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**13th GRUAN Implementation-
Coordination Meeting (ICM-13)**

Virtual

15 - 19 November 2021

Task Team Progress Report for November 2021 – Radiosondes

(Submitted by Masatomo Fujiwara and Christoph von Rohden and the team members)

Summary and Purpose of this Document

Progress report from the task team on Radiosondes.

Summary

Some tasks had good progress, but others need more community inputs and help.

This table shows the current members (14) of the team.

Name	Affiliation	Status
Masatomo Fujiwara	Hokkaido University, Japan	Co-chair
Christoph von Rohden	GRUAN Lead Centre, DWD, Germany	Co-chair
Frank Schmidlin	NASA Retiree, USA	
Hannu Jauhiainen	The Association of Hydro-Meteorological Equipment Industry & Vaisala, Finland	HMEI representative
Micheal Hicks	NOAA/NWS/OOS, USA	
Rigel Kivi	Finnish Meteorological Institute, Finland	
Masami Iwabuchi	Japan Meteorological Agency, Japan	
Yang RongKang	China Meteorological Administration, China	
Jean-Charles Dupont	Institut Pierre Simon Laplace, France	
Sergey Kurnosenko	Scientific Software Consultant, USA	
Bruce Ingleby	ECMWF, UK	
David Edwards	Met Office, UK	
Gonzague Romanens	Meteoswiss, Switzerland	Added 4 Jan 21
Frédéric Vogt	Meteoswiss, Switzerland (DVAS for UAH2021)	Added 4 Jan 21

Note : Jean-Charles Dupont took over Martial Haeffelin's duties in 2021.

Note : Larry Miloshevich left the team in November 2021.

Progress on main tasks

Justification for high ascent attainment

Task: Justification for high ascent attainment (Criteria to include NWP impact, seasonal predictability, importance of monitoring LS winds, radiative transfer calculations, satellite validation, climatology, etc.)

Main Contact: TT Radiosondes, IPET-OSDE

Due Date: (New deadline to be set at ICM-13)

Status: Ongoing, presentation at ICM-13

Milestone: Publication in the peer reviewed literature or a technical report

Progress & Issues: An ad hoc team has been formed. Masatomo Fujiwara has started to gather related information/ publications to draft outline.

Some suggestions: Check presentations at WMO Impact Workshops. Try to make a statement that is as justified as possible to provide a basis. Needs the modelling community to prove it.

Background: The goal would be to extend GRUAN radiosondes another 10 km from 20 hPa (25 km), typically 50% of the GRUAN radiosondes since 2016 reached this level, to 5 hPa (35 km), typically only 2% reached this for 2016-2020. Regarding benefits of consistently achieving 5 hPa in the context of satellite sensor validation, Tony Reale will kindly pursue a specific GSICS recommendation for the GRUAN meeting. A survey of balloon sizes used at each GRUAN site is also needed.

Additional notes: TT radiosondes to progress an analysis of the additional benefits of high altitude attainment (10hPa compared to 30hPa) with a view to arising one or more papers. Criteria to include not only climate monitoring, but also NWP impact, seasonal predictability, importance of monitoring LS winds, satellite validation, radiative transfer calculations, etc. ...GMAC discussions ...in the context of CMIP6: <https://doi.org/10.5194/essd-12-2157-2020> (the radiative kernels themselves can underestimate the adjustment if they are developed from data with a low altitude profile top.) Met Office assessing additional NWP FSOI impact of 10 hPa ascents vs 30 hPa ascents. Lack of data bit of a problem, but will look at US flight data (much more data available over US).

Standardizing cloud treatment

Task: Standardizing cloud treatment (i.e., Develop a proposal on how and when cloud observations should be taken to support the radiosonde profiles including how that information should be included in the data files. Strategy to be cognizant of existing practices and the results of the survey into site issues identified (ICM-11 Action C6, now closed))

Main Contact: TT Radiosondes, TT AM (satellites) [and TT Sites and LC]

Due Date: Presentation to be developed for ICM-13 (in particular, Tony Reale to discuss the importance of this in the context of using GRUAN in-situ to verify satellite measurements, particularly hyperspectral IR sensors).

Status: Discussions on-going

Milestone: Publication in the peer reviewed literature or a technical report

Progress & Issues: We may also need to include TT Sites and LC on this task. (because operational sites & operational radiosonde softwares usually have been collecting this type of information for many years. In the radiosonde GRUAN Data Product, this is currently considered in the uncertainty estimation.)

Background: This arose from a discussion around the heterogeneity as to whether and if so how and when cloud observations were being taken around the time of a radiosonde ascent by sites. Issues include not only how but “when” the cloud observation is taken, which is usually at the time of launch;

however with drift and the up to 1 hour ascent (through troposphere) desired information on cloudiness at a given time/height of report is not available. Also, for radiosondes targeting a given satellite, a cloud observation at the time of overpass would be of value. There was a question whether the way cloud observations were taken should be standardized and transmitted with the RSLaunchclient and whether this would help to reduce uncertainty in GRUAN products in future potentially as these cloud observations may allow better assumptions around direct, diffuse and reflected solar radiation effects upon ascents. A clear sky ascent may take different assumptions from a cloudy ascent for e.g. This really matters in heterogeneous cloud environments where e.g. the sonde may by chance ascend through a clear column which is surrounded by several convective clouds of considerable depth.

Use of descent data

Task: Use of descent data (i.e., Revisit the potential use and value of operational radiosonde descent data within GRUAN)

Main Contact: Bruce Ingleby and TT Radiosondes

Due Date: Presentation at ICM-12 by Bruce Ingleby (New deadline to be set at ICM-12)

Status: A paper manuscript is now in review in AMT:

- Ingleby, B., Motl, M., Marlton, G., Edwards, D., Sommer, M., von Rohden, C., Vömel, H., and Jauhiainen, H.: On the quality of RS41 radiosonde descent data, Atmos. Meas. Tech. Discuss. [preprint], <https://doi.org/10.5194/amt-2021-183>, in review, 2021.

Milestone: Publication in the peer reviewed literature or a technical report

Progress & Issues: This task will be closed once the paper is accepted for publication in AMT.

List of other tasks

(The primary contact for most of these tasks is the Lead Centre or other body. The Task Team Radiosonde is to help and support their work.)

Task: GRUAN Radiosonde Fundamental Technical Document

Task: Community approach paper on the GRUAN change management

Task: RS92 GRUAN Data Product (GDP) version 3

Task: RS41 GDP

Task: Meisei iMS-100 GDP version 2

Task: Modem M10 GDP

Task: Ozonesonde GDP

Task: Frostpoint hygrometer GDP

Task: QC/QA flagging and presentation in data files, the “Quality Task Force”

Task: Multi-payload configurations (for the CIMO comparison; by DWD & MeteoSwiss)

Task: Updated analysis of dual launch holdings

Task: Survey of site approaches vis-à-vis variety of radiosonde issues

Task: Standard Humidity Chamber

Task: Metrological closure of GNSS-IWV and radiosondes