Introduction to WIGOS Data Quality Monitoring System (WDQMS) concept and functions

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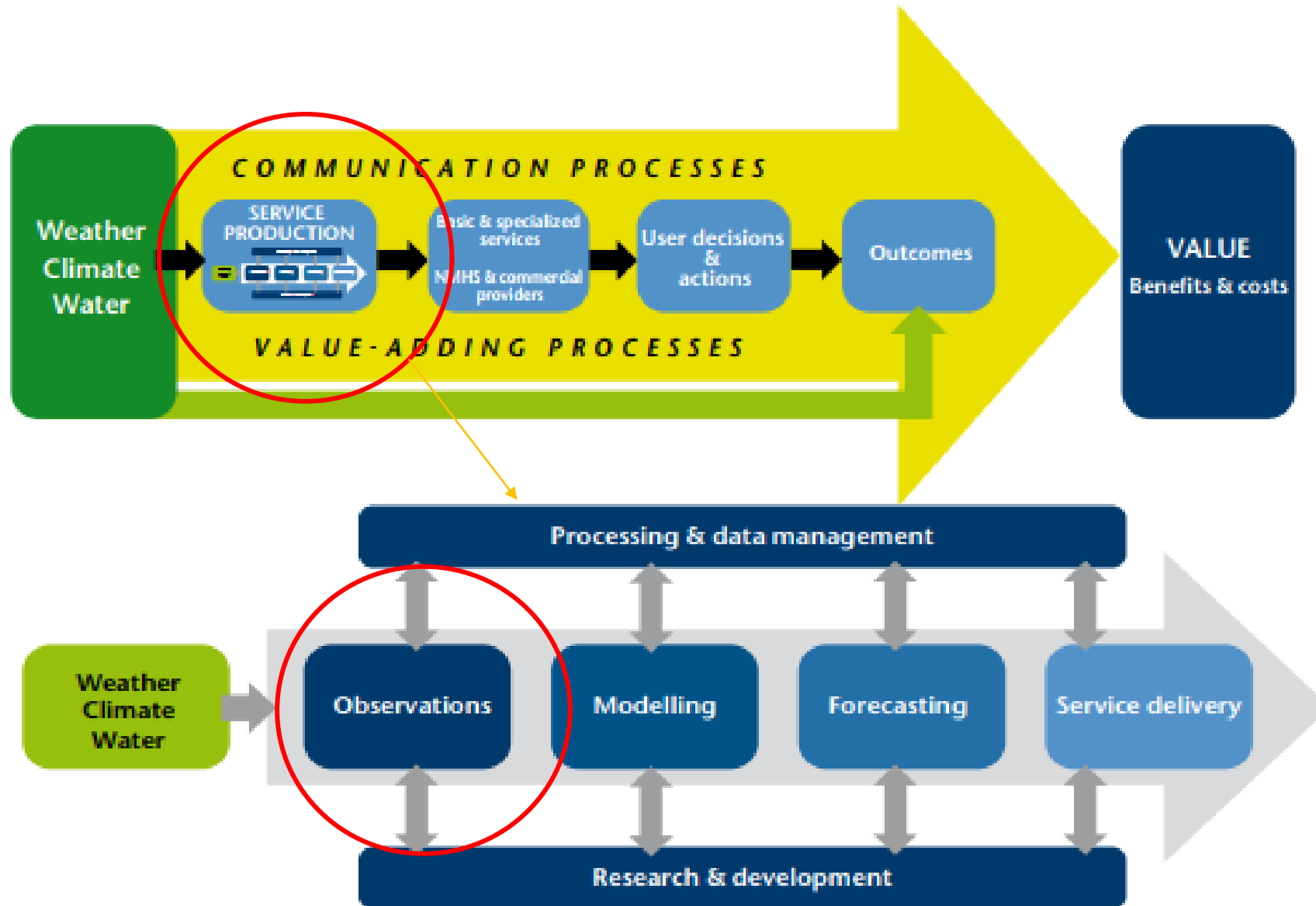WIGOS Branch, Observing Networks and Measurement Division
Acknowledgements: Tanja Kleinert, Ercan Buyukbas

Outline

- Why?

