GRUAN data flow

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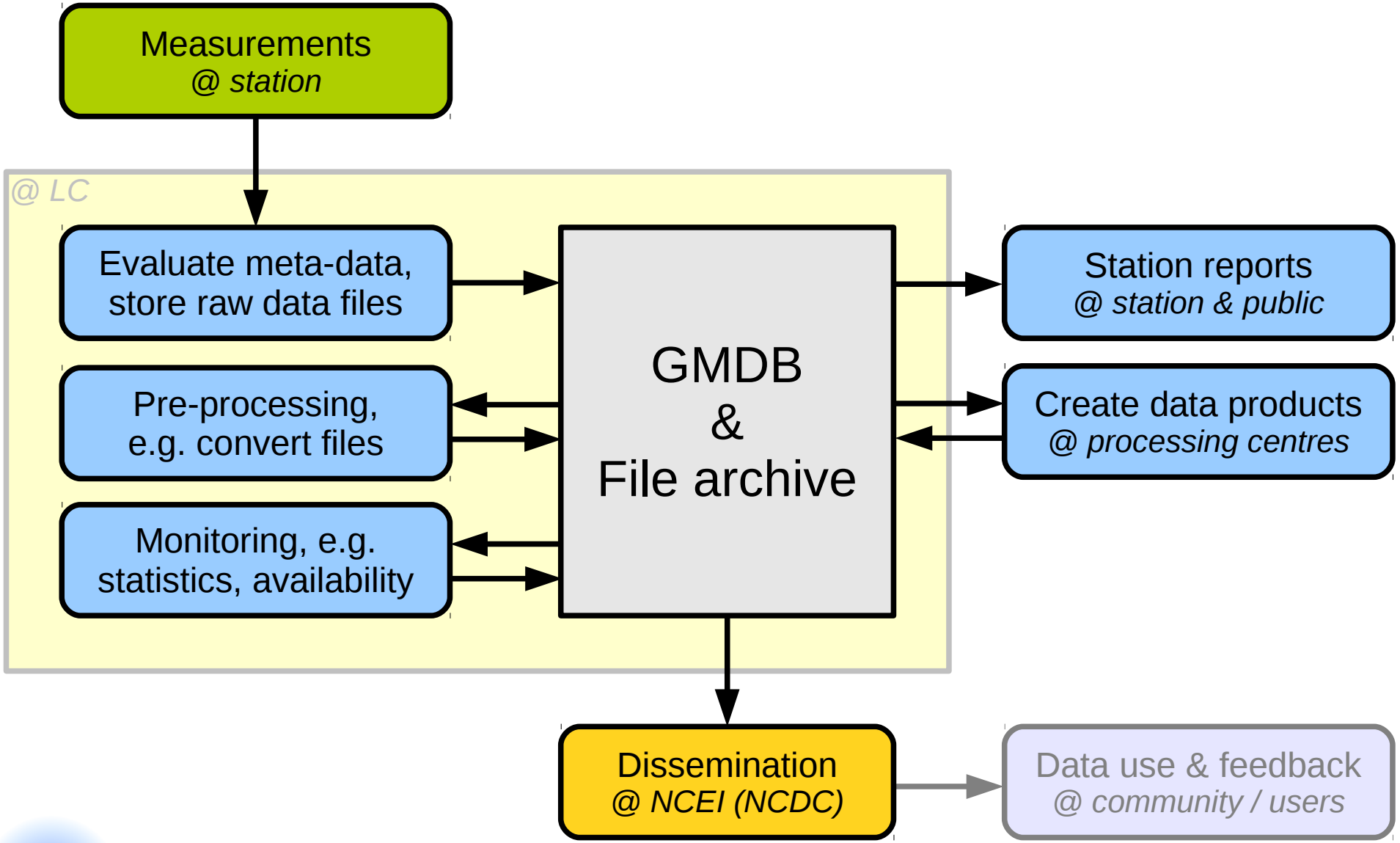
Outline

- Overview of GRUAN data flow
- GMDB & file archive
- Statistics
- Processing centres & dissemination of GRUAN data
- Conclusion

Scheme of GRUAN data flow



GRUAN meta-data base (GMDB)

