



WIGOS WORKSHOP 2019

Session 5.2

Outcomes of the workshop

Contents

- Purposes and organization of the workshop
- Outcomes

Purposes and organization of the workshop

Purposes of the workshop

- I. To foster shared understanding on WIGOS key issues including OSCAR/Surface and the WIGOS Data Quality Monitoring System (WDQMS)
- II. To make practical discussion on collaboration between the RWCs and Members to improve availability and quality of observation
- III. To share RWCs' services with Members based in line with user requirement

Organization of the workshop

Session 1:

Introduction

Session 2:

Open seminar - Integration, quality management and application

Session 3:

Operation of RWC mandatory functions

Session 4:

Technical support as RWC optional functions

Session 5:

Wrap up of the workshop

Session 1

Introduction

[1.1] Introduction of WIGOS - Integration -

[1.2] CIMO-17 outcomes and CIMO activities -
Quality management -

[1.3] Development framework - Application -

Session 2

Open seminar - Integration, quality management and application

- [2.1] CIMO TECO-2018 highlights - Towards fit-for-purpose environmental measurement -
- [2.2] GSMaP - Integrated application with developer and user collaboration -
- [2.3] Proposed framework for Integrated regional radar network
- [2.4] Innovative remote sensing measurements as new data sources
- [2.5] Observation for 2030 Vision

Session 2

Open seminar - Integration, quality management and application

[2.6] Measurement quality classifications for surface observing stations on land

[2.7] Survey results

[2.8] Discussion on measurement quality classification

Session 3

Operation of RWC mandatory functions

- [3.1] Update on WIGOS and RWCs
- [3.2] Introduction of RWC mandatory functions
- [3.3] Country report
- [3.4] Country report summary
- [3.5] Technical tour
- [3.6] Survey results
- [3.7] Discussion on RWC mandatory function

Session 4

Technical support as RWC optional functions

- [4.1] Review of Day 1 recommendations about measurement quality classification
- [4.2] Introduction of RIC-RWC collaboration
- [4.3] RIC Beijing report
- [4.4] RIC Manila report
- [4.5] RIC Tsukuba report
- [4.6] Discussion: How do we encourage skilled staff?

Session 4

Technical support as RWC optional functions

- [4.7] Discussion: How do we develop an expert community based on inter-regional collaboration?
- [4.8] Discussion: How do we improve observing system? - Review of Tokyo Action Plan 2018 status -
- [4.9] Discussion: How do we develop products and train experts? - JMA's 10-year plan and collaborative approaches -
- [4.10] Discussion: What can RWCs do for developing human resource in the region?
- [4.11] Discussion summary - Development framework as RWCs optional functions -

Session 5

Wrap up of the workshop

[5.1] Future operation and activities of RWCs

[5.2] Outcomes of the workshop

Outcomes

Session 1

Introduction

[1.1] Introduction of WIGOS - Integration -

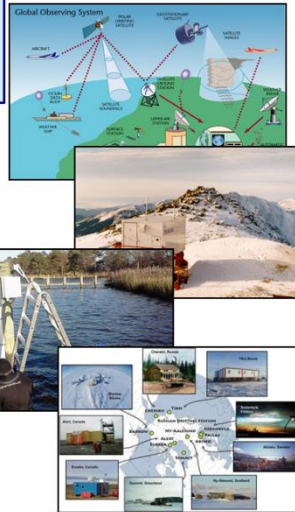
[1.2] CIMO-17 outcomes and CIMO activities -
Quality management -

[1.3] Development framework - Application -

[1.1] Introduction of WIGOS - Integration -

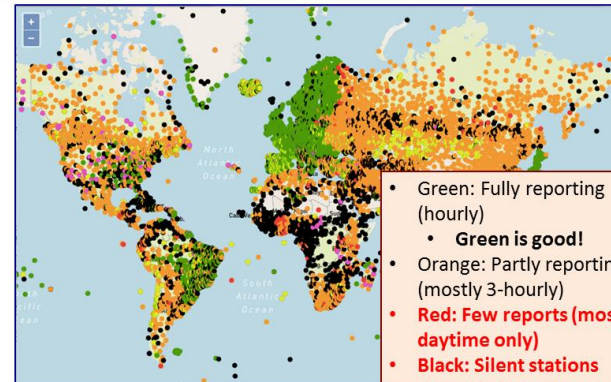
WIGOS Component Systems

- Global Observing System (WWW/GOS)
- Observing component of Global Atmospheric Watch (GAW)
- WMO Hydrological Observations (including WHOS)
- Observing component of Global Cryosphere Watch (GCW)