  - Value Chain and Quality of Weather Observations

- What?

  - WDQMS concept and functions

- Data availability and data quality issues

Observations in the Meteorological Value Chain

Observations data and their "quality"

- The overall **purpose of taking weather and climate observations** (and others) is to provide information in sufficient detail to meet the users requirements, to ultimately contribute to safety and well being of the people and goods.

- Need to ensure that, **efforts** are made to acquire, transmit, and archive observations with the greatest precision and consistency possible.

- However, observed data can be subject to **failures and/or errors** (e.g. due to human intervention, equipment failures, issues in the data processing, coding, or transmission).

- Various means are used to assure data "**quality**" and availability.

Observations data and their quality

National observing stations

Data transmission from site to NMHS Data Centre or Headquarter (HQ) Office

NMHS HQ

GTS/WIS
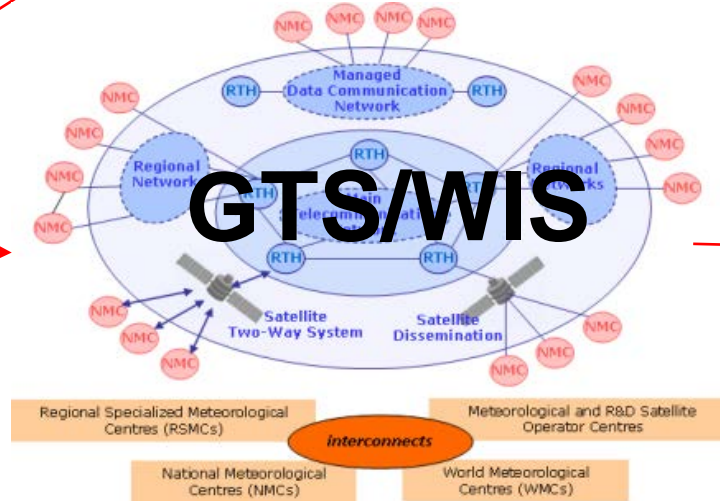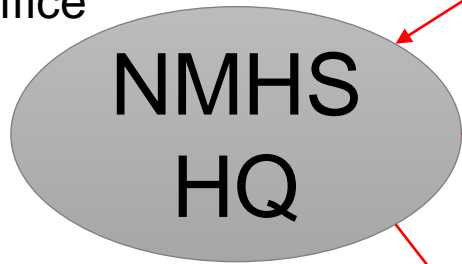
WDQMS starts here ❗