- Central storage of all “relevant” meta-data in GRUAN
  - Extensive and very detailed meta-data collection
  - Database located at LC
- Information about
  - Stations & measurement systems (including all changes)
  - Possibilities of MS & measurement setups
  - Measurement events with all related equipment, instruments, sensors, …
  - Files in file archive
  - Status of data flow
  - Data quality

Access to GMDB

- Current access → exclusively by LC (read & write)
- Future access → three options (read)

  1) unchanged
  2) whole GRUAN community (with registration)
  3) whole world (without registration)

- Proposal from LC
  - Read access for whole GRUAN community (with registration)
  - Part of our new GRUAN web site
  - Start with a part of meta-data (e.g. sites, systems, measurements)

GRUAN file archive

- Located at Lead Centre
- "Levels" of files
  - Special meta-data
  - Manufacturer raw data
  - Converted raw data
  - Manufacturer data products
  - GRUAN data products
- Current data streams
  - Complete set of in-situ sounding files
  - Complete set of GNSS-PW files

Year	Number of files	Size compr. [GiB]	Size full [GiB]
2010	1,023	1.5	4.0
2011	26,778	30.8	78.3
2012	105,830	103.9	245.0
2013	81,254	90.5	216.2
2014	42,319	49.7	123.3
2015	87,722	92.5	202.9
2016	13,971	25.8	44.4
Sum	**358,897**	**394.6**	**914.2**

GNSS data in GRUAN archive
(at 2016-04-13)

Station	System	Data since	Binary [¼h]	RINEX v3 [1h]	MET	Product	GDP
Lindenberg	ldb0	2013-09	89,604	22,347	–	yes	–
Lauder	ldrz	2012-04	–	32,680	398	yes	–
Ny-Alesund	nya2	2013-09	89,894	22,420	34,770	yes	–
Sodankylä	sodf	2015-04	40,838	8,746	–	yes	–
(Boulder)	tms3	2016-02	4,642	1,157	–	yes	–

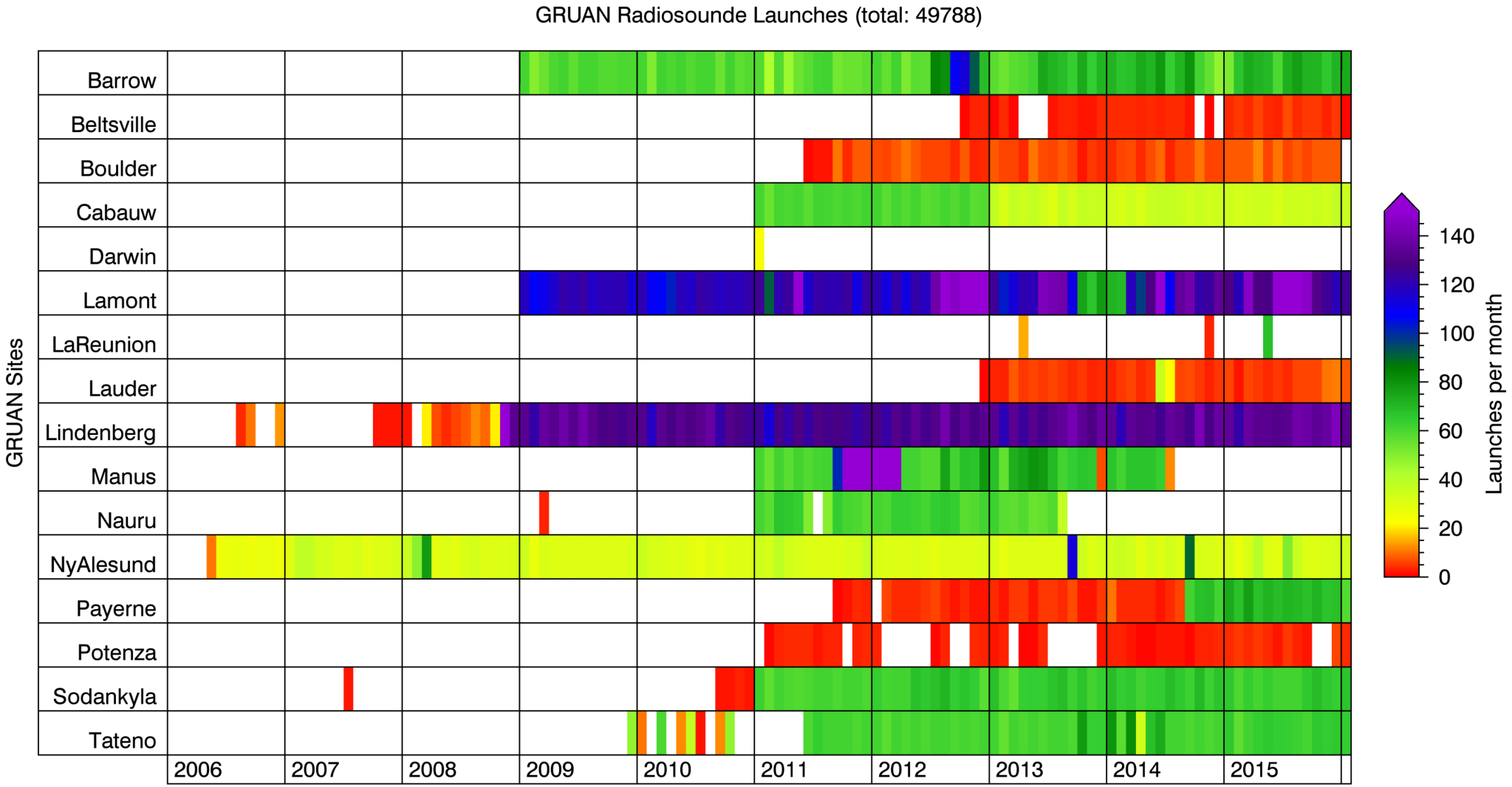
- Binary raw data (manufacturer-dependent)
- Converted raw data (RINEX v3) & meteorological data
- Operational data product (non-GRUAN)
- GRUAN data product

