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Task Team Progress Report for April 2019 – Ancillary

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Summary and Purpose of this Document

Progress report from the task team on Ancillary Measurements.

The task team on ancillary measurements oversee the production and integration of ancillary measurements, namely MWR, FTIR and ground-based lidar in compliance with GRUAN best measurement practices. Satellite observations also provide a source of ancillary measurement and their integration for use in overall validation, weather and climate applications is facilitated by the team. Co-chair. Tony Reale stepped down as Task team co-chair and Lori Borg, from University of Wisconsin - Madison, assumed the role after ICM-10 in April 2018. The remaining team is unchanged. Lori has a strong involvement in satellite instrument validation and is very familiar with Tonys work for the GRUAN TTAM. The rest of the team remains unchanged.

Lidar

Version 1 of the GRUAN Lidar Analysis Software Suite (GLASS) has been developed to a mature stage. The software can analyse large amounts of raw signals from 14 ozone, water vapor, aerosol, and temperature lidar instruments belonging to 3 networks, namely GRUAN (Payerne, Ny-lesund, Cabauw), NDACC (Lauder, Eureka, Mauna Loa, 3 x Table JPL-Mountain, 2 x Reunion Island), and TOLNet (NASA Langley, NASA Goddard, and Environment Canada). The full metadata ingestion framework required for long-term, mass-processing is now in place. More than 120 input parameters are ingested, with the option, for each parameter, to be either read in a default metadata file, or overridden using optional keywords during runtime (IDL). All parameters are instrument-dependent and time-dependent, making the analysis and re-analysis quick and versatile. The remaining components of the GRUAN Lidar Data Stream are still being finalized, as little progress could be made in 2018/2019:

1. LidarRunClient interface: No progress in 2018. A new version of the Client was produced in the second half of 2017. Technical difficulties remain in the design of the Client to make it fully compatible with the lidar investigator needs, and with the GLASS operational needs at the same time. Time commitment is critical and very difficult to find, both on the Lead Center and TTAM sides.
2. GLASS I/O in GRUAN environment: Currently, Level 0 (raw) data and Level 2 (products) are available on the data processing machine, i.e., JPL Table Mountain. Large data transfers occurred in 2018 for the processing of the lidar data from the site of Payerne, and large amount of data from the TMF lidar have been processed. However, despite inquiries (and reminders) no further data transfer was performed from the other potential GRUAN lidars (Ny-Alesund, Cabauw) due to a lack of response from the respective PIs.
3. Lidar Data Stream Technical Documentation: The document write-up is once again delayed in order to accommodate the latest functionalities of the GLASS and LidarRunClient. It is

still planned to write a full documentation (Technical Doc) within the next few months. Time commitment is again critical for this task.

Echoing the conclusion of the 2018 Report, considering the very heavy agenda of the current investigators involved in the development of the GRUAN Lidar Data Stream, it is **HIGHLY DESIRABLE** that the Lead Centre, or another organization, considers the hiring of a part-time person to work specifically on items 1) and 2) mentioned above, if one wants to see measurable progress in the year to come.

FTIR

Because of the low resolution of the technique in the troposphere, the most suitable contribution to GRUAN would be the production of a total precipitable water product. This product however is not standard for FTIR. Another application is the FTIR HDO product, providing indirect information on the transport of water vapor in the lower stratosphere. TTAM member Matthias Schneider (KIT) is the main POC for this activity.

MWR

A first version of the Best Measurement Practices and Guidelines document was released in early 2017. TTAM member Nico Cimini (University of L'Aquila) is the main POC for this activity.

Satellite

The integration of satellite data as a source of ancillary measurement for GRUAN-related efforts is a goal of the Ancillary Measurements task team. The STAR NPROVS Special has been compiling collocations of radiosonde, Satellite (EDR; polar, GPSRO ...) and NWP since 2013. These include for targeted radiosonde (JPSS funded) subsequently processed into GDP (GRUAN mini-expansion). Activities to expand (MetOp-C, GOES...) including routine access/storage of Sensor Data Record (ATMS, CrIS...) are underway. Strategies are needed on which satellites / observations to consider for LC s and best way for the Lead Centre (other agencies?) to access/ store these data. These issues will be addressed (following year) using the Radiosonde Intercomparison and VALidation (RIVAL) field campaign as a test scenario (also in coordination with GSICS).

