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Session 1

Lead Centre progress report 01/2011

(Submitted by GRUAN Lead Centre)

Summary and Purpose of Document

Progress report from the GRUAN Lead Centre covering the period 08/2010 to 01/2011.

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Summary

The focus of the work of the lead centre during the second half of 2010 was on the preparation of the GRUAN data flow. The lead centre has developed a tool that allows the collection and forwarding of measurement data and meta-data, in particular those of complex radiosoundings. This tool was tested in Lindenberg and Sodankylä for launches of CFH-Ozone sondes and RS92-FN sondes. Currently it is in operational use at both sites for all specialized soundings and is in a testing phase at a number of other GRUAN sites (i.e. Tateno, Boulder). A second focus was on the development of a GRUAN data product from RS92 data that complies with the standards established in Immler et al., AMT, 2010. This product is now available for temperature, humidity, and wind measurements (pressure following soon) and is currently being reviewed in TT1.

The Task Teams have been established (except TT4, site assessment). Their terms of reference (ToRs) are published on the GRUAN website.

Health of network

Data from Sodankylä (Ozone, CFH, COBALD) and Lindenberg (RS92, RS92FN, CFH, Ozone, Cobald) are operationally collected and archived in the GRUAN meta-database and raw data archive.

The network is not yet operational	

Progress against stated objectives

Open items	**Summary of progress**
Develop definition for optimal GRUAN site to decide on future sites (optimal location/climate zone, institution etc.)	Not yet started. The experiences and lessons learned at the different GRUAN sites will be a key to the definition of an optimal GRUAN site. The site certification process, which has yet to be established by the task team on site certification, needs to be considered. This

	task will commence with the operational start of the network and the definition of the site certification and evaluation process within GRUAN.
Prepare a position paper on a process to manage change and optimize intercomparisons at GRUAN sites	A post related to this issue was published at the GRUAN blog and remains open to discussion.
Perform gap analysis on existing documentation (manuals) vis-à-vis the adopted skeletal GRUAN manual of operation, and provide a summary document of where these gaps are.	Not yet started.
Progress of items announced in the last report	
Publication on RS92 uncertainties.	The uncertainty analysis was extended to include uncertainty of wind. Temperature and humidity products were validated based on data from the CIMO intercomparison and other campaigns. Currently the documentation is drafted and the publication will follow soon.
Suitability Meisei Temperature Reference sensor for GRUAN is tested in Lindenberg.	The MTR was tested in Lindenberg in November 2010. Twelve flights of MTR were launched using different configurations. Due to its fast response MTR is useful for assessing the influence of contaminations on temperature uncertainty.
Task teams start working	All task teams except TT4 have been established. ToRs are published on the GRUAN website.
Preparation of ICM-3	The LC is preparing ICM-3 in co-operation with local organizers and the head of WG-ARO.
Contributions to the CIMO report on the Yangjiang intercomparison	Reports on humidity and temperature from the scientific sounding instruments (SSI) of the CIMO intercomparison are currently drafted and will be discussed in a meeting at UK MO in February 2011.
Items from ICM-2 relevant for LC	

3. Formulate Task Teams, which report to WG-ARO on semi-annual basis; agree on ToRs. (July 2010)	The task teams are established. The terms of reference have been published on the GRUAN website. Exception is task team 4 on site assessment which is without chair. This issue needs careful consideration at ICM-3.
6. Agree a protocol for dealing with any site offers arising in the interim.	Not yet started.
8. Explore the possibility to publish GRUAN metadata congruent with WIS metadata standards.	Done. GRUAN meta data can be provided for WIS.
9. Explore the possibility to disseminate near real-time data via the WMO Information System (WIS) including the Global Telecommunication System (GTS) using existing infrastructure existing connections.	As far as the required infrastructure at the site is available, real-time data produced along with GRUAN measurements (e.g. TEMP or BUFR files produced by radiosonde ground stations.) can be provided using WIS and/or GTS.
10. Agree and implement data usage acknowledgement protocol.	To be done.
11. Investigate the potential for tracking of data usage.	The data dissemination configuration currently planned at NCDC does not provide the possibilities for user tracking. In order not to set up additional technological and administrative barriers for the GRUAN data flow, we suggest not to insist on user tracking at least for the initial phase of GRUAN. However, users should be encouraged to register. This will allow to inform them when new version of data products are available
12. Define data reprocessing and version control procedures.	The entire GRUAN data flow is designed to allow for reprocessing of data at any stage and at any time. Version control is one of the key features implemented in the structure of the data- and meta-data base.
13. Develop a case study for the measurement uncertainty guide focusing on in situ observations	Underway; paper to be submitted by ICM-3.
14. Develop generic outreach material, a ppt-presentation and a brochure	Brochure has been created by the GCOS secretariat in co-operation with WG chair and LC and is currently in print. Apresentation about GRUAN is available at

	website (material pool).
15. Publish and maintain an inventory of GRUAN site instrumentation (maps, table)	Done, the inventory of all GRUAN sites is available at the webpage.
16. Implement final version of data dissemination structure (2011)	Under way.

