Status of all GDPs under development

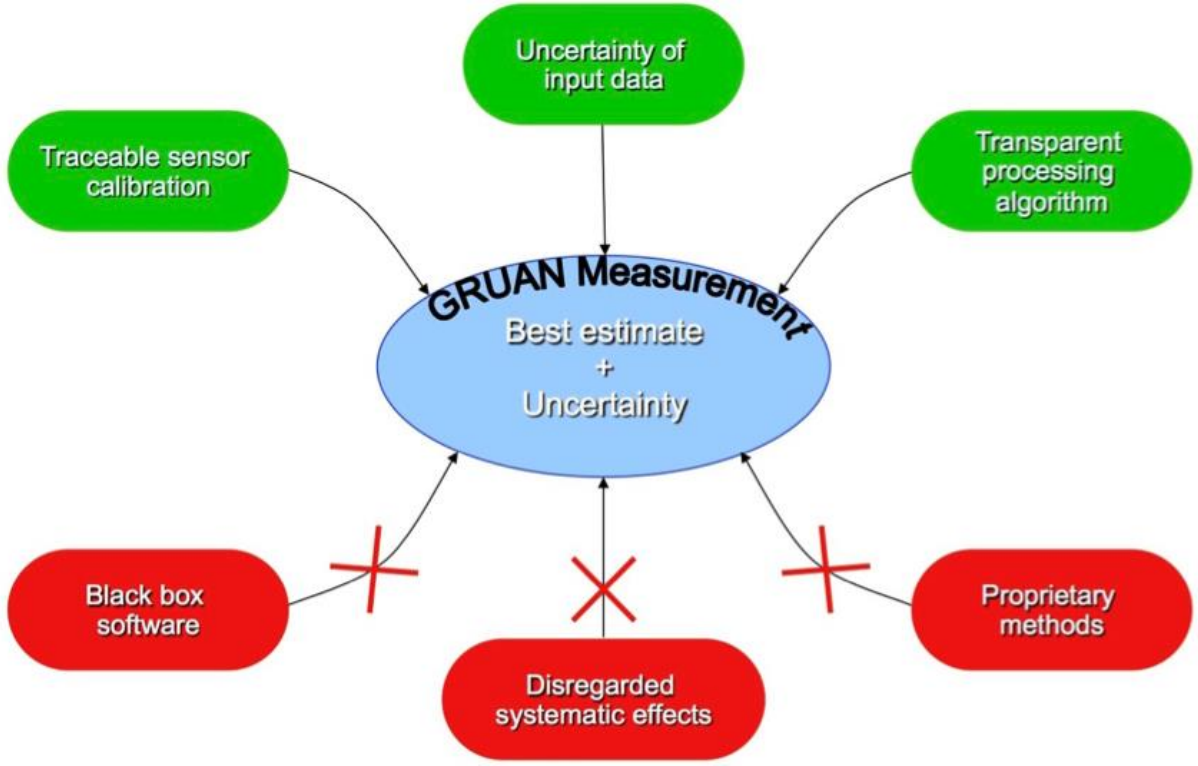
Ruud Dirksen
GRUAN Lead Centre, DWD

14th GRUAN Implementation and Coordination Meeting (ICM-14)
Saint Denis, La Reunion
28 Nov - 2 Dec 2022

Motivation for GRUAN data products

- From the GRUAN-for-beginners presentation:
  To answer the need [of WMO and the Global Climate Observing System] for highest accuracy data possible

- GRUAN's main deliverable



Requirements for certification of GRUAN data product

- Outlined in TN-1 & TN-4
  - Technical document with full description of the data processing
  - Peer reviewed paper on the data product
  - Measurement System employed within GRUAN
  - Central processing facility
  - Existing operational data stream
  - Review/validation of the data stream