International users
e.g. global NWP centres

ECMWF

NCEP

DWD

気象庁
Japan Meteorological Agency

International exchange to be indicated in

OSCAR Observing Systems Capability Analysis and Review Tool

The WDQMS Webtool

- A web based tool for **near-real time monitoring the availability and quality** of observations **exchanged internationally**
  - Land surface and upper air observations (near-real-time NWP)
  - Surface and upper air observations of GCOS
  - Surface and upper air GBON observations
- One of the **WIGOS Tools**, critical for WIGOS implementation/operations
- Operational since March 2020
- Under evolution based on requirements and expansion of the observing systems/observations to be monitored
- Several new releases expected per year
- Current release 1.4.3
- https://wdqms.wmo.int
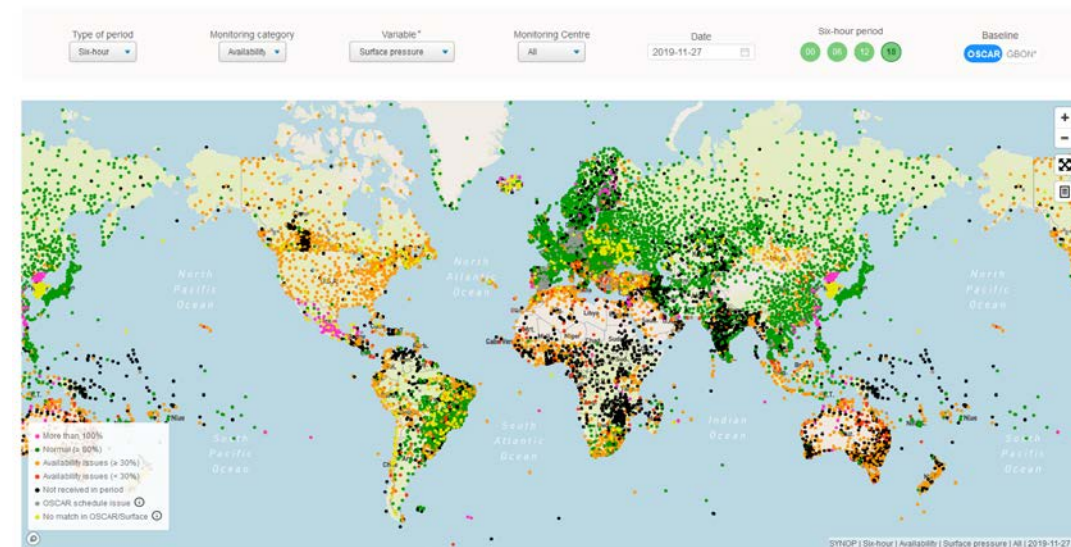
The WDQMS Webtool

- **Surface land observ. (availability & quality)**
  - *Surface pressure /geopotential height*
  - *Air temperature (2m)*
  - *Relative humidity (2m)*
  - *Wind (10m)*

- **Upper air observations (availability & quality)**
  - *Air temperature*
  - *Relative humidity*
  - *Wind*

- **Completeness of surface land observations (GCOS)**
  - *Pressure*
  - *Temperature*
  - *Max and min temperature*
  - *Water vapor*
  - *Precipitation*
  - *Sunshine duration*