Status of in-situ sounding

- Radiosondes
  - Many different types
  - e.g. RS92, SRS-C34, RS-11G, DFM-09, RS41, iMET-1, M10, IMS-100
- Ozone sondes
  - Two manufacturers → DMT/EnSci, Science Pump
  - Attached to different RS
- Stratospheric (or “reference”) humidity sondes
  - CFH, FPH
  - SnowWhite
  - FLASH
  - Attached to different RS

Radiosonde soundings

Deutscher Wetterdienst
Wetter und Klima aus einer Hand



Ozone soundings

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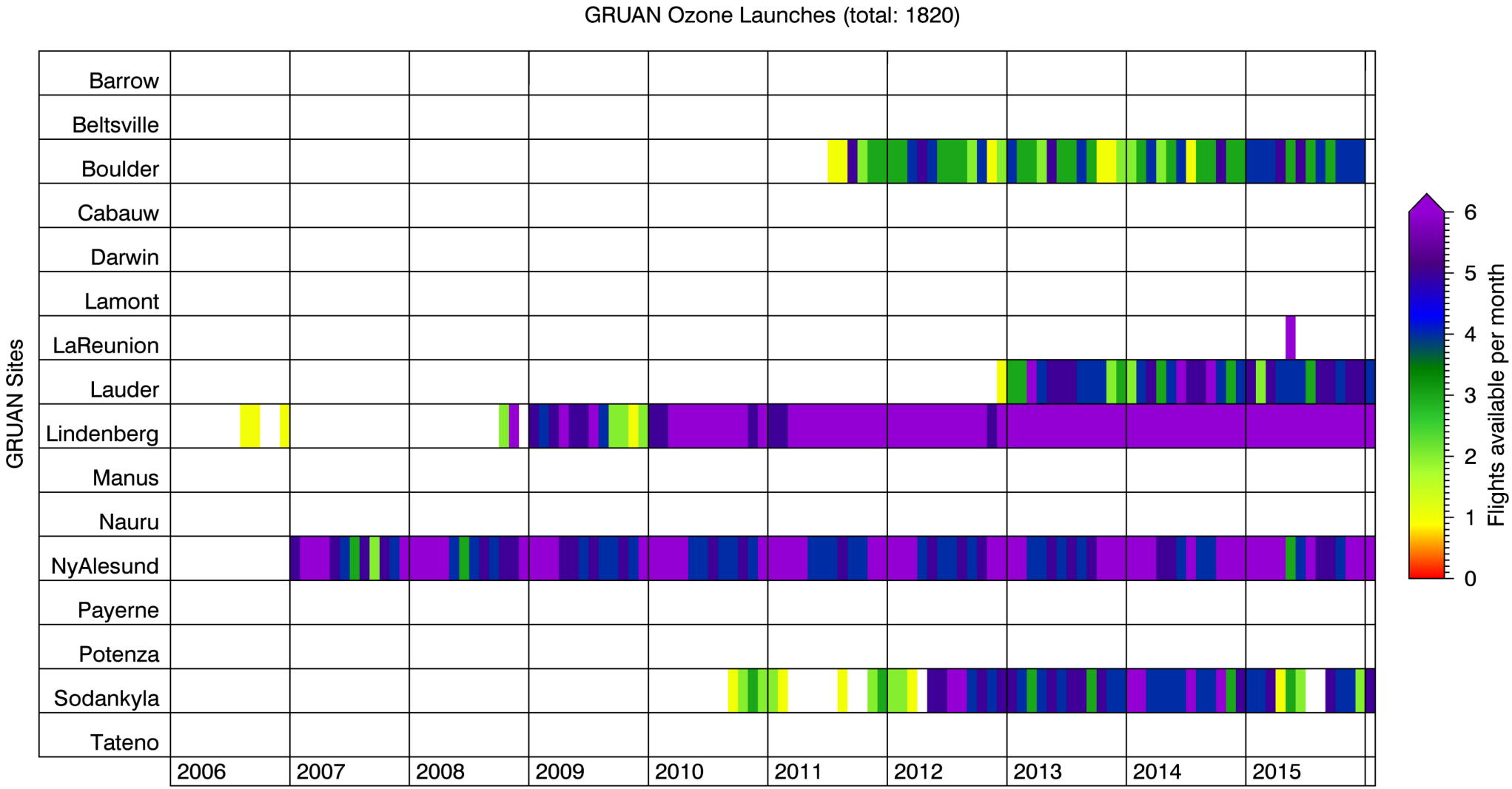
Wetter und Klima aus einer Hand



Stratospheric humidity soundings

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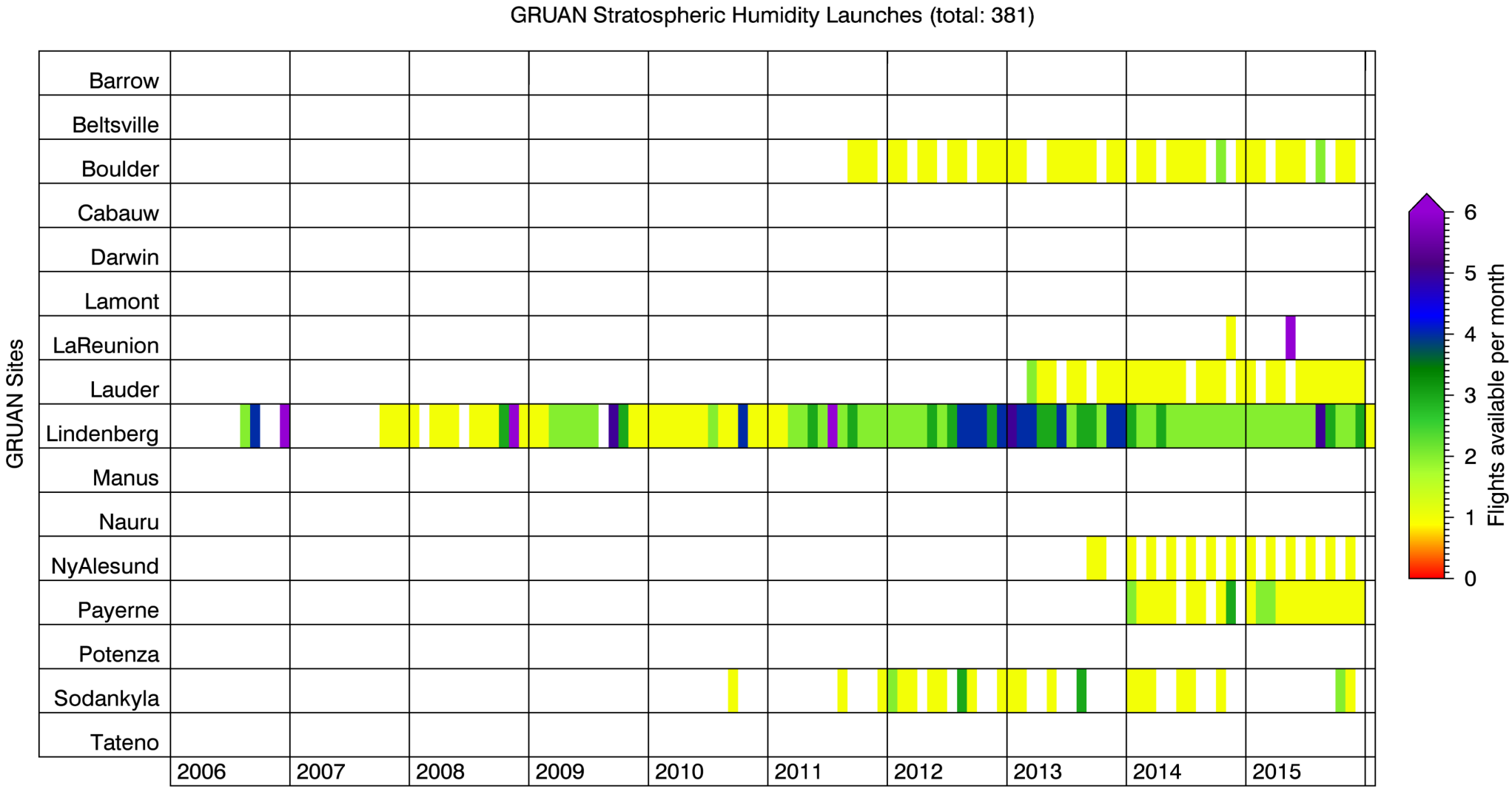

