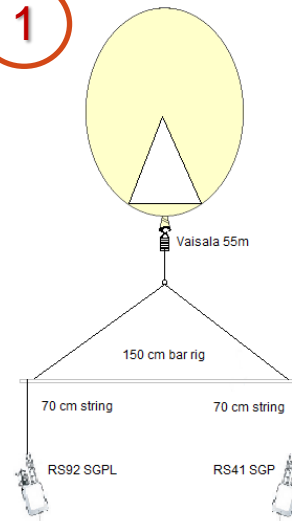- Homogeneous merged data series of RS92-GDP and RS41-GDP

Different configurations / setups
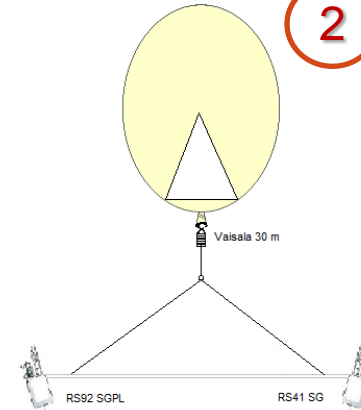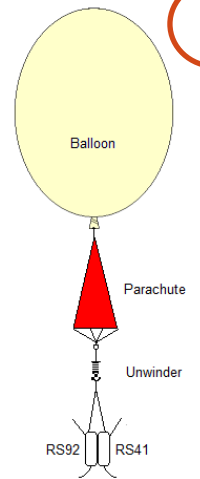
1. 2x free hanging

2. 2x taped/fixed
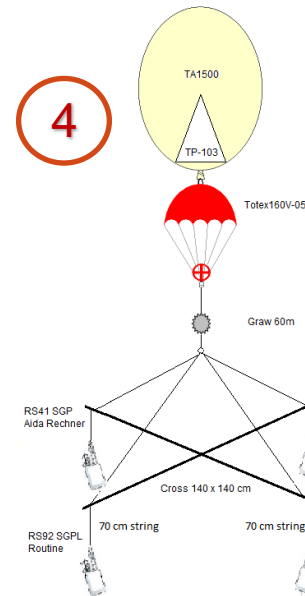
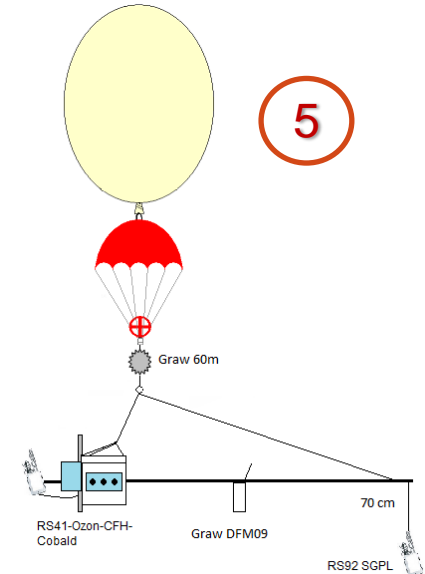3. 2x direct attached (back to back)

4. 4x differently attached

5. First direct attached on CFH, ECC + second free hanging or fixed

Ground system and ground check

➤ Initialisation & manufacturer GC → GC25, RI41, RI41-B

- o RS92 → Temperature reference (stable?)
- o RS92 → Desiccant (regularly changed?)
- o RS41 and RS92 → Pressure sensor of site

➤ Additional ground check → SHC and/or shelter

- o RS41 and RS92 → Temperature and/or humidity references (stable?)
- o RS41 and RS92 → Pressure sensor of site

➤ Software version & configuration

- o Correct configuration?
- o Software updates

Participating sites and campaigns

➢ GRUAN sites

- Long period: Beltsville, Ny-Alesund, Lindenberg, Lauder, Payerne

- Short campaign: La Reunion/REU (2015), Lamont/SGP (2014), Tateno (2017)

- Sporadically: Sodankylä

➢ Additional non-GRUAN sites

- Table Mountain Facility, TMF (2014, 2016)

- Nainital, Kathmandu, Palau (2016-2018) → StratoClim campaign

- Camborne (2014)

