

Bringing priority 2 variables into GRUAN

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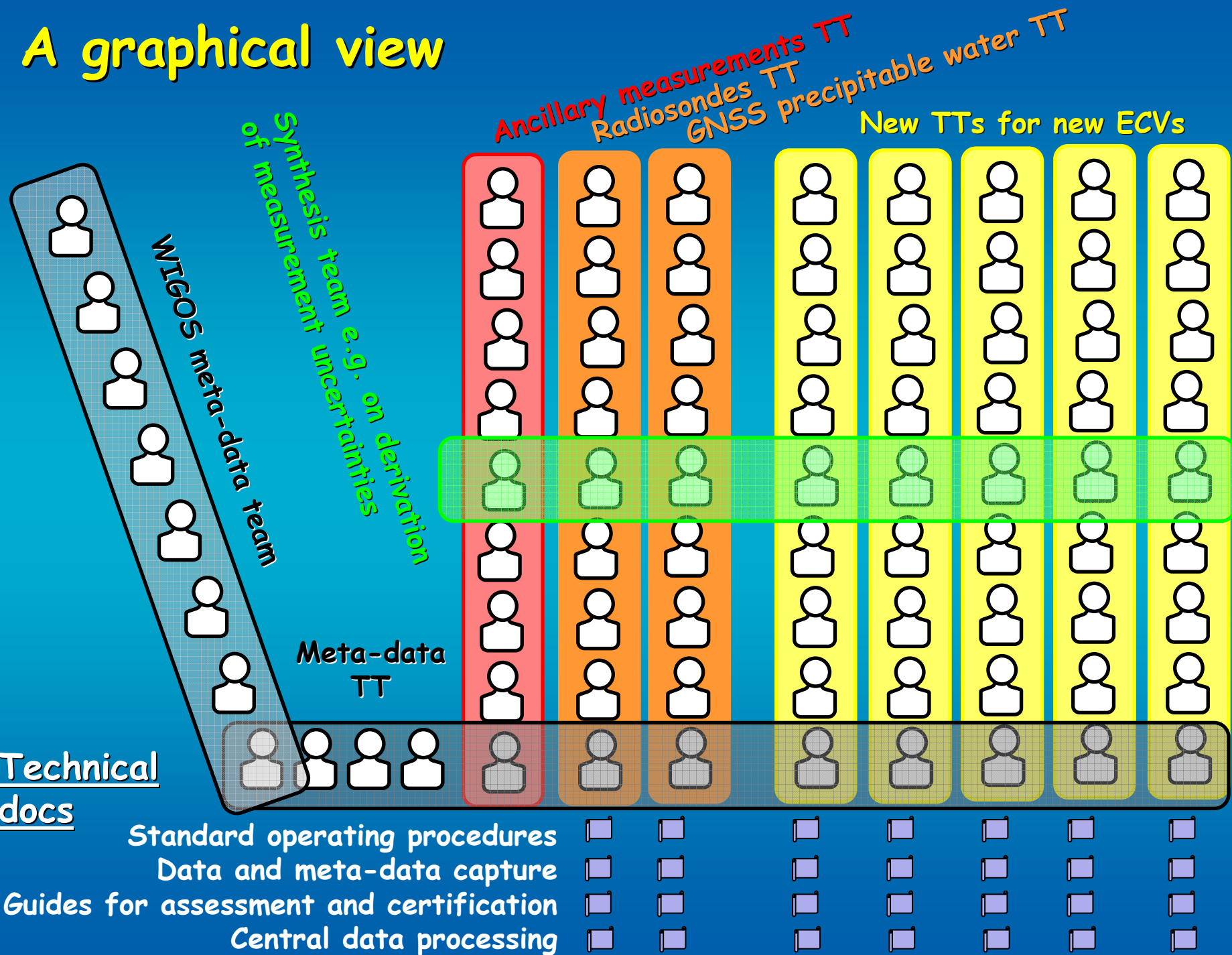
Overview

- Introduction
- Requirements
- Technical documents
- Procedures, roles and responsibilities

Introduction

- Emphasis to date has been on priority 1 variables.
- A fully functioning GRUAN, serving all envisaged purposes, will require measurements of all ECVs listed in GCOS-112.
- The procedures and requirements for expanding the capabilities of GRUAN recognize the heterogeneity of the network and that not all target variables are likely to be observed at all stations.
- To achieve consistency and homogeneity of data products both at individual GRUAN sites and across the network as a whole, it is essential that the procedures developed to bring new ECVs online within GRUAN provide an end-to-end solution that details the collection of raw data and associated metadata, the processing and quality assurance of those measurements, and the provision of the data products to the GRUAN user community.

