WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

Hydrological data, standard and quality

Tommaso Abrate, Scientific officer
Climate and Water Department

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World Meteorological Organization
Organisation météorologique mondiale

Role of WMO in the field of Hydrology and Water Resources

WMO Convention

Art: 2(e) : "to promote activities in operational hydrology and close co-operation between Meteorological and Hydrological Services"

Hydrology and Water Resources Programme

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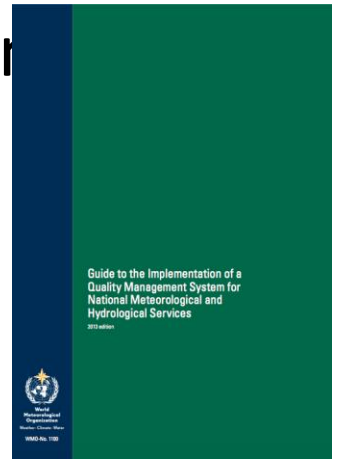
Operational Hydrology

is the real-time and regular measurement, **collection, processing, archiving and distribution** of hydrological, hydrometeorological and cryospheric data, and the generation of analyses, models, forecasts and warnings which inform water resources management and support water-related decisions, across a spectrum of temporal and spatial scales. Operational hydrology requires capacity building and scientific and technical advancement and innovation in the areas of observation, data **standards** and services, modelling, prediction, hydro-informatics and decision support, communications, training, and outreach.

Quality Management Framework

- **Quality is essential**
- Embedded in all system components
- Data are compatible, comparable and of known quality
- Impacts on information and knowledge quality
- Strengthen users's confidence in data, products and services quality
- Makes users aware of inherent uncertai
- National implementation
- No need for formal certification
- **Cost of quality vs cost of lack of it**



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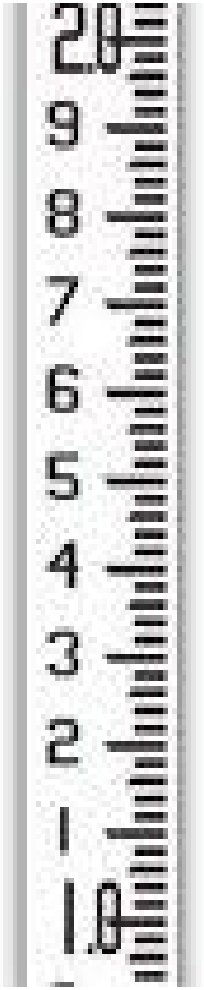
Standards

- *What's the best way of doing this?*
- A document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose (ISO)



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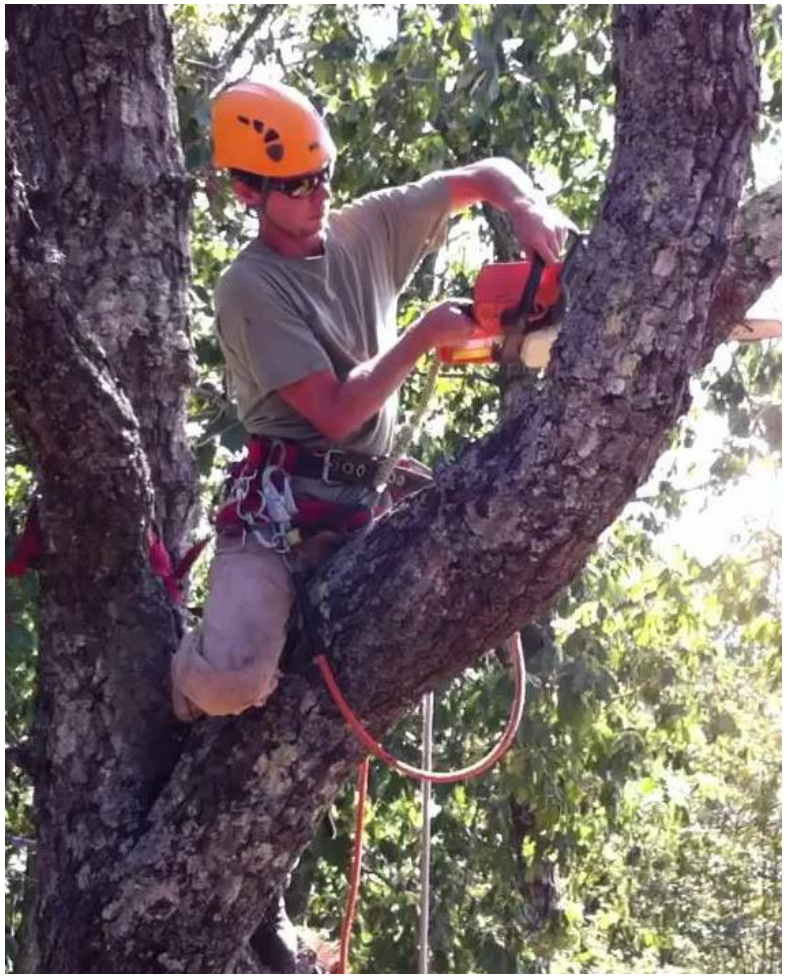
Right vs wrong way of doing things