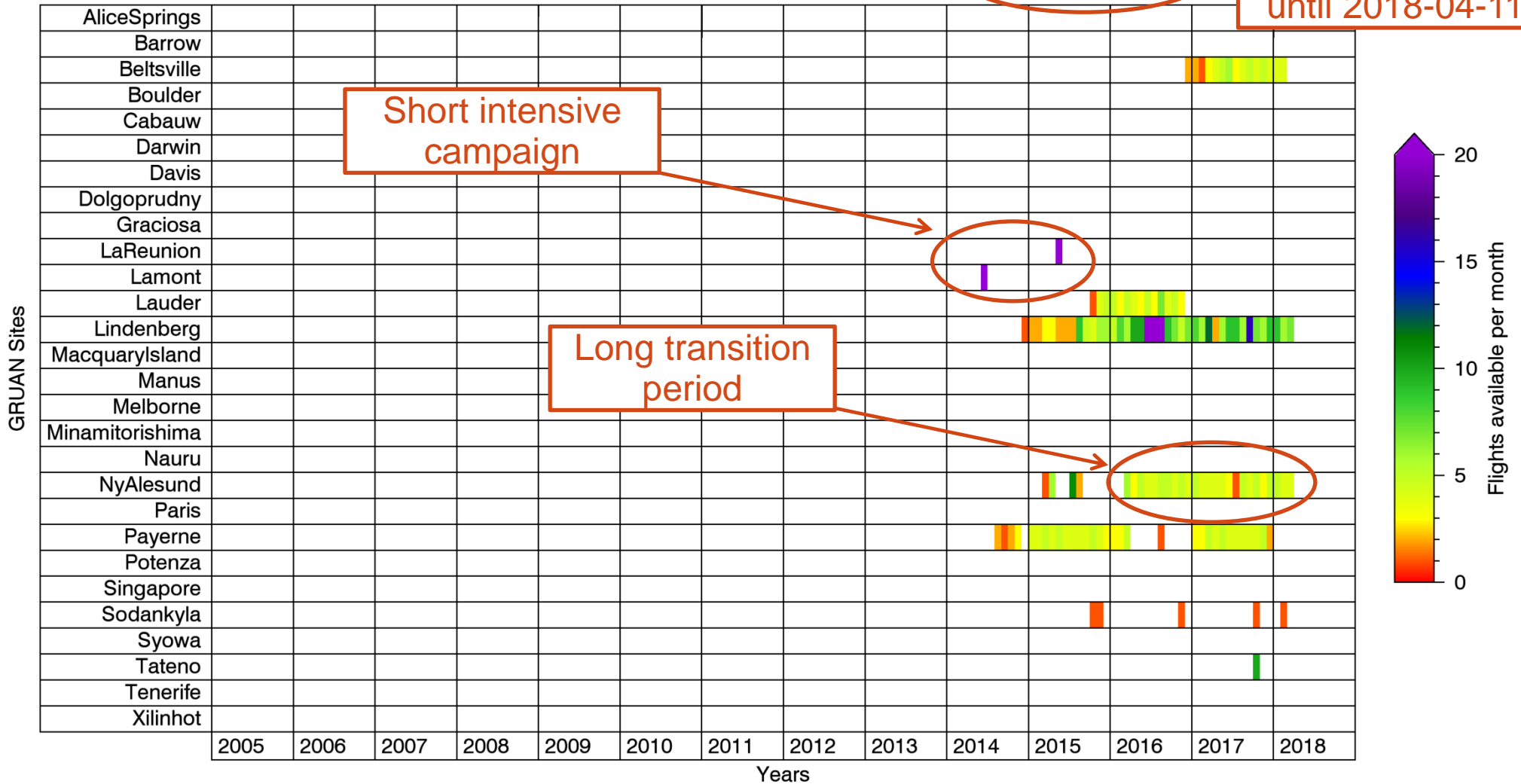➢ Are there other stations and campaigns that can provide data?

- Please contact the GRUAN Lead Centre → gruan.lc@dwd.de

Overview about comparison launches at GRUAN sites

GRUAN Vaisala RS92 vs. Vaisala RS41 Comparison Launches (total: 730 at 2018-04-11)

730 launches until 2018-04-11

Short intensive campaign

Long transition period

→ plus ~100 launches at other sites

➢ List of all comparison launches with following content:

- o Site (launch position, LLA)

- o Launch date & time (UTC)

- o Short setup information (rig, attachment, additional sondes)

- o Burst date & time (UTC)

- o Geographical box of trajectory (min/max Latitude, min/max Longitude)

- o Tropopause altitude, cold point temperature

- o Range of temperature, relative humidity, pressure, altitude/geopot. height

- o Range of solar elevation angle (or solar zenith angle)

- o What is missing here?