Radiosonde launches in archive
(at 2016-04-12)

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Manufacturer	Sonde	Number of soundings	Raw data	Manufacturer data products	GRUAN data products
Graw	DFM-06	71	yes		
	DFM-09	**202 (+2,707)**	**yes**		*in developm.*
Intermet US	iMet-1	364	yes		???
Intermet ZA	BAT-4G	25			
Meisei	RS2-91	115			
	RS-06G	19			
	RS-11G	**1,915**	**yes**		**yes**
	IMS-100	6			*in developm.*
Meteolabor	**SRS-C34**	**1,239**	**(yes)**		**yes**
Modem	M10	22			*in developm.*
Vaisala	RS80	85			
	RS90	118			
	RS92	**51,649 (+47k)**	**yes**	**yes**	**yes** + *in dev.*
	RS41	234	yes	yes	*in developm.*

GRUAN processing centres (PC)

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Wetter und Klima aus einer Hand

- Our motto is

  "One processing centre for one instrument"

- Functions of PC
  - Development of GRUAN data products for an instrument
  - Make/organise lab experiments
  - Processing & reprocessing
  - Basic monitoring
- Agreement
  - Between LC and PC

- PC at Lead Centre
  - RS92 radiosonde
  - DFM-09 radiosonde (in developm.)
  - RS41 radiosonde (in developm.)
- PC at site Tateno (JP)
  - RS-11G radiosonde
  - IMS-100 radiosonde (in developm.)
- PC at site Payerne (CH)
  - SRS-C34 radiosonde
- PC at GFZ Potsdam (DE)
  - GNSS-PW (in developm.)
- PC by H. Vömel → *in future at LC*
  - CFH (in developm.)

Dissemination of data

- At the moment
  - Only "*approved*" data of GDP's
- Known issues
  - A lot of gaps in data series
  - Comparison with manufacturer data product or raw data is not easy (or possible)
- In (near) future we could disseminate
  - **All** processed data of GDP's → need more quality information in files
  - Manufacturer data products → if available in file archive
  - Raw data → converted to a standardised file format (NetCDF)

Is it acceptable for the whole GRUAN community?

Conclusion

- All information about GRUAN data → GMDB
- All GRUAN data files → GRUAN file archive
  → More than radiosonde data
- Proposal to evolve → Extended data dissemination

Thank you for your attention.