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In WMO practice

- **It shall be possible to determine the position of a fully automated mobile sea station.**
- **Weather radars shall be located in such a manner as to minimize interference from surrounding hills, buildings and electro-magnetic sources…**
- **Members shall ensure that measurement systems and instruments are calibrated regularly in accordance with adequate procedures for each type of system and instrument …**

Ensuring compatibility and comparability

In WMO practice

- **The main standard times for surface synoptic observations shall be 0000, 0600, 1200 and 1800 UTC.**
- **The snow depth or the thickness of ice cover shall be reported in *sss*, in accordance with Code table 3889.**
  - 000 Not used
  - 001 1 cm
  - etc. etc.
  - 996 996 cm
  - 997 Less than 0.5 cm
  - 998 Snow cover, not continuous
  - 999 Measurement impossible or inaccurate

Standards and recommended practices

Standard practices and procedures	**Recommended practices and procedures**
Necessary	Desirable
Uniform application by member is essential	Not compliance is not harmful in the short term
Shall	**Should**
Requirement	Recommendation
Art 9 applicable	Art 9 non applicable

Members *shall do their utmost* to implement the *standard* practices and procedures

WMO regulatory framework

- Technical Regulation
- Guide to Hydrological Practice
- Manual
- Guidelines and technical documents

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WMO Manuals

- International Glossary of Hydrology
- Manual on Stream Gauging
- Manual on flood forecasting and warning
- Manual on estimation of Probable Maximum Precipitation
- Manual on Low-flow Estimation and Prediction
- Guidelines on the role, operation and management of National Hydrological Services

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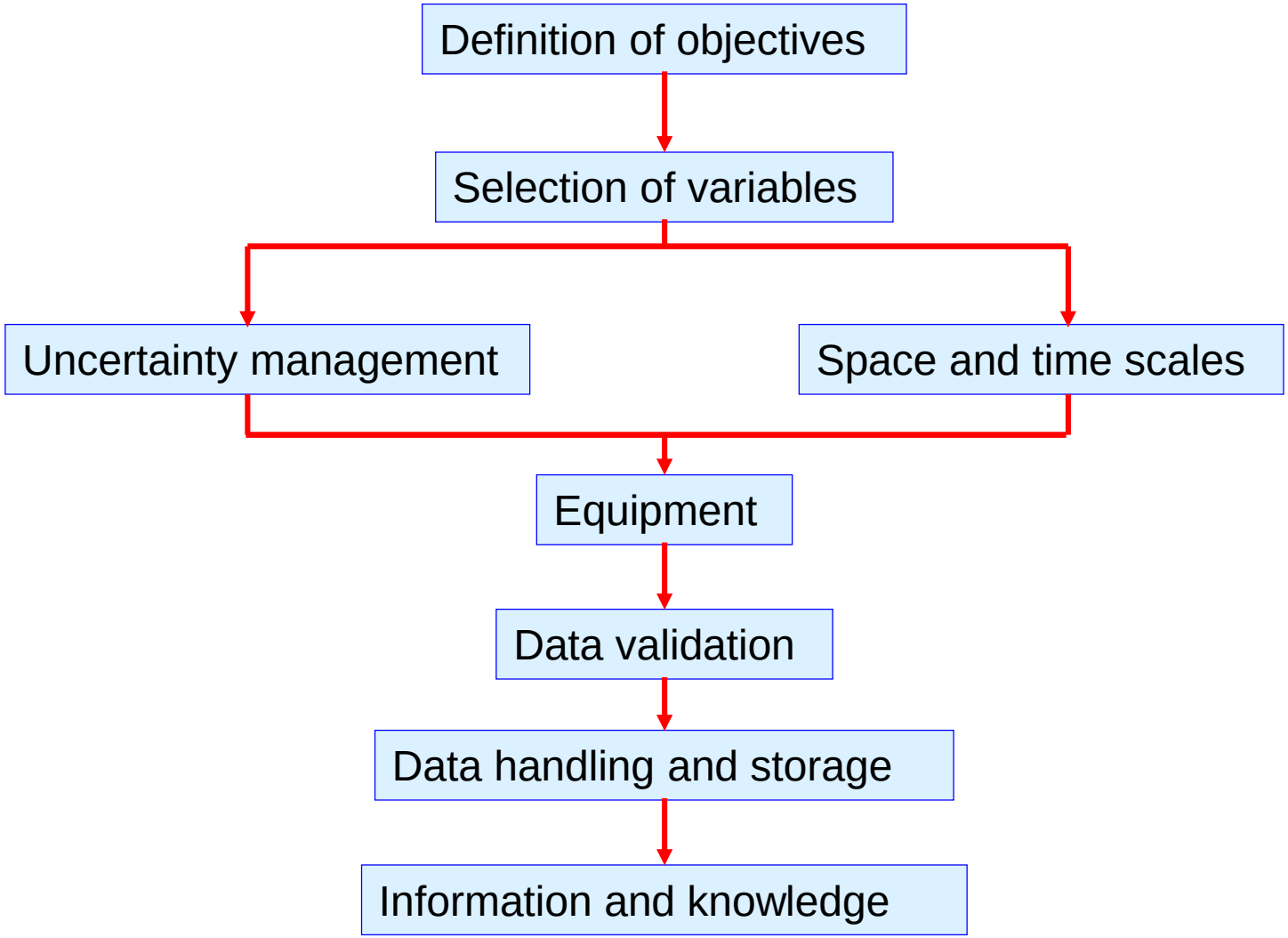
Other guidelines