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Where are we currently missing observations? (surface-based; satellite data can help, but cannot do the job alone)



- Green: Fully reporting (hourly)
 - **Green is good!**
- Orange: Partly reporting (mostly 3-hourly)
- **Red: Few reports (mostly daytime only)**
- **Black: Silent stations**

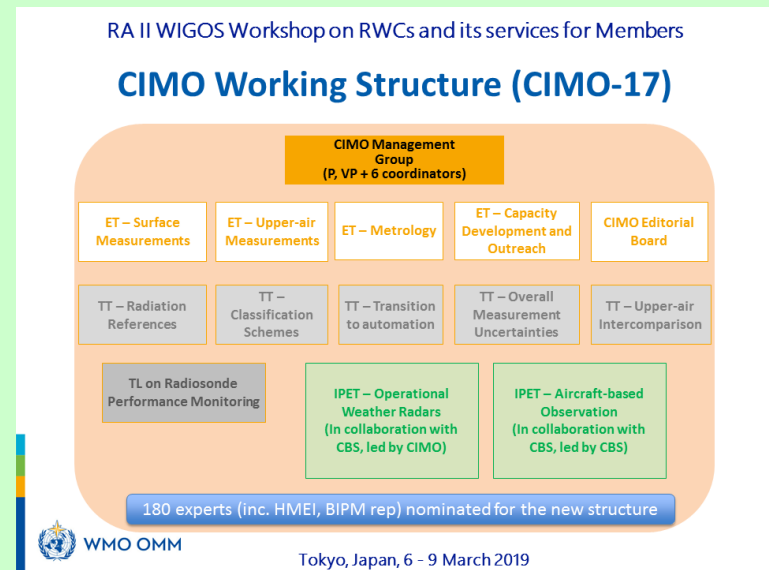


Surface pressure obs available to global NWP Centres on 17 February 2019, 18Z
(Purple or yellow: metadata problems)

- Activities of the Pre-operational Phase
- Outline of RRR, OSCAR, WDQMS and GBON

[1.2] CIMO-17 outcomes and CIMO activities - Quality management -

2018		2018	
GUIDE TO METEOROLOGICAL INSTRUMENTS AND METHODS OF OBSERVATION (WMO-No. 8, CIMO Guide)		GUIDE TO INSTRUMENTS AND METHODS OF OBSERVATION (WMO-No. 8, CIMO Guide)	
Part	Title	Vol.	Title
I	MEASUREMENT OF METEOROLOGICAL VARIABLES	I	MEASUREMENT OF METEOROLOGICAL VARIABLES
II	OBSERVING SYSTEMS	II	MEASUREMENT OF CRYOSPHERIC VARIABLES
III	SPACE-BASED OBSERVING SYSTEMS	III	OBSERVING SYSTEMS
IV	QUALITY ASSURANCE AND MANAGEMENT OF OBSERVING SYSTEM	IV	SPACE-BASED OBSERVING SYSTEMS
		V	QUALITY ASSURANCE AND MANAGEMENT OF OBSERVING SYSTEM



- CIMO activities, e.g. CIMO Guide
- CIMO-17 outcomes, e.g. Vision for the future environmental measurements, working structure

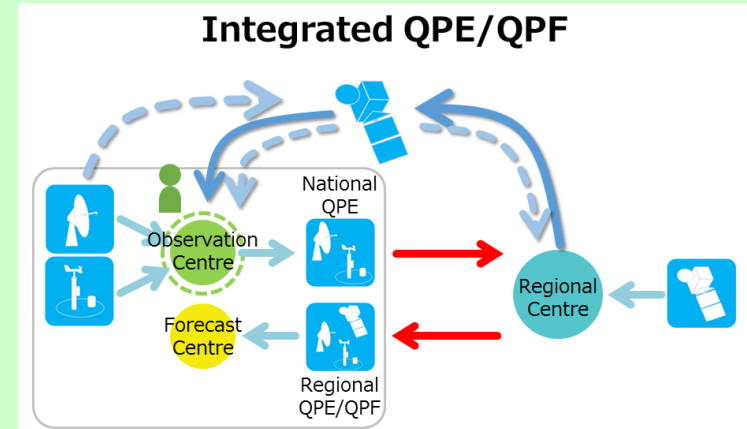
[1.3] Development framework - Application -