GRUAN dataproducts

Certified

RS92 V2
RS-11G V1
GNSS-PW*
RS41**
iMS-100**

*NetCDFdata format not implemented yet
** provisional certification

Under development

RS-11G V2
M10
Graw DFM09/DFM17
RS92 V3
CFH/FPH
MWR
Lidar
O_3



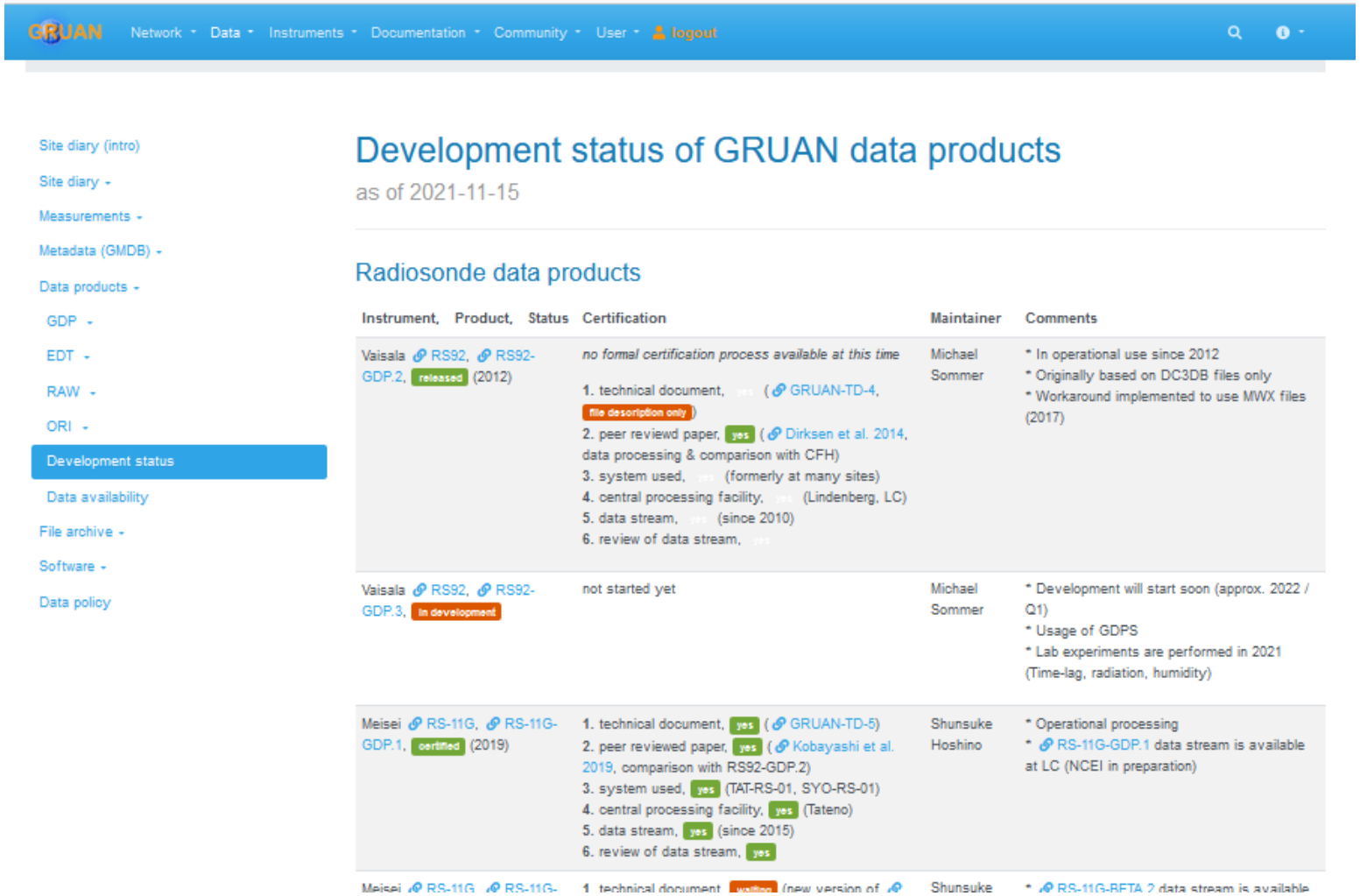




Presentation on GRUAN website

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Accessible in the restricted area (Data | Data Products | Development Status)



GDP development status – certified products

System	data processor	centralized processing facililty	GRUAN documentation	Peer reviewed paper	GRUAN certification	Topics covered by paper
Vaisala RS92	yes	yes	GRUAN TN4 (data format)	Dirksen et al 2014 (AMT)	de facto certified, although never officially	Data processing & comparison with CFH
Meisei RS-11G V1	yes	yes	GRUAN TD5 (processing & data format)	Kobayashi et al 2019 (AMT)	completed	comparison with RS92
GNSS	yes	yes	yes	Ning et al 2016 (AMT)	completed	uncertainty
Vaisala RS41	yes	yes	under review	Rohden et al 2021 (AMTD)	provisionally	Radiation correction
Meisei IMS-100	yes	yes	Update TD5 in progress	Hoshino et al 2022 (AMT)	provisionally	comparison with RS92

GDP development status – in development

System	data processor	centralized processing facililty	GRUAN documentation	Peer reviewed paper	GRUAN certification	Topics covered by paper
Meisei RS-11G V2	yes	yes	Update TD5 in progress			
Modem M10	beta version	yes	in preparation/under review	Dupont et al. 2020 (JAOT)		Humidity correction
Graw DFM09/DFM17	in progress	no	no	no		
Meteolabor SRS 34C	yes	yes			halted	
Meteolabor SRS 50C	?	yes			halted	
Ozone	in progress	no	Under review/update	ASOPOS		
lidar	yes	yes	in progress	Leblanc et al 2016 (AMT)		Temperature resolution & uncertainty
MWR	in progress	in progress	in progress	no		
CFH/FPH	in progress	no	no	e.g. Vömel et al 2016 (AMT)		uncertainties

In-depth info

- RS41: presentation 2-4
- iMS100: presentation 3-2
- M10: presentation 3-2
- Lidar: presentation 9-1
- MWR: presentation 9-2
- CFH/FPH: presentation 9-3
- O_3: presentation 9-4
- GNSS-PW: presentation 10-3

Some thoughts

- Development of GRUAN data product is a considerable task. For radiosonde products and GNSS-PW typically 4 years.
  - Multiple persons involved
  - Takes time and resources.
- Based on experience and lessons learned, can the development be sped up?
- Radiosondes: some investments can be re-used
  - Optimized measurement program + set ups + analysis software, modular data processor system
- Not re-usable
  - Data analysis, develop & implement correction algorithms, validation (perform & evaluate twin soundings), documentation