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Lead Centre Progress Report for April 2019

(Submitted by Lead Centre)

Summary and Purpose of this Document

Progress report from the Lead Centre.

GRUAN Lead Centre
www.gruan.org

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GRUAN Lead Centre progress report 01/2019

Covering the period 05/2018 to 04/2019

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Summary

Lamont (SGP) and Singapore (SNG) have been certified. Various sites recertified.

The GRUAN Lead Centre participated in the CONCIRTO campaign on Reunion Island.

Co-organization of ICM-11.

Ongoing development of GRUAN data processing for RS41. Alpha version 2 of RS41-GDP is available.

Coordination of RS92-RS41 transition.

Research contract TU Dresden for study into alternatives to R23 for frostpoint hygrometers.

Health of network

The network consists of 26 sites.

Neumayer and Arrival Heights were invited by GCOS Secretariat to become candidate sites. No response from Dakar/Senegal to invitation to become GRUAN site.

Certification of Lamont (SGP) & Singapore has been completed. In total 12 sites have been certified.

Certification process ongoing for Tenerife.

Recertification of various sites (Boulder, Lauder, Lindenberg, Ny-Ålesund, Sodankylä). Payerne under review.

Lead Centre operations

- Operationally running GRUAN data management server - GDMS (24/7).
- Operationally running GRUAN meta-data data base - GMDB (24/7).
- Operationally working GRUAN file archive - GFA (24/7).
- Ongoing development and optimization of all GRUAN server software components, GDMS, GMDB, GFA.

- Ongoing development on several software tools for use at sites, e.g. RsLaunchClient, gt92, gtRsl, gm41.
- Regularly update of data flow statistic plots (available at website).
- Configuring data flow for sites switching to RS41.
- Continued testing and characterization of Vaisala RS41.
- Coordination RS92-RS41 transition.
- Ongoing development of GRUAN data processor for RS41 (highest priority action).

Visitors to LC

- Graw, discussion/coordination, May 2018.
- ETH-Zürich, tests with PCFH, September & December 2018.
- Alexey Lykov, test of FLASH-B instrument, November 2018.
- Meisei, test of Skydew instrument, April 2019.
- David Smyth, GRUAN coordination, May 2019.

Instrument research

The following activities were undertaken in testing and/or characterizing research instruments and radiosondes:

- FLASH-B, Meisei Skydew, PCFH.
- RS41, RS92, DFM-09 (laboratory & intercomparison).
- Research contract TU Dresden to investigate alternatives for R23.

Site visits

- Visit to Korea Research Institute of Standards and Science (KRISS), December 2018.
- Participation in the CONCIRTO campaign on Reunion Island. RS92-RS41-M10-CFH comparison soundings, January-February 2019.

Conferences

- CIMO-TECO, Amsterdam October 2018

GRUAN-related publications

The following GRUAN-related publications appeared in peer-reviewed literature:

- Bobryshev, O., S. A. Buehler, V. O. John, M. Brath, and H. Brogniez, Is There Really a Closure Gap Between 183.31-GHz Satellite Passive Microwave and In Situ Radiosonde Water Vapor Measurements?, IEEE Transactions on Geoscience and Remote Sensing, 56(5), 2904-2910, doi:10.1109/TGRS.2017.2786548, 2018, ISSN 0196-2892.
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- Finazzi, F., A. Fassò, F. Madonna, I. Negri, B. Sun, and M. Rosoldi, Statistical harmonization and uncertainty assessment in the comparison of satellite and radiosonde climate variables, Environmetrics, pp. 1-17, doi:10.1002/env.2528, 2018.

- Gierens, K., K. Eleftheratos, and R. Sausen, Intercalibration between HIRS/2 and HIRS/3 channel 12 based on physical considerations, Atmos. Meas. Tech., 11(2), 939-948, doi:10.5194/amt-11-939-2018, 2018, URL https://www.atmos-meas-tech.net/11/939/2018/.
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Progress against stated objectives

Nr	Action	Summary of progress
HIGHEST PRIORITY		
HP1	**First full version of RS41 GDP**: Lead Centre to complete production of first full version of RS41 GDP before ICM-11 and be at worst under active consideration by WG for certification. Product to make use of traceability diagram and effects table approach of GAIA-CLIM and aim to have a radiosonde TD annex and a paper describing the product submitted.	Ongoing. Alpha version 2 of GRUAN data product for RS41 has been developed and processing is running since 2019-03-04. Data product is available for GRUAN-internal use (2018-01-01 to 2019-05-01). Beta version is under development. Guidance/assistance needed with the implementation of (semi) correlated uncertainties.
HP2	**Radiosonde fundamental documentation:** Develop first draft of GRUAN radiosonde foundational technical document to cover the general instrument-independent aspects. Available for review.	Ongoing. Various chapters are in different states of maturity.

