WMO Observing Systems
&
GRUAN
Standard Procedures

1st GRUAN ICM, 2-4 March 2009

Dr John Nash, President of CIMO

Dr M. Ondráš, WMO, Chief, Observing Systems Division

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Outline

How GRUAN should be incorporated in the below WMO Regulatory Material if implemented as a WMO Observing System:

- **Manual on the GOS,** (WMO-No. 544)
- **Guide on the GOS,** (WMO-No. 488)
- **CIMO Guide,** (WMO-No. 8)

GRUAN text to be included in:

Manual on the GOS

(WMO-No. 544)

Annex V to WMO Technical Regulations

Manual on the GOS
Volume I – Global Aspects

Part I: General principles

- Purpose of GRUAN
- Organization and Design of GRUAN
- Implementation of GRUAN

Part III: Surface-based Subsystem

- Composition of GRUAN
- Implementation of Elements of GRUAN
- Equipment and Methods of Observation applied for GRUAN

Volume I – Global Aspects
Part III: Surface-based Subsystem

Composition of the Subsystem

- Insert GRUAN under Climatological stations (GUAN)

Implementation of the Subsystem

- Networks of observing stations
  - Insert GRUAN
- Observing stations
  - Insert description and Members' obligation relevant to GRUAN
  - Location and composition of GRUAN (spacing, obs. Programme),
  - FRQ and timing of GRUAN observations

Volume I – Global Aspects
Part III: Surface-based Subsystem

Equipment and Methods of Observation

- General requirements of a GRUAN station
  - (e.g., siting and exposure, calibration, inspection, observers, etc.)
- General requirements of GRUAN instruments
  - (e.g., comparison and traceability)
- GRUAN observations
  - (e.g., details on how measurements and observations should be made for defined variables)

GRUAN text to be included in:

Guide on the GOS
(WMO-No. 488)

Part III: The Surface-based subsystem

- **Design of GRUAN network**
- **Planning of GRUAN network and stations**
- **Management of GRUAN network:**
  - Administrative arrangements and operational tasks,
  - Staff,
  - Logistics and supplies,
  - Establishment of new station,
  - Regular inspections,
  - Procurement of instruments,
  - Instrument check, maintenance, calibration,
  - Coordination, planning and budgeting,
  - Network performance monitoring.

Part III: The Surface-based subsystem

- **GRUAN Stations:**
  - Siting and location,
  - Observing & measurement area,
  - Premises;
  - Station staff,
  - Staff training,
  - Station identification,
  - Telecommunications,
  - Quality standards,
  - Data processing and archiving,
  - Etc.

GRUAN text to be included in:

Guide to Meteorological Instruments and Methods of Observation (CIMO Guide)

(WMO-No. 8)

Part I, Chapter 12
Measurement of upper air pressure, temperature, humidity

Insert text relevant to GRUAN into chapters:

12.1 General (Definitions, units, requirements, methods of measurements)
12.2 Radiosonde electronics
12.3 Temperature sensors
12.4 Pressure sensors
12.5 Relative humidity sensors
12.6 Ground station equipment
12.7 Radiosonde operations
12.8 Errors of radiosondes
12.9 Comparisons, calibration, maintenance
12.10 Computations and reporting procedures

Part II, Chapter 5
Special profiling techniques for the boundary layer and the troposphere

Insert text relevant to GRUAN into chapter:

5.2 Ground-based remote sensing techniques

- Acoustic sounders (sodars)
- Wind profiler radars
- Radio-acoustic sounding systems (RASS)
- Microwave radiometers
- Laser radars (lidars)
- Etc.