Radiosonde Intercomparison and VALidation (RIVAL)

RIVAL is a sustained 2-year effort in which weekly dual radiosonde soundings (RS92 & RS41 on same balloon) are being performed targeting the NOAA-20 satellite. RIVAL is currently underway at the Eastern North Atlantic (ENA), North Slope Alaska (NSA), and Southern Great Plains (SGP) ARM sites. RIVAL will be used not only to assess RS92/RS41 differences at these sites, but also to assess synergy with other ancillary data streams for use in Site Atmospheric State Best Estimates (SASBE; Scheduling Task Team), subsequent validation of Satellite Temperature and H2O-vapor (EDR) retrievals and “ultimately” to monitor sensors (i.e. CrIS, ATMS and GSICS) and associated RT models. RIVAL is a joint effort involving GRUAN, ARM, and the JPSS Project; partial funding of RIVAL is leveraged from JPSS Project (Lihang Zhou...) using equipment/materials provided by Vaisala / ARM using ARM site facilities. Current overall status of RIVAL launches is shown below in the table 1.

Table 1: RIVAL launches through 05 April 2019 targeting NOAA-20

Site	ENA	NSA	SGP
Start date	26 Apr 18	26 Apr 18	13 Feb 18
Overpasses Targeted	32	12	50
Single Balloon	–	4	18
Twin Balloons	–	7	32

NPROVS Special

The NPROVS Special has operated since 2013 is the NOAA Products Validation System, which routinely compiles datasets of collocated “special” radiosonde and satellite retrieval products. The NPROVS infrastructure was upgraded to access and store RIVAL launches and collocated satellite EDR and SDR. Global distributions of radiosonde/satellite collocations for ALL special radiosondes (Top, 50,000+) and GRUAN radiosondes (Bottom, 25,000+) are “available” (see figures 1 and 2).

Goals

1. Coordinate with Scheduling Task Team to a) Schedule (i.e., when Raob in air...), b) Assess and c) Integrate ancillary data streams for use in SASBE ... start with RIVAL
2. Coordinate with the LC to facilitate access to “relevant” satellites and data from RIVAL and selected GRUAN sites ... What (data, satellites ...)? Where should it be stored? How often?
3. Coordinate with the Lead Centre wrt overpass information for the JPSS (NOAA-20) satellites to include in overpass emails sent to GRUAN sites.

Figure 1: NPROVS – Global distributions of radiosonde/satellite collocations for ALL special radiosondes (50,000+) are “available”