- **Quality of upper air land observations (GCOS)**
  - *Pressure*
  - *Temperature*
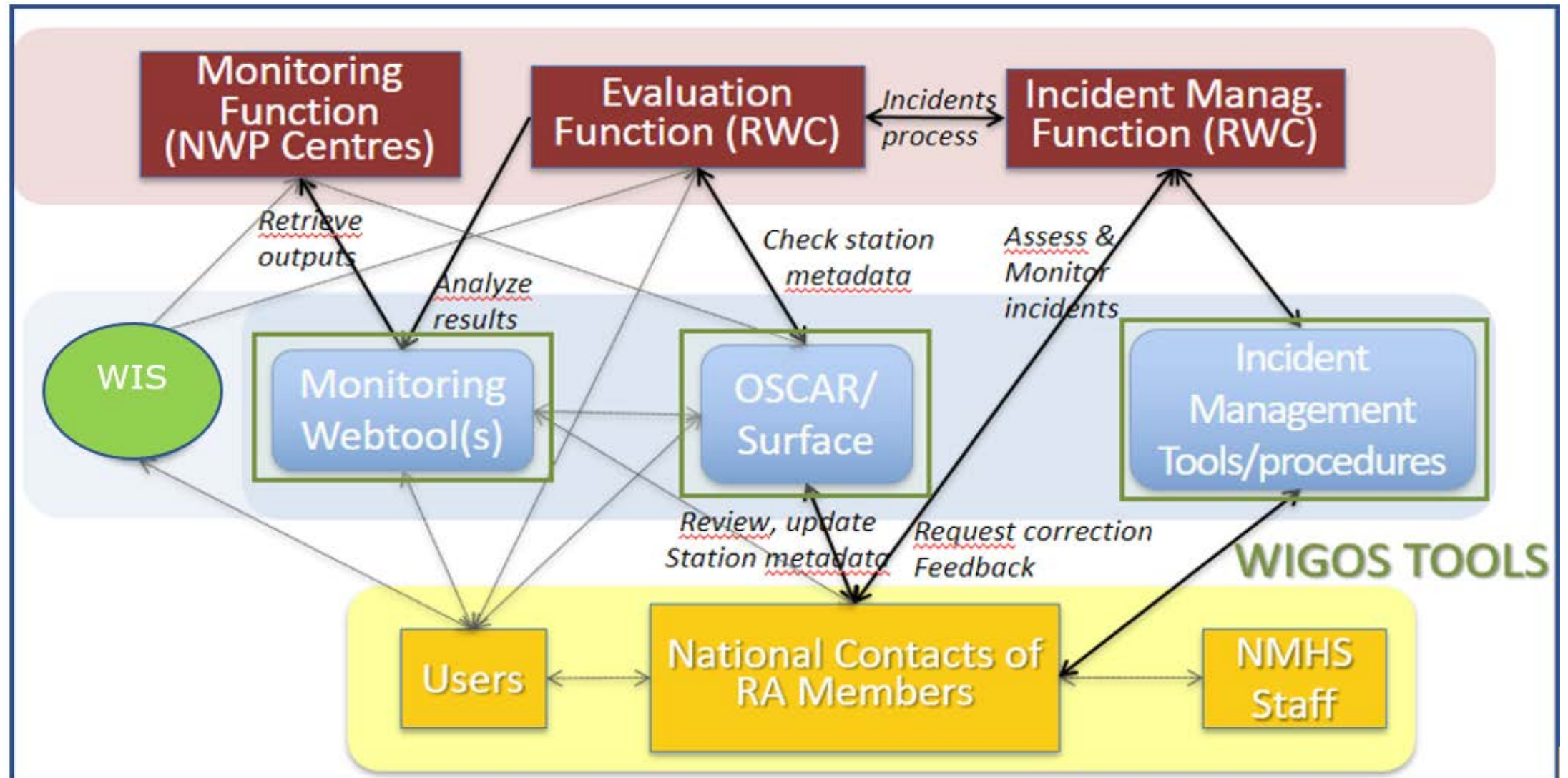 - *Humidity*

- **GBON stations monitor. (surface availability)**
  - *Surface pressure /geopotential height*
  - *Air temperature (2m)*
  - *Relative humidity (2m)*
  - *Wind (10m)*

- **GBON stations monitoring (upper air)**
  - *Complete soundings*

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The WDQMS Process

The WDQMS functions

- The WIGOS **monitoring function** - WIGOS Monitoring Centres (Global NWP Centres: ECMWF, NCEP, JMA, DWD):
  - provide daily monitoring reports (availability/quality/completeness)
  - provide input to the WIGOS evaluation function
- The WIGOS **evaluation function** generates routine performance reports on the basis of the relevant information
  - From the daily monitoring reports
  - From metadata about the observing stations, from the Observing Systems Capability Analysis and Review (OSCAR)/Surface tool,
  - From the WMO Information System (WIS)
- The WIGOS **incident management function**
  - takes up the issues that the evaluation function raise as incidents, and follows up actions with the data supplier to resolve the incident

WDQMS outputs as part of the WIGOS monitoring and evaluation functions (examples for surface pressure)

- The webtool displays maps of **monitoring** outputs from Monitoring Centres allowing to evaluate the stations performances within a RWC´s responsibility

- It serves as part of the WIGOS **evaluation** function by aggregating the performances on a daily basis or in time series

Data availability

- 🟣 More than 100%
- 🟢 Normal (≥ 80%)
- 🟠 Availability issues (≥30%)
- 🔴 Availability issues (<30%)
- ⚫ Not received in period
- ⚪ OSCAR Schedule issue
- 🟡 No match in OSCAR/Surface

Data quality

- 🔴 Very high O-B
- 🟠 High O-B
- 🟡 Moderate O-B
- 🟢 Small O-B
- 🟢 Very small O-B

Thank you
Gracias

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