

WIGOS Data Quality Monitoring System (WDQMS)

And the Demonstration Project in RA I
The Plan, Status and First Results



WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

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Outline

- I. The Concept and Main Functions
- II. The Demonstration Project in RA I
 - Rationale (objectives, participants, timeframe)
 - Monitoring tools
 - Incident Management tools/procedures
 - Phases and their status
 - First results
- III. Next Steps

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WDQMS - The Concept (1)

- Real-time monitoring of data availability and data quality:
 - searchable by region, country, station type, period, etc.
- Monitor regional and national performance of all WIGOS components
- Delayed mode monitoring of data quality as measured against reference sources of information.
- Incident management system for tracking and mitigation of performance issues.
- Demonstration project in RA I, started July 2016 (KMD, TMA, ...)

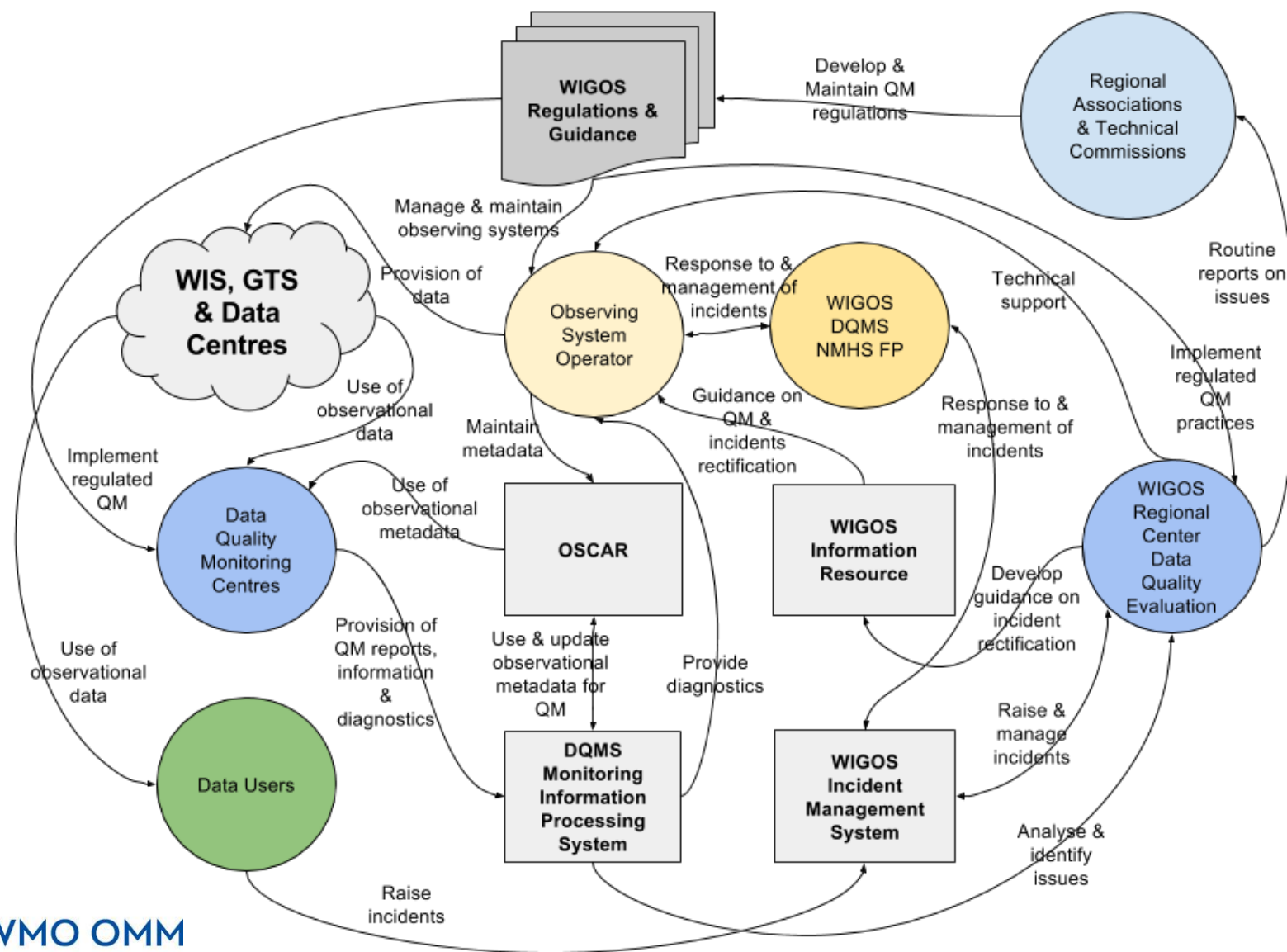
WDQMS - The Concept (2)