Not yet included

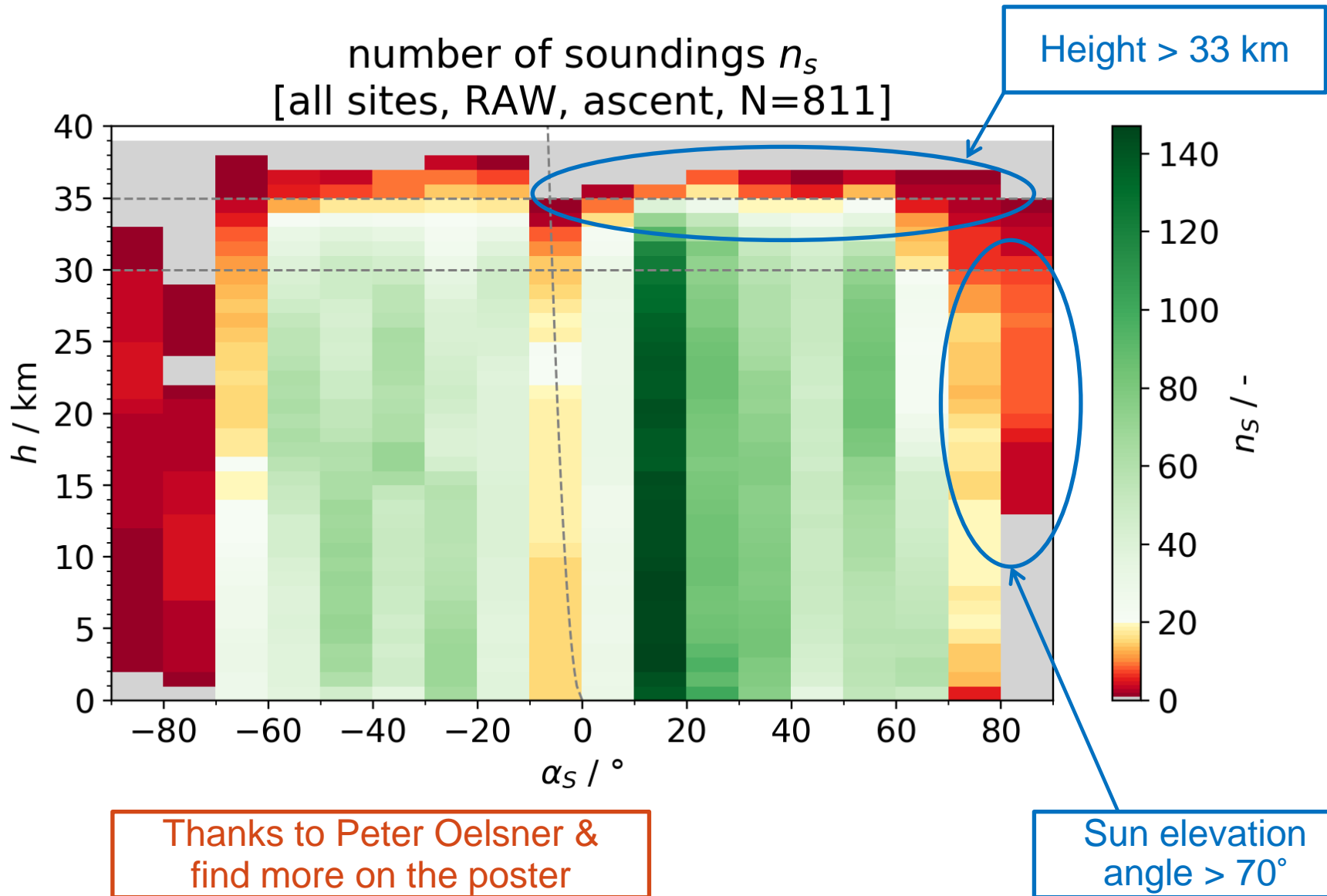➢ In future → regularly updated (e.g. monthly)

Current content of dataset

➤ **Radiosonde data files/products**

	RS92	RS41
○ ORI → original files from manufacturer	DC3DB, MWX	MWX
○ RAW → converted raw data files	yes	yes
○ EDT → manufacturer data product	yes	yes
○ GDP → GRUAN data product	yes	not yet

➤ **Ancillary data products**

	included?
○ Other in-situ instruments, e.g. CFH	(yes)
○ GNSS-PW (integrated water column)	(yes)
○ LIDAR (temperature, humidity)	not yet
○ MWR	not yet
○ Satellite (temperature, humidity, other?)	(not yet)
○ Other? (e.g. ceilometer, wind profiler, …)	not yet

> We should improve this part of dataset.

Relevant conditions & necessary amount

➢ How many comparison launches are needed?

- 5, 10, 25, 50, … Who can answer it?

➢ Which conditions are relevant?

- Solar elevation angle → *main important condition for radiation correction*

- Range of altitude and pressure

- Range of air temperature

- Range of relative humidity and/or mixing ratio?

- Combined range of air temperature and relative humidity

- Altitude of tropopause and hygropause, temperature and altitude of cold point

- Cloud scenes (ice, water, thin, thick, low, high, complex, …)

- Ascent speed, wind speed, rainy/snowing, surface albedo, …

- …

Solar elevation angle vs. altitude

number of soundings n_s
[all sites, RAW, ascent, N=811]

Height > 33 km

Sun elevation angle > 70°

Thanks to Peter Oelsner & find more on the poster

Conclusion

➢ Complex dataset → Bunch of different configurations

➢ Large dataset → **More than 800 comparison launches**

➢ Missing ancillary data → Lidar, satellite, …

➢ Sufficient dataset? → Who can answer?

Thank you for your attention.