A graphical view



Requirements

A task team:

- Provide scientific basis and oversight to bring new ECV online in GRUAN.
- Write Technical Documents.
- Should include one member of Lead Centre, one member of the Ancillary Measurements TT, a representative of the central processing facility for that ECV, at least one internationally recognized instrument expert for each of the instruments likely to provide measurements of the ECV of interest, and other members of the international community with expertise in the processing, quality control and interpretation of the resultant data.
- TT remains in effect only in the lead-up phase prior to those data products flowing to users through the GRUAN data archive.

Requirements

Central processing facility: Processing raw data collected at GRUAN sites at a single centralized processing facility is essential to ensure homogeneity of measurement time series at each GRUAN site and to ensure homogeneity of the data product across the network. Centralized data processing facility will implement data collection, quality assurance, processing and dissemination protocols defined in the technical documents developed in consultation with the task team.

Technical Documents

Standard operating procedures:

- Required for each instrument.
- Key to achieving homogeneity of GRUAN data product.
- Archived at the Lead Centre and provided to each GRUAN site operating that instrument.
- Work with partner networks
- Sites are required to document where they have deviated from prescribed standard operating procedures.
- Audit includes ability and willingness to adhere to the standard operating procedures.
- How instrument meets requirements in terms of information content, instrument heritage, sustainability, calibration, robustness of uncertainty, manufacturer support and site location.
- Describes measurement scheduling under guidelines in guide.
- Includes detailed description of how any changes in instrument type, operating procedures, data processing algorithms, instrument operators, location of instruments, and operating environments for instruments are managed

Technical Documents

Data and meta-data capture:

- Describes process for capturing raw data from each measurement, meta-data associated with each measurement, and meta-data associated with measurement programme.
- Requirements guide development of software tools developed by central processing facility (e.g. the RSLaunchClient and LidarRunClient).
- Requirements must be specified in complete detail including field types (scalar/vector), descriptors, units etc..
- Essential that meta-data associated with site and measurement programme as a whole, and in particular change events, are captured.
- Requirements for meta-data capture will guide development of the necessary tools (e.g. the IGLIMP for lidar metadata capture) by the central data processing facility.

Technical Documents

Guidelines for assessment and certification:

- Individual measurement programmes are assessed and certified for inclusion in GRUAN.
- TD defines criteria against which that assessment and certification takes place.

Technical Documents

Central data processing

- Defines how PRD and CRD streams, and including meta-data, from individual sites are processed to generate the Standard GRUAN product data (e.g. GLASS for lidar operation).
- Includes description of
 - all data processing algorithms
 - calibration procedures and mechanisms for ensuring traceability of measurements to fundamental calibration standards
 - data correction and homogenization algorithms
 - procedures for describing and/or analyzing all source of measurement uncertainty
 - procedures for quantifying and/or synthesizing all sources of measurement uncertainty
 - and procedures for verifying measurement uncertainty
- Includes description of triggers that signal need for reprocessing.
- Includes thorough description of methods for QA/QC.

Technical Documents

Creation of GRUAN product:

- Details any additional processing required to create Standard GRUAN Product Data.
- Details how Integrated GRUAN Product Data are generated from SGPD. In particular, use of IGPD to generate SASBEs
- Includes full description of contents and structure of data files used to disseminate data to users.

Procedures, roles and responsibilities

- Process of activating the generation of a new GRUAN data product begins with WG-ARO, in consultation with Task Team on Ancillary Measurements, possibly constituting a new task team.
- Lead Centre selects centralized GRUAN data processing facility.
- Task team develops technical documents. Done in close consultation with the central data processing facility. TDs are reviewed under GRUAN protocols for TD review.
- Once finalized TDs are circulated to those sites proposing to provide measurements of that ECV.
- Raw data and meta-data then flow from GRUAN sites to the central data processing facility.
- Followed by generation of SGPD and IGPD.
- Task team reviews data products before they are disseminated.
- Central processing facility processes historical data that might be available from GRUAN sites so that time series are extended backward in time.