- Key priority:
 - development of a modern and efficient performance monitoring and reporting system
- Essential for:
 - measuring the effectiveness and impact of WIGOS,
 - developing **robust practices** leading to improved data quality & availability.
- An ICG-WIGOS TT on WDQMS, with initially CBS experts:
 - focusing on NWP-based monitoring of surface-based component of GOS
- Substantial resources will be needed:
 - to develop the initial ideas into an actual system,
 - to bring in the space-based component of the GOS,
 - and to broaden the concept to the other WIGOS component systems.
- Incremental IT resources will be required to support:
 - the generation, exchange, storage & analysis of monitoring/incident reports

WDQMS - The Main Functions

- The **WIGOS Quality Monitoring** Function:
 - essentially provided by Global NWP Centres, by monitoring reports, as a by-product of their data assimilation process;
 - Initially ECMWF and NCEP, currently also JMA and DWD NWP Centres.
- **WIGOS Evaluation** (and reporting) Function:
 - based on performance indicators, compared with metadata in OSCAR
 - automatic reports are produced and made available to national/regional/thematic centres with the issues raised as incidents.
- **WIGOS Incident Management** Function:
 - Undertakes the incidents raised by the Evaluation function.
 - Key to the success of this function will be the **clear communication**:
 - with the data providers to ensure they accept and take necessary actions
 - And with data users to ensure they take suitable precautions using the affected data.

WIGOS Data Quality Monitoring System Process Map



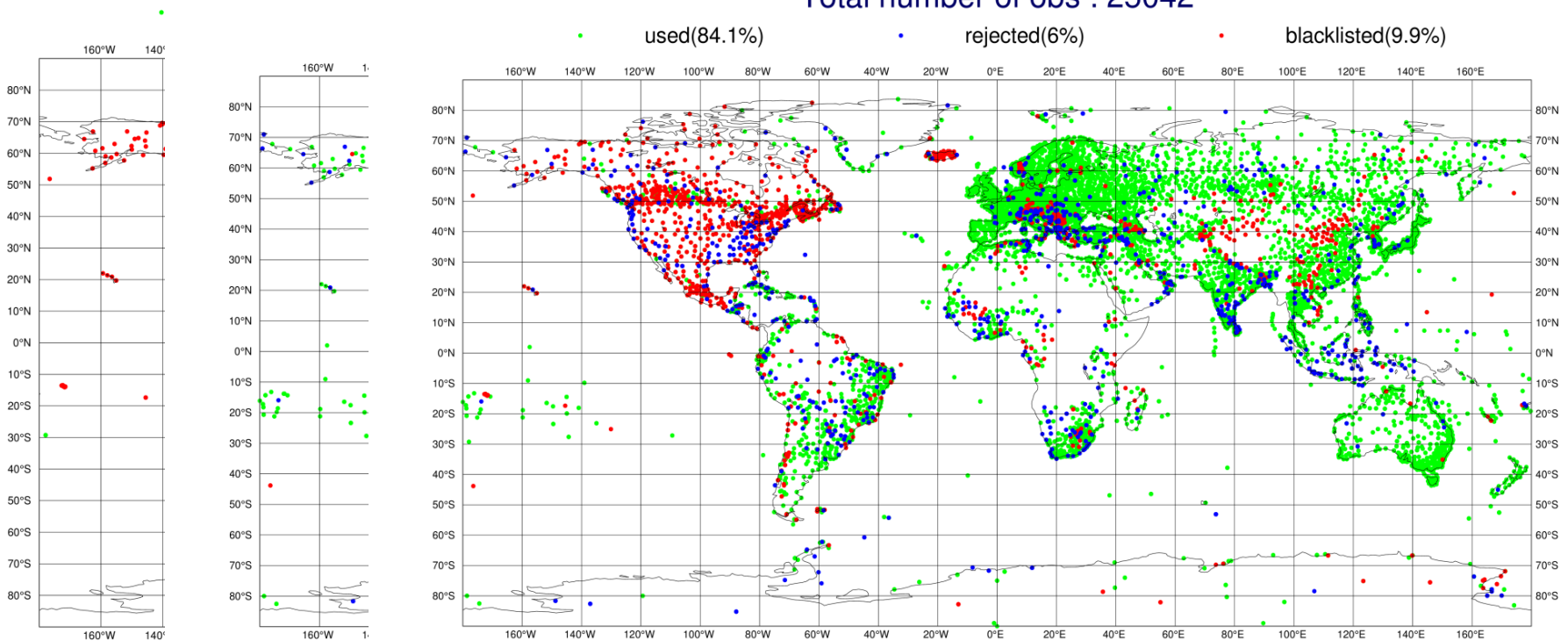
But a lot of information is already there:

ECMWF Images - snapshots

ECMWF data coverage: ALL SYNOPs.

16 Nov 2015, 12UTC

Total number of obs : 25042



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Rationale (1)

Background:

- **Outcome of 2nd WIGOS Workshop** on Quality Monitoring and Incident Management (Geneva, Switzerland December 2015)

Goal:

- **Test the concept** of the WIGOS Data Quality Monitoring System (WDQMS) and its major components: **QM**, **Ev** and **IM** functions

Steps:

- A. Planning and preparation of Demonstration Project in RA I: Jan-June 2016;
- B. Running/testing the QM/Ev/IM functions in operational environment:
Jul-Nov 2016;
- C. Assessment via a dedicated Workshop and follow-up actions: Dec. 2016

Rationale (2)

Participants (and acknowledgments):

- i) **Kenya** Meteorological Department (KMD)
 - operations pilot centre, providing temporary local resources (human and technical);
- ii) **Tanzania** assessing the issues being identified with their stations;
- iii) **NWP Centres** (ECMWF,NCEP,JMA,DWD) providing near real time monitoring results;
 - Additionally: **EUMETNET/EUCOS**

Governance:

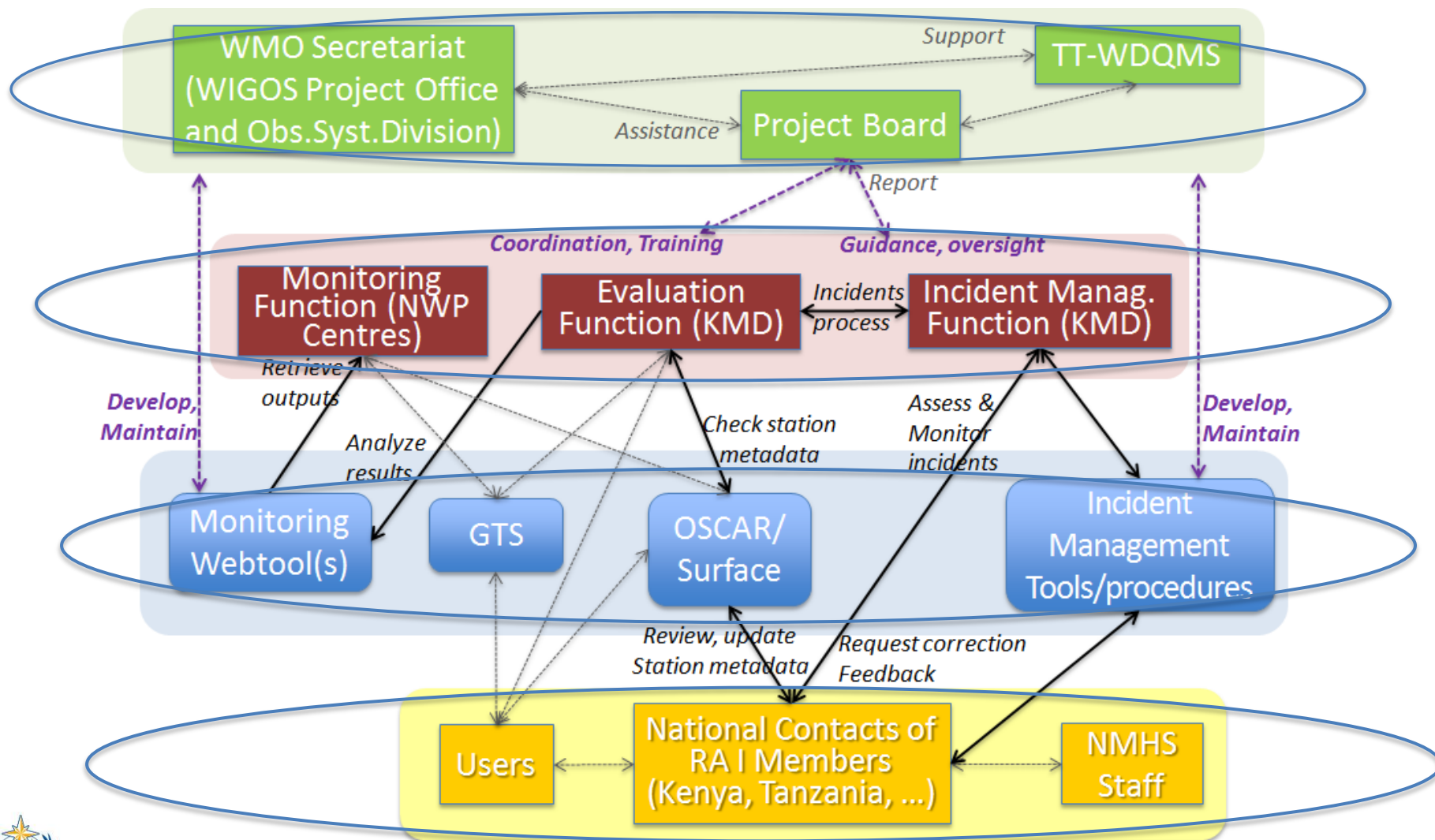
- ICG-WIGOS **Task Team on WDQMS** providing technical advice and support;
- WMO Secretariat providing support and training on OSCAR/Surface;

Tools to be made available by TT-WDQMS and WMO Secretariat:

- a) an online monitoring information/processing system, with geographic visualization tools, complemented by other monitoring tools/websites;
- b) an incident management tracking tool;

Other tools/resources: **OSCAR/Surface** operational and populated

Demonstration Project



Monitoring tools

WIGOS Quality Monitoring Web-tool:

- for global daily quality monitoring and evaluation (data availability and quality issues)
- prototype developed at Secretariat and TT-WDQMS now including a "Country page view"
 - > <http://128.65.196.37/wdqms>

ECWMF Wiki page 'Demonstration Project':

- to identify silent stations, data availability and quality issues:
 - > <https://software.ecmwf.int/wiki/display/WIGOS/Demonstration+Project>

WMO Quality Monitoring Portal operated by EUMETNET

- detailed statistics to identify and monitor data availability and quality issues,
 - > <https://eucos.dwd.de/ravi>

OSCAR/Surface

- official source of station metadata information
 - > <https://oscar.wmo.int/OSCAR>

Incident Management Tools/Procedures

Based on a (Google) Website:

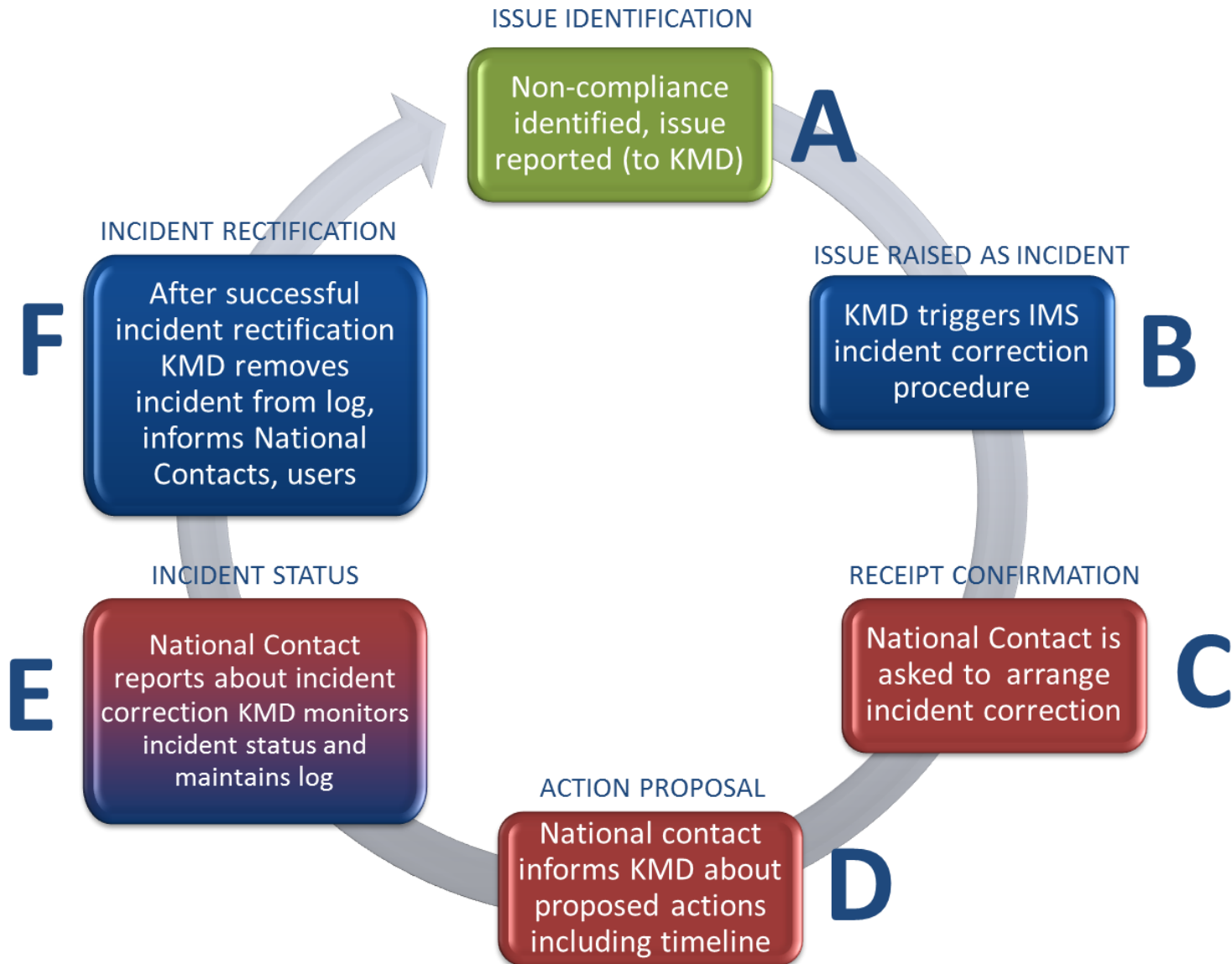
- 1st prototype developed at WMO Secretariat in collaboration with TT-WDQMS:
- **for raising, communicating and following incidents**
- > <https://sites.google.com/a/wmo.int/wdqms-demo-ra-i/home>

It contains relevant information about the 'Demonstration Project':

- contacts of people involved,
- links to the monitoring tools,
- **procedures** to be followed by participating countries
- **guidance** for the procedures and how to use the website
- links to each **incident ticket**
- **repository and summary** of incident tickets for each country,
- everybody involved receives automatic notifications of new tickets created or updates/edits to existing tickets

WDQMS Demonstration Project RA I

Incident Management Reporting Procedure



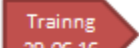
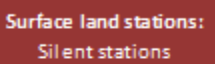
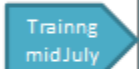
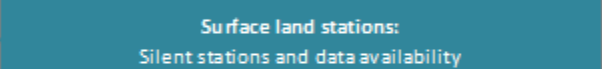
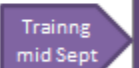
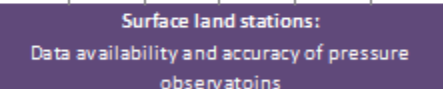
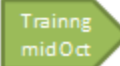
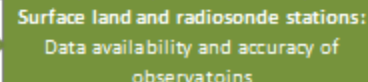
Phases