Achievements

- Data from the **CIMO radiosonde intercomparison**, which took place in Yangjiang, China from 12/07 to 31/07/2010, has been analyzed in co-operation with Junhong Wang and Masatomo Fujiwara (CIMO-SSI-team). The tropical conditions impose challenges for all sensors. The CFH often showed unwanted oscillation that need to be corrected for and also suffered from contaminations. However, generally comparisons of water vapor show good agreement in the lower and middle troposphere. In the upper tropical troposphere larger discrepancies occur. Vaisala operated a new software version in the DigiCORA III (v3.64) that includes time-lag and radiation correction of the RS92 humidity data. This product compares very well with CFH data in the upper troposphere. The RR01 DryCap sensor on the other did not work properly in Jangjiang and did not produce useful data. Temperature measurements of the SSI payload generally compare well during night and daytime and lie within the expected uncertainty ranges.
- **Collection of raw and meta-data** from some sites is operational. Lindenberg reports all relevant meta-data from routine (RS92) and specialized radiosonde launches (CFH, COBALD, RS92FN and Ozone). Sodankylä reports its weekly ozone sonde launches. All meta-data of these launches are stored in the GRUAN meta-database (GMD). All raw data are archived in Lindenberg in a raw data archive. The operational compilation of GRUAN data products from RS92 and CFH data is in its testing phase, as is the data dissemination through NCDC.
- In the frame of a research stay of Kensaku Shimizu (Meisei Co. / University of Sapporo) a campaign was conducted in Lindenberg in November 2010. A number of **"Meisei Temperature Reference" sensors (MTR)** were launched together with routine RS92 in different configurations. The MTR sensor is a very thin tungsten wire that has a very low (< 20 ms) time constant. In the configuration with the Meisei RS06-G radiosonde it provides a temperature profile with 6 Hz temporal resolution. Owing to this fast detection small temperature fluctuations are visible in the data, most of which are caused by contamination of air that was heated (or cooled) by the rigging or the balloon. Experiments were carried out with different lengths of the unwinder string and different geometric configurations. The goal of this campaign was the assessment and minimization of the influence of such contaminations.
- The **GRUAN RS92 data product** now involves an uncertainty analysis for wind measurements. The temperature and humidity products have been improved and validated using data from the CIMO intercomparison, the LapBiat campaign in

Sodankylä 2010 and from Lindenberg. The product will be submitted to the task team on radiosondes for review and discussion in the near future and later to a peer reviewed journal (e.g. AMT).

- Formation of the **task teams** except for task team 4 is accomplished.
- The **GRUAN manual** was drafted in co-operation with Greg Bodeker. It describes the following aspects of GRUAN:
  - Purpose and scope of GRUAN
  - Organization and design of GRUAN
  - Implementation of GRUAN
  - Requirements for observational data
  - GRUAN stations
  - Equipment and methods of observation
  - General requirements of a GRUAN station
  - Network design
  - Management of GRUAN stations
  - Establishment of a new station
  - Instrument checks and maintenance
  - Network performance monitoring
  - Station meta-data
  - Data quality control
  - Procedural aspects of quality control
- The lead centre is organizing the **GRUAN Implementation and Coordination Meeting** (ICM-3) in Queenstown in co-operation with the local organizers and the head of WG-ARO.

Lead Centre operations

- Stay of Greg Bodeker in Lindenberg (one week in September and one week in December 2010) → drafting the GRUAN manual.
- LC arranged a MTR campaign with Kensaku Shimizu (Meisei) in Lindenberg in November 2010.
- Report on the LUAMI intercomparison at TECO 2010 in Helsinki. (31/08 – 02/09/2010).
- Site visite at Sodankylä station in September 2010 → operation of CFH/Cobald sondes, installation of GRUAN protocol and data transmission, installation of a water vapor Raman LIDAR (in co-operation with AWI Bremerhaven).
- Participation at the ISSI workshop on **"**Critical Assessment and Standardized Reporting of Vertical Filtering and Error Propagation in the Data Processing Algorithms of the NDACC Lidars" (http://www.issibern.ch/teams/ndacc/).
- Development of the RsLaunchClient (RLC) for collecting all relevant meta-data and data of any kind of radiosonde launch.
- Optimization of the data flow and usage of RLC in co-operation with some sites

(Lindenberg, Tateno, Sodankylä and Cabauw).

- Start of the GRUAN data flow from LC to NCDC and to/from ARM.
- Optimization of the automatic processing of GRUAN data flow within the lead centre:
  - Import of launch protocols to meta-database
  - Archiving of raw data files incl. backup at 2 locations
  - Optimization of converting of RS92 data files (DC3DB) to netCDF
- Developed a first version of a meta-database browser as a website (currently only for local use at Lindenberg).

Work plan for next six months

- Organization and attendance on ICM-3.
- Data flow starts for most initial sites (radiosondes).
- Planning for data flow for products other than those from radiosoundings.
- Development of reporting system.
- Start of data-dissemination through NCDC.
- Web-Access to GRUAN meta-database.
- Uncertainty analysis for pressure, geopotential height and geometric height from RS92 raw data.
- Publication of RS92 GRUAN data product documentation.