FY	2018	2019	2020	2021	2022	2023-2027
	Phase I		Phase II			Phase III
Provision of materials and training for users	<ul style="list-style-type: none"> Draw up product specifications for Phases II and III Provide user manual 		<ul style="list-style-type: none"> Standardize product specifications Provide training 			<ul style="list-style-type: none"> Provide mobile training centers
Satellite	Identification of Rapidly Developing Cumulous Areas (RDCA)	<ul style="list-style-type: none"> Conduct evaluation to determine detection uncertainty Improve detection accuracy 	<ul style="list-style-type: none"> Develop regional lightning nowcasting in Asia 			<ul style="list-style-type: none"> Develop severe storm alert content for Asia
	Himawari products (HCAI & HRP)	<ul style="list-style-type: none"> Launch Phase I website in December 2018 	<ul style="list-style-type: none"> Develop regional integrated QPE/QPF in Asia 			
	JAXA/GSMaP	<ul style="list-style-type: none"> Conduct evaluation to determine uncertainty in rainfall analysis and prediction 				
Radar	Southeast Asian Radar Network -Regional WIGOS Project	<ul style="list-style-type: none"> Improve quality checking techniques Expand and enhance international exchange of observation data 				
Surface	Tokyo Action Plan	<ul style="list-style-type: none"> Devise and implement training on quality improvement 	<ul style="list-style-type: none"> Improve quality management 			<ul style="list-style-type: none"> Enhance observation networks

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As a result, JMA's 10-year plan was framed including technical support and training.

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I do think we could refine this concept because we are working together.

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- JMA's 10-year plan
- Proposed concept of integrated QPE/QPF

Session 2

Open seminar - Integration, quality management and application

- [2.1] CIMO TECO-2018 highlights - Towards fit-for-purpose environmental measurement -
- [2.2] GSMaP - Integrated application with developer and user collaboration -
- [2.3] Proposed framework for Integrated regional radar network
- [2.4] Innovative remote sensing measurements as new data sources
- [2.5] Observation for 2030 Vision
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- [2.7] Survey results
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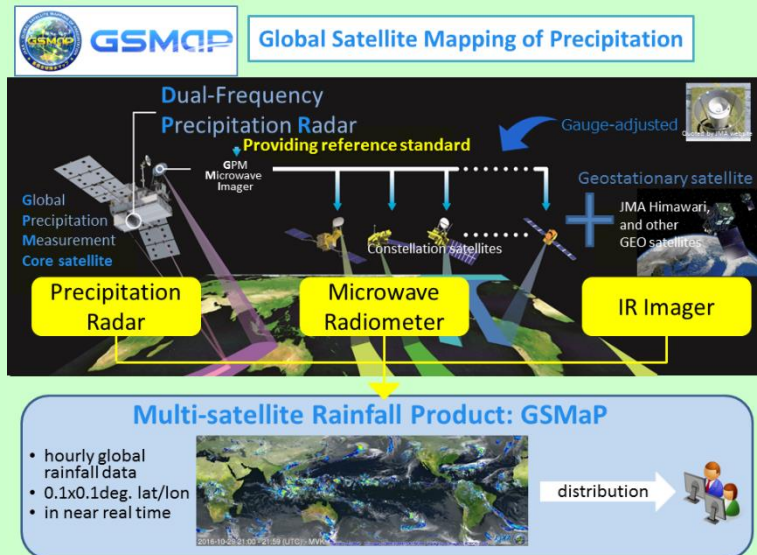
Towards fit-for-purpose environmental measurement -

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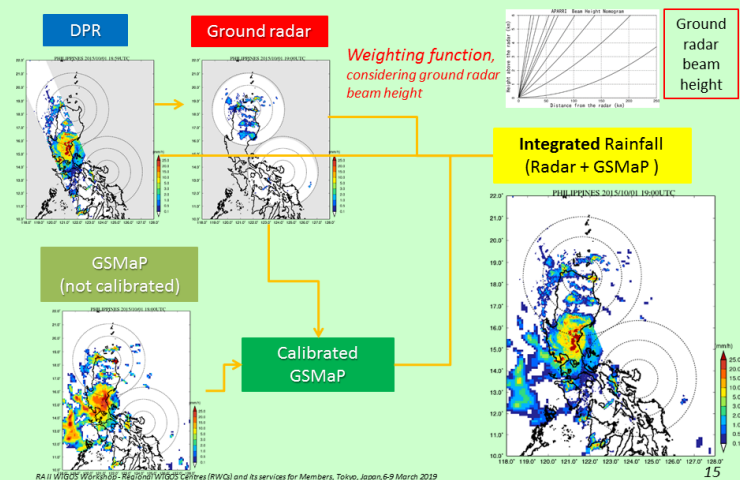
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- Discussions on New data sources and AWS tender specifications
- Feedback survey