Phase 1 = Land surface **silent stations**

Phase 2 = phase 1 + **availability of land surface stations**

Phase 3 = phases 1 & 2 + **accuracy of pressure observations**

Phase 4 = phase 1,2 & 3 + **radiosonde stations accuracy & availability**

WDQMS Demonstration		July 2016			August 2016					September 2016				October 2016				November 2016					
Project RA I		04.07	11.07	18.07	25.07	01.08	08.08	15.08	22.08	29.08	05.09	12.09	19.09	26.09	03.10	10.10	17.10	24.10	31.10	07.11	14.11	21.11	25.11
Phase 1																							
Phase 2																							
Phase 3																							
Phase 4																							

Status of phases 1, 2, 3 (by late October)

- 1) Land surface **silent stations** and
 - 2) **Data availability** of land surface stations
 - 3) **Data accuracy** of pressure observations from land surface stations
- Total of 38 incident tickets have been raised by KMD:
 - 25 tickets for KMD stations
 - Only 2 tickets have been closed,
 - 7 tickets have no follow-up;
 - 13 tickets for TMA stations
 - no ticket has been closed,
 - 6 tickets have no follow-up
 - 30 incidents refer to silent stations or data availability
 - 8 incidents refer to data accuracy
 - Inconsistencies between the tickets and the summaries

Findings from phases 1, 2, 3

- Technical problems:
 - Editing the website and/or the tickets = solved after some weeks
- Functional problems:
 - Lack of understanding/training on the use of monitoring tools
 - Slow response from the "actions" side (national or station contacts)
 - Role of national contact for the follow-up of the incidents?
 - What to do with Incident tickets that stay open for a long time?
 - no response, no follow-up, proposed solution not implemented/not adequate
- Other problems:
 - The WIGOS Web-tool for Quality Monitoring not mature yet
 - Lack of access and/or not updated metadata in OSCAR/Surface
 - **The case of Network/Programme affiliation!**

Provisional conclusions

- The evaluation function should keep the identified issues under «surveillance» for 5 days, instead of 2, before raising it to incident
- The IM system should create/update automatically the summary(ies) of incidents
- Is there a need for a "System Coordinator"?
- Training is essential:
 - for the use of the monitoring tools and the IMS (the Google-site in this case)
 - OSCAR/Surface, particularly for National Focal Points
- Technical support (IT) is essential to ensure operations of a IMS
- The IMS must be robust and based on standard technology and compatible with current HW/SW existing in the market



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- Phase 4 of the Demonstration project just started:
 - Four (plus one) training sessions were delivered remotely (via Webex)
 - End of Demonstration project = Late November 2016
- A TT-WDQMS Meeting/3rd Workshop:
 - 13-15 December, under preparation
- Results to be submitted to ICG-WIGOS:
 - 12-14 January 2017 (Tentative)
- *Develop a pilot project on WDQMS by RA II EG-WIGOS?*

Next Steps

- The Plan for the WIGOS Pre-Operational Phase:
 - (a) **Initial WIGOS (land surface stations of the GOS) monitoring capability** at various NWP centres, evaluation and incident management functions: by end of 2016;
 - (b) **Functional specifications and the pilot components developed**, following demonstration project: end 2016;
 - (c) **Full WIGOS** (GOS surface-based components) operational QM & IM functionality: **end of 2018**;
 - (d) Monitoring Workshop(s) for JCOMMOPS, GAW, GCOS, GCW and hydrology components of WIGOS: 2016-17;
 - (e) Initial monitoring capability for all WIGOS components by end of 2018;
 - (f) Mechanisms for routine reporting of monitoring results to EC, regional associations and Members: end 2017;
 - (g) Mechanisms and regional structures in place to handle incident management actions and support Members in improving the data availability and quality: by 2018 (dependent on establishment of RWCs).

Thank you Merci

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