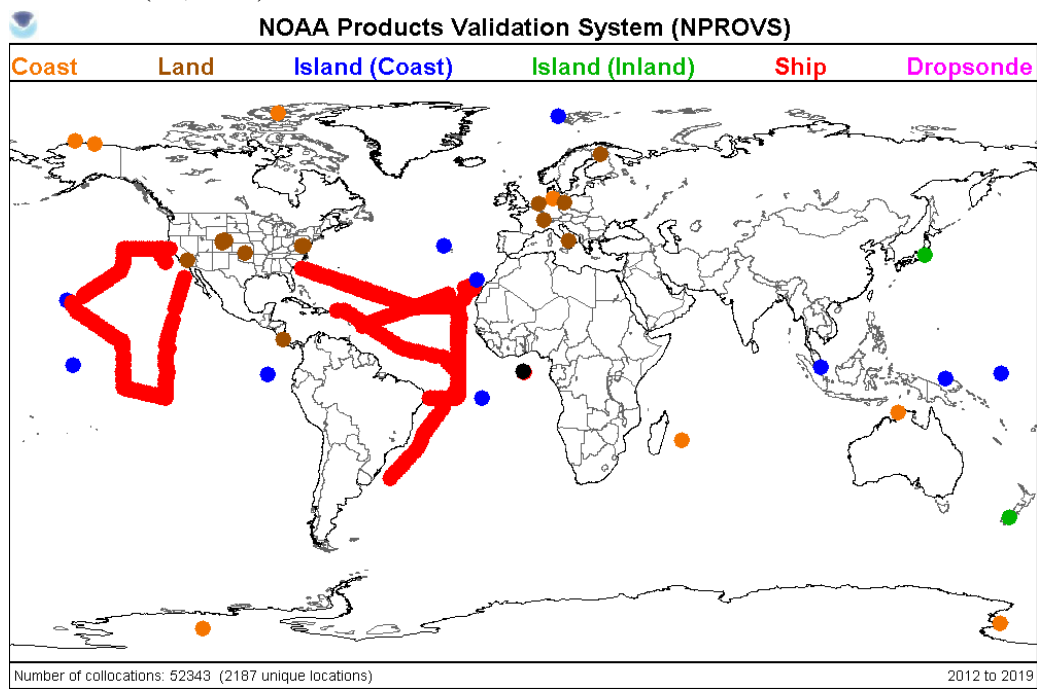
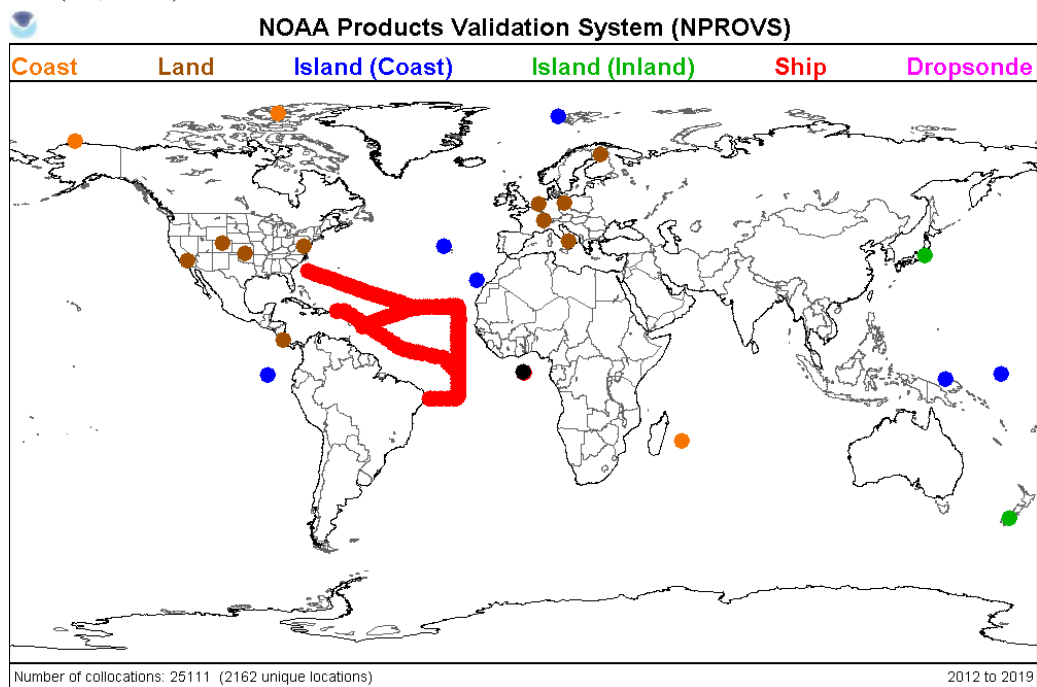


Figure 2: NPROVS – Global distributions of radiosonde/satellite collocations for GRUAN radiosondes (25,000+) are “available”



4. EUMETSAT plans to go “dedicated”! ... Coordinate with the Lead Centre wrt overpass information for the EUMETSAT satellites ... propose (recommend) EUMETSAT fly at GRUAN sites ... include in overpass emails sent to GRUAN sites.
5. Coordinate with the Lead Centre to access (process??... Holger) CFH(FPH) ... start with RIVAL (Martin Stuefer, IASI, SGP ...)
6. Consider collection of targeted satellite data from other (RO) platforms ... “golden” collocations (3G), etc.
7. Facilitate access to COSMIC-2 (when available), KOMPSAT, GRAS ...
8. Other?