- Climate and Meteorological information requirements for water management
- Technical Material for Water Resources Assessment
- Planning of Water Quality monitoring systems
- Guidelines for Hydrological Data Rescue
- Guidelines on environmental flow
- Guidelines on Water Resources Assessment

- WHOS

Aspects of data quality



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Monitoring objectives

Goal: acquiring knowledge on something in order to manage it

- What do we want to know?
- What for?
- What level of uncertainty can be accepted?
- How much would it cost?

Network design

Hydrological stations for basic streamflow data.

a. Principal hydrological stations, (primary stations)

b. Secondary hydrological stations

2. Special Gauging Stations

a. Inventory outflow from a basin

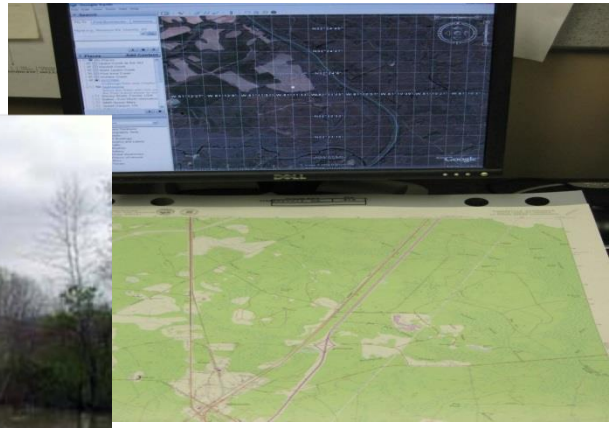
b. Management of a project

c. Fulfill legal requirements

d. Design of a project

Network Design Considerations

- Use available resources to recon possible locations
- Multiple criteria must be evaluated when locating a gauging station



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Network Design Considerations

- Tailored to the drainage characteristics
- Consider also planning and future development
- Regular evaluation

Network Design Considerations

- Basic pragmatic approach
- Maximize regional information within a limited budget
  - Cartographic analysis
  - Statistical methods
  - Enthropy and information theory
  - Physiographic analysis
  - User survey

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Network Design Considerations

- Mix of design criteria (hybrid methods)
- Solutions are always “grey”
- Robust against an uncertain future

Data validation

It is not an option

- All data, all measurements
- Two phases
  - Detection
  - Diagnostic
- Local and global level
- Calibration
- Keep records

Data handling and storage

Going back to old data is one of the most common activities in hydrology

- Portability of data formats
- Lifetime of data and storage system
- Data integrity and security

What is MCH?

Data Base Management System (DBMS)

MCH stands for **M**eteorological, **C**limatological and **H**ydrological data base management system (DBMS).

What is a DBMS?

"A **Data Base Management System (DBMS)** is a computer program (or more typically, a suite of them) designed to manage a database, a large set of structured data, and run operations on the data requested by numerous users." (source :From Wikipedia, the free encyclopedia)

For whom?

- NMHSs looking for a simple, customizable and license free solution to store, analyze and generate reports and maps on large amount of data.

Advantages

- **OPEN SOURCE** based (No license fees, Not a “black box”)
- **A configurable system** (you define your variables and stations etc.), and allows you to connect external modules
- **Manages** Hydrological, Climatological and Meteorological **data under a unique platform**
- **Multilingual**, using an external text file, currently available in Spanish, English and French
- **Minimum system requirement**

Conclusions

- Data quality is essential
- Embedded in each element of the system
- Reflects in the quality of information and knowledge

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Thank you
Merci
Hvala
Благодарам
Faleminderit

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