[2.2] GSMP - Integrated application with developer and user collaboration -



Integration of Radar + GSMP (Philippines)



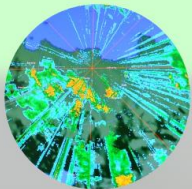
- Multi-satellite Rainfall Product: GSMP
- Integration of GSMP and radar

[2.3] Proposed framework for Integrated regional radar network

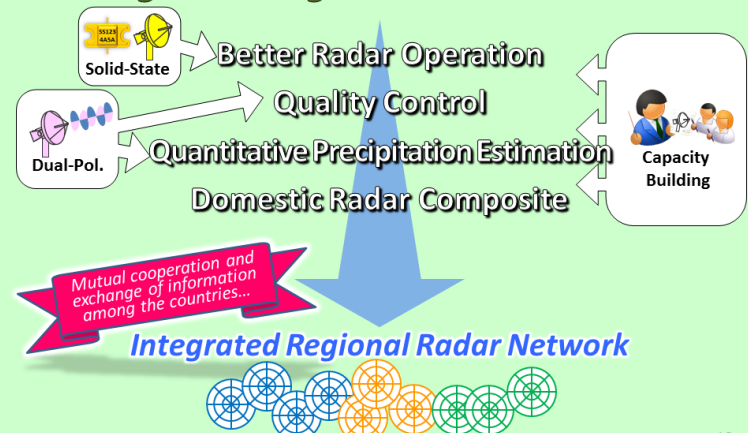
Summary of Survey in the Four Countries



- **Not enough human resources**
(Mechanics, IT engineers and radar meteorologists)
- **High maintenance costs**
- **Various data formats from various donors**
(Needs to be integrated)
- **Radio wave interferences** due to other radars, WiFi, etc.
- **Radar beam cut** due to urbanization.



Steps toward Integrated Regional Radar Network



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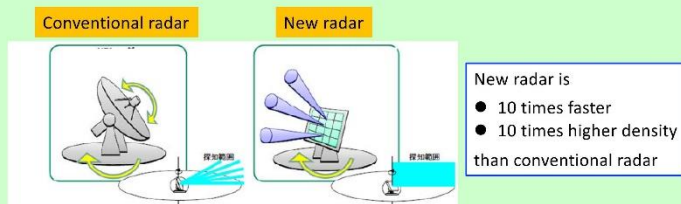
- Survey in 14 countries (incl. 4 countries visit)
- Proposed step toward integrated radar network

[2.4] Innovative remote sensing measurements as new data sources

Rain observation for guerilla heavy rain



- The conventional weather radar takes time to perform a volume scan of rain.
- The time scale of guerilla heavy rain is very short.
- To observe rain clouds at high speed in three dimensions, NICT is developing new weather radar.
- This radar utilizes phased array technology.



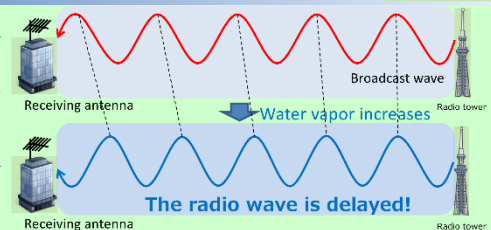
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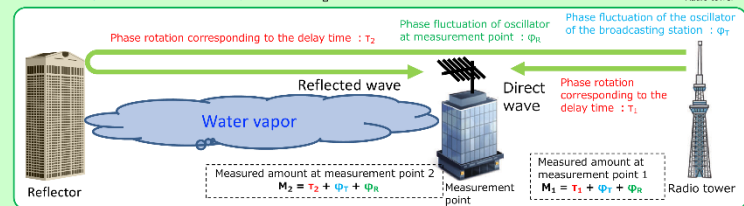
Water vapor observation using broadcasting wave



- When we receive radio waves 5 km away, the arrival of radio waves will be delayed by about 17 picoseconds (17×10^{-12} s) as the water vapor increases by 1%.
- This sensor measures the delay time of radio waves and estimates the amount of water vapor.



Method (Reflection method)



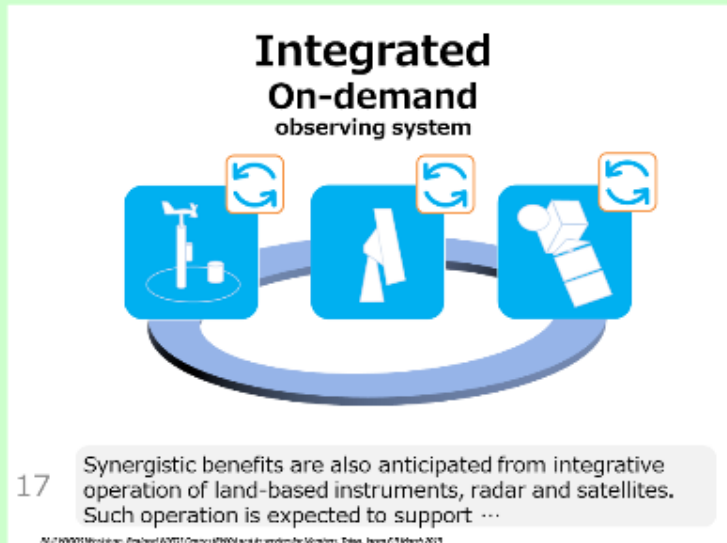
There are restrictions on the arrangement condition, but when there is a reflector, it can observe without synchronization

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- New radar utilizing phased-array technology
- Water vapor obs. using broadcasting wave

[2.5] Observation for 2030 Vision



Weather analysis map with IoT

23 As you probably viewed, Ms. Owada of JMA presents one poster about "Smart Umbrellas" in this conference hall.

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- Integrated on-demand observation system
- Weather analysis map with IoT

[2.6] Measurement quality classifications for surface observing stations on land

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Measurement Quality Classifications for Surface Observing Stations on Land

- Instrument performance monitoring is also critical to ensure sustained quality of observations (CIMO-15).
- Experts from CIMO ET OIST and ET DIST have developed the classifications that are complementary to the siting classifications.
- Purpose: to provide **a simple assessment of instrument quality, maintenance and calibration state**, leading to a further indication of the likely quality of observational data produced at the site.



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Decision 6 (CIMO-17)

CIMO noted with appreciation the progress made to the Measurement Quality Classifications for Surface Observing Stations on Land, which is provided in the Annex to the present decision.

The commission urges CIMO Members who expressed their concerns with some parts of the scheme, **to submit their proposals for improvement to the Task Team on Classification Schemes, and to actively contribute to the work of the Task Team.**

The Commission requests the Task Team to improve the document according to the inputs received.



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- Outline the classifications
- Decision 6 (CIMO-17) and TT on Classification Schemes

[2.7] Survey results

[2.1] TECO-2018 highlights - New data sources and fit-for-purpose measurement -

[2.2] GSMap - Integrated application with developer and user collaboration -

[2.3] Proposed framework for Integrated regional radar network

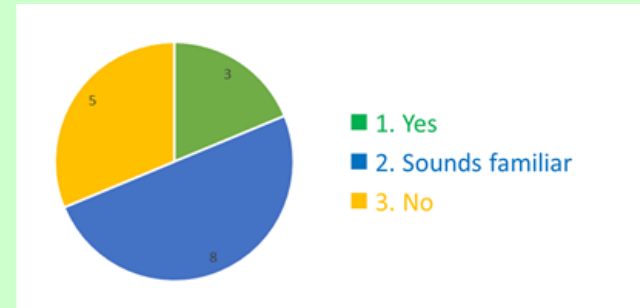
[2.4] Innovative remote sensing measurements as new data sources

[2.5] Traceability for low-cost instruments - How should we do for quality management?

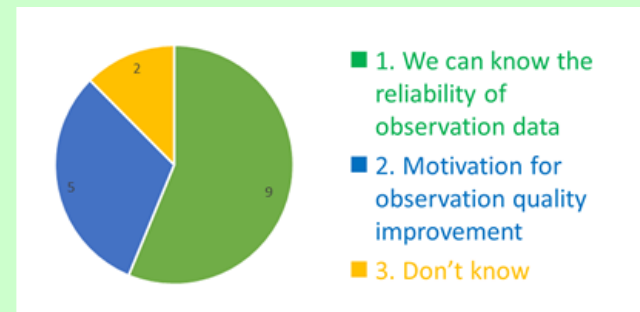
[2.6-2.8] Measurement quality classification?

[2.8] Discussion on measurement quality classification

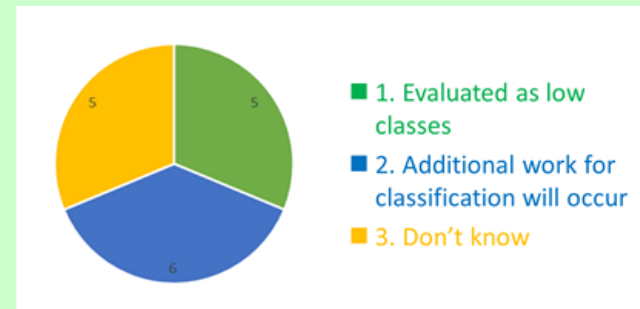
Q2.6-1 Do you know measurement quality classification?



Q2.6-2 What is the benefit of introducing measurement quality classification?



Q2.6-3 What is the concern caused by the introduction of measurement quality classification?

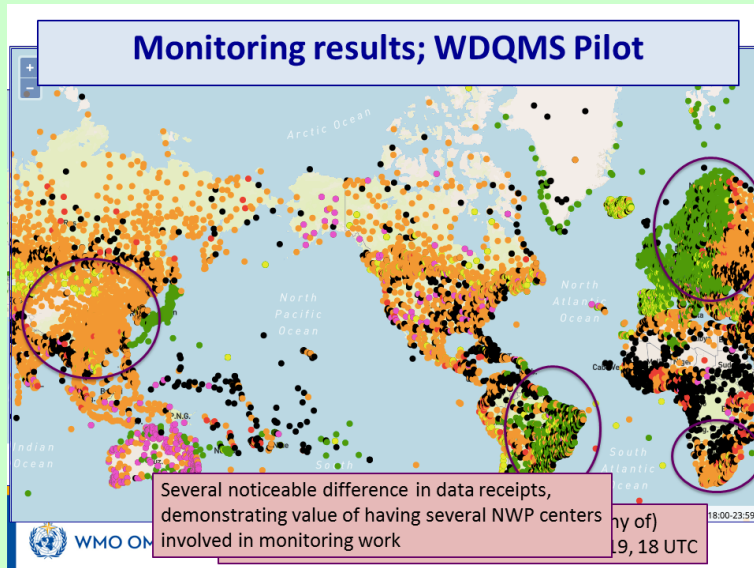


Session 3

Operation of RWC mandatory functions

- [3.1] Update on WIGOS and RWCs
- [3.2] Introduction of RWC mandatory functions
- [3.3] Country report
- [3.4] Country report summary
- [3.5] Technical tour
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- [3.7] Discussion on RWC mandatory function

[3.1] Update on WIGOS and RWCs



Regional WIGOS Centers; current status

- **Region I:** Many indications of national interest; limited national resources. RWC pilot to be initiated in East Africa on DFID (UK) project funding, centered in Kenya and Tanzania; South Africa and Morocco have both indicated interest in submitting proposals;
- **Region II (this meeting):** Will be done on a sub-regional basis; *China has formally addressed P/RA-II to request approval of RWC in pilot mode in Beijing; Japan has done the same for Tokyo*; indications of interest also from Saudi Arabia, India and Russia; This meeting will also be the first informal RWC coordination meeting between these four Members; ICG-WIGOS recommended establishment of a global RWC coordination mechanism;
- **Region III:** Plans for Virtual RWC maturing, decision to be made at RA-III-17 later this month; Region VI used as model.

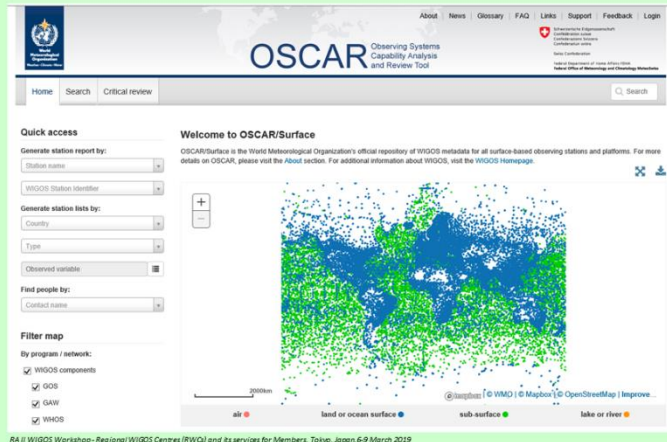


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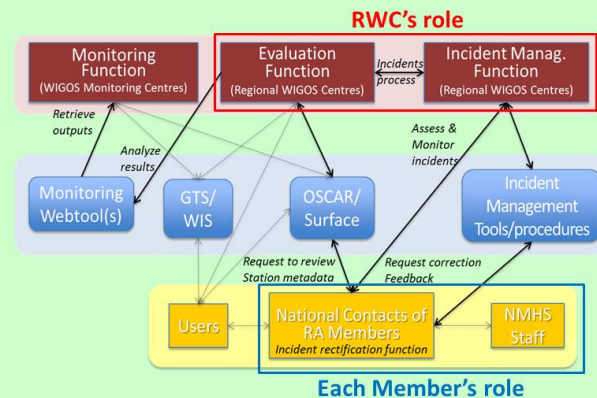
- Outline of OSCAR/Surface and WDQMS
- Outline of RWC and current status

[3.2] Introduction of RWC mandatory functions

Why OSCAR/Surface?



The process of the WDQMS



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- How to use OSCAR/Surface
- WDQMS components and process

[3.3] Country report

[3.4] Country report summary



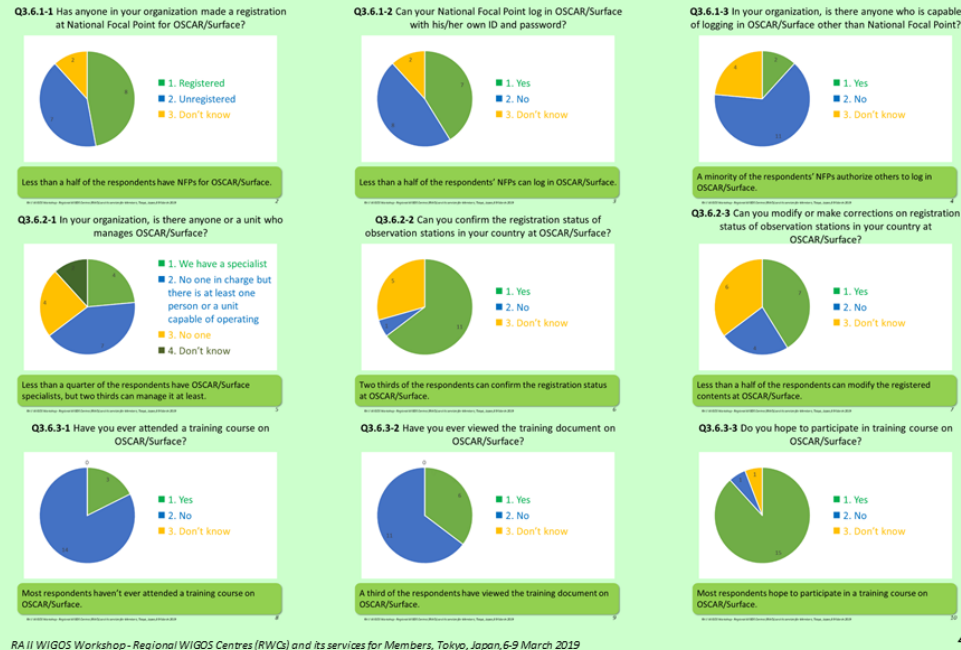
- To facilitate close discussion, Country report was conducted as a Poster Session format.
- Each country shared their discussion points.

[3.5] Technical tour



- Participants visited Observation operation room and Forecast operation room of JMA HQ.

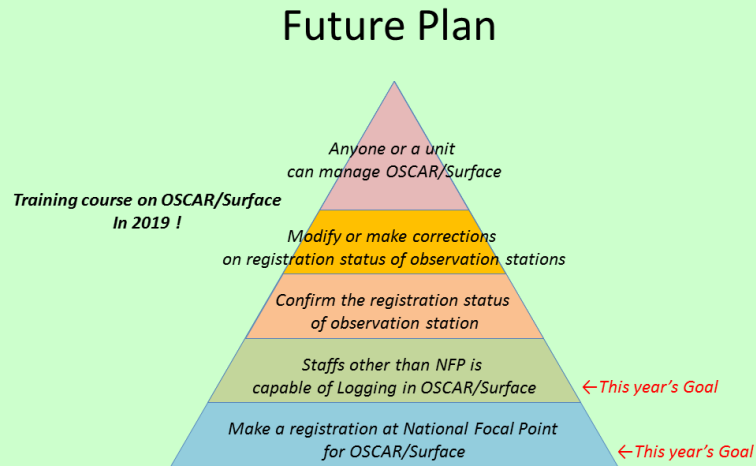
[3.6] Survey results



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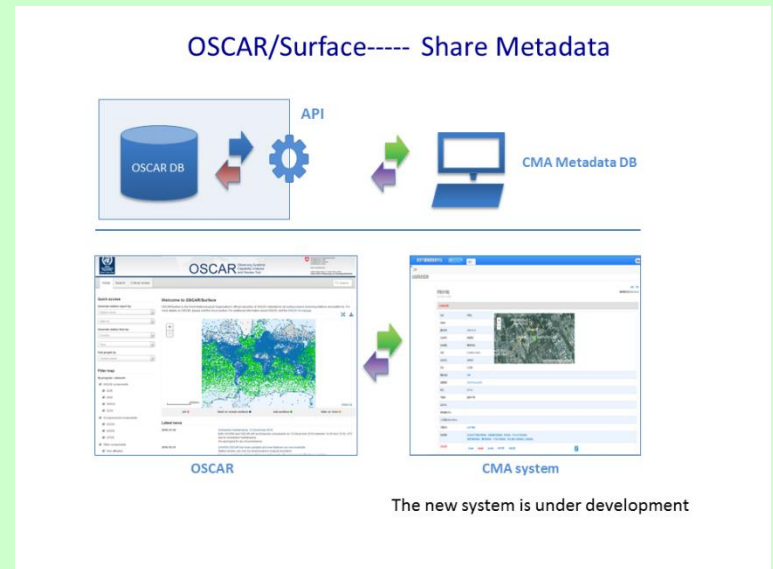
- Pre-workshop survey results on OSCAR/surface

[3.7] Discussion on RWC mandatory function



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- High prioritized area in OSCAR/Surface and WDQMS were discussed.
- China and Japan introduced their RWC statuses and plans.

Session 4

Technical support as RWC optional functions

- [4.1] Review of Day 1 recommendations about measurement quality classification
- [4.2] Introduction of RIC-RWC collaboration
- [4.3] RIC Beijing report
- [4.4] RIC Manila report
- [4.5] RIC Tsukuba report
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- [4.11] Discussion summary - Development framework as RWCs optional functions -

[4.1] Review of Day 1 recommendations about measurement quality classification

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Draft for Review

Recommendations (1)

1. Members are urged to implement Siting Classification for Surface Observing Stations on Land and share their experience with this implementation.
2. CIMO Task Team on Classification Schemes (TT-Class) is invited to examine Siting Classification in the sense of its applicability for different terrain (for example, mountain areas, steep slopes, urban areas) and provide updates and/or guidance, as necessary.



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Draft for Review

Recommendations (2)

3. Measurement Quality Classification scheme is recognized as a helpful tool for increasing reliability of the measurement data and enabling improvement of measurement quality.
4. Possible challenges expressed by survey respondents, such as many low-class stations or a need for additional human resources to implement the scheme, should be turned into opportunities for overall improvement of measurement quality.



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Draft for Review

Recommendations (2)

5. TT-Class is encouraged to clearly indicate benefits of implementation of the classification schemes, in the introductory text of the schemes, and consider development of relevant guidance material.
6. TT-Class is invited to consider inclusion and interpretation of different averaging intervals in Measurement Quality Classifications for Surface Observing Stations on Land.



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Draft for Review

Recommendations (3)

7. Finalization and approval of the Measurement Quality Classification Scheme is strongly supported by the Workshop participants
8. Future development of Measurement Quality Classification Scheme could include measurands at remote sensing (weather radars, wind profilers, lidars, etc.), and upper-air stations, based on available resources.
9. TT-Class is invited to explore possibilities for development of quality classifications for manual measurements.



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Draft for Review