HP3	**Auto-launchers**: (1) An assessment of the advantages and disadvantages of manual vs. auto launches written up and submitted to the peer reviewed literature and/or a technical document. (2) Find a way to get GRUAN certification for radiosonde data products taken with auto launcher systems. (First collect the information/experiences/concerns from various groups, and define the critical questions to answer which would appear to be at least: i) Can we create a GDP?; ii) Is there a bias between manual and auto-launched sondes?; iii) Does the random uncertainty change?; iv) impact of lifetime in launcher (quality, SHC repeatability, and height attained); v) how to make manufacturer-independent ground check.)	Ongoing. Draft in preparation by F. Madonna.
RS92 to RS41 transition actions		
A1	**Community approach paper**: Paper describing the GRUAN change management replacement strategy submitted to peer-reviewed journal (GI) to increase visibility of effort and get broad community buy-in.	Ongoing. Shortly before submission.
A2	**Ensuring all sondes on multi-payloads in archive**: Lead Centre to advise each site of current archive status of muti-rig launches in the database. Sites who have launched more complex set-ups with additional non-Vaisala sondes on their rigs not currently archived to advise Lead Centre and where possible provide that additional data to the Lead Centre. Lead Centre to ensure these additional data associated with such launches. Known cases: Payerne, Modem multi-payload launches	Completed.

A3	**Parallel soundings database augmentation with satellite/ancillary**: Augment parallel soundings of RS92-RS41 with satellite co-locations and 'ancillary' measurements (CFH, FPH, lidar, MWR, satellites, cloud observations (incl. BSRN) within +/-2 hours). • Sites to identify instrument streams available within +/- 2 hours of existing and planned parallel launches • TT ancillary to provide advice on suitability and also provide satellite matchúps (closest pixels?) • WG Chair to coordinate • Lead Centre to receive and archive	Little progress. Lists and statistics of all parallel soundings are available at website. Data from other instruments/ sondes (e.g. CFH etc) are included in the database. No progress for other ancillary data (satellite, ground based remote sensing).
A4	**UKMO/BAS ascents inclusion**: Arrange for the inclusion of Met Office and BAS parallel soundings data in the RS92-RS41 transition. Particular interest in St. Helena given paucity of tropical locations.	Completed. Transfer of MetOffice twinsounding data was coordinated by T. Oakley.
A5	**Scheduling by conditions**: Lead Centre to work with sites to fill the low solar elevation angle 'hole' in the current set of dual launches with a lack of dawn / dusk ascents.	Completed. RS92-RS41 twin-soundings were performed in January/February 2019.
A6	**Updated analysis of dual launch holdings**: Presentations on updated analysis, including accounting for distinctions in rigging and ancillary measurements to be presented at ICM-11. Reports to be made available a month prior. Consideration of submission of reports as peer-reviewed literature.	Ongoing. Database of RS92-RS41 twin-soundings are available at GRUAN ftp-server.

A7	**Hard to soft casing**: Lead Centre to undertake a number of RS-41 dual launches between hard and soft casing and archive as part of the dual soundings archive. Other sites that wish to ascertain the impact to also submit to the archive.	Ongoing. Analysis by NWS-Sterling showed no differences (reported at ICM-10). Comparison flights are performed at Lindenberg. Analysis ongoing.
New GRUAN data products		
B1	**Keeping track of new data stream developments and progress**: WG to define and agree table entries for a quick check table on progress against data stream requirements (per summary given by Tom Gardiner). Lead Centre to host this on an appropriate area of the GRUAN website. WG to regularly review this table on calls.	Ongoing. Check table available on GRUAN website.
B2	**Meisei GDP product certification**: WG Chair to initiate data stream certification as soon as a discussion version of a paper describing the product is available. Lead Centre to provide a package of materials and data necessary. WG members and TT radiosondes members to undertake a review and advise a decision.	Completed. Meisei RS-11G data product has been certified.
B3	**GNSS-PW GDP data flow and certification:** Certify the GNSS-PW data stream by ICM-11. WG Chair to work with TT-GNSS-PW to ensure review and finalisation of TD. GFZ to advance a data stream with full uncertainties (considering how to ensure as much information as possible expressed). Lead Centre to prepare a package of materials to enable certification by WG to proceed.	In progress. Technical Document is finalized and is prepared for publication.

B5	**Modem sonde GDP**: Further update on the Modem product development to be given at ICM-11. Special attention paid to completing documentation steps and laboratory test results.	Completed. Manuscript for M10 data product has been reviewed and is undergoing revision.
B6	**Microwave Radiometer GDP**: WG-Chair and Lead Centre to discuss with Nico Cimini and explore potential processing centre options for an MWR product stream and outline potential options. Presentation to be given at ICM-11.	Ongoing. Update by F. Madonna at ICM-11.
Remaining actions		
C1	**Sites photos**: Technical note on guidance on site survey photos and upload instructions. Current site photo surveys to be uploaded to appropriate area of website. GCOS Secretariat to then discuss with WIGOS inclusion into OSCAR Surface metadata database. Lead Centre to instigate mechanism to remind sites to submit new photos. Included here is ensuring that all GRUAN sites have WIGOS identifiers and metadata within OSCAR Surface.	Ongoing. TN has been drafted; test-review at Lindenberg. Comments from TT-sites are collated and implemented.
C3	**Generalisation of overpass information**: Augment the current golden overpass emails so they show in addition appropriately polar orbiter overpasses information to enable sites to also be able to target these overpass times should they wish to do so.	Ongoing. Weekly emails to sites now include information on GPR-RO collocations and overpasses by polar orbiters from EUMETSAT (MetOp A-C). Discussion with L. Borg and T. Reale about expanding this service to include overpass information from NOAA polar orbiters.

C4	**Certification and auditing**: WG-GRUAN and Lead Centre to ensure certification and auditing of sites on the agreed upon timetables and verify against these targets at ICM-11.	Completed.
C5	**Annually based reporting**: Lead Centre to provide automated reports on annual performance no later than 20 January of each year. Sites to append site report no later than 15 February to inform the ICM. WG-GRUAN members to read site reports prior to ICM.	Completed.
C6	**Letters on behalf of sites**: WG-GRUAN chair to review site reports and initiate letters from appropriate parties accordingly. TT sites to advise any additional requests as they arise.	Completed. Support letters have been sent out by GCOS secretariat in cooperation with sites.
C7	**Uncertainty terminology and presentation in GRUAN products**: Brief (max. 8 pages) discussion document to be produced on issues surrounding uncertainty terminology and presentation to users in GDPs including a review of heterogeneity in current approaches in certified and candidate streams to form basis for discussion at ICM-11.	Ongoing. Update by T. Gardiner at ICM-11.
C9	**New sites**	Ongoing. GCOS sent invitations to Neymayer and Arrival Heights. Discussions with Paramaribo, Hong Kong and Australia.
C10	**Clarification on NRT transmission when launching dual sondes**: Lead Centre to draft letter with John Eyre to sites undertaking dual launches to clarify preference to transmit the operational sonde in NRT.	Completed, letter has been sent to the sites.

Achievements

- Alpha version 2 of RS41 data product (RS41-GDP-ALPHA.2)

Technical documentation published

- GRUAN-TD-7 - Review of Multiple-payload Radiosonde Sounding Configurations for Determining Best-Practice Guidance for GRUAN Sites.

Training by Lead Centre

- CONCIRTO campaign on Reunion Island: Ozone & CFH soundings.
- AWI.

Issues

- Staffing: LC staff reinforced by one DWD-funded FTE for a period of 4 years, starting 1 April 2019. This is a welcome addition in view of the multitude of tasks the LC has to perform (support, coordination, product development, research activities, and campaigns).

Work plan for next 12 months

- Complete the development of a new GRUAN data processor.
- Finish development of GRUAN data product for RS41 (RS41-GDP.1).
- Develop GRUAN new version of data product for RS92 (RS92-GDP.3).
- Complete the GRUAN radiosonde omnibus.
- Prepare WMO-CIMO Radiosonde intercomparison campaign.
- Continue development of alternative, non-R23 based, cooling mechanisms for frostpoint hygrometers.
- (Re)certify sites.
- Further coordinate RS92-RS41 transition within GRUAN.
- Further development of the GRUAN website.
- Operationalize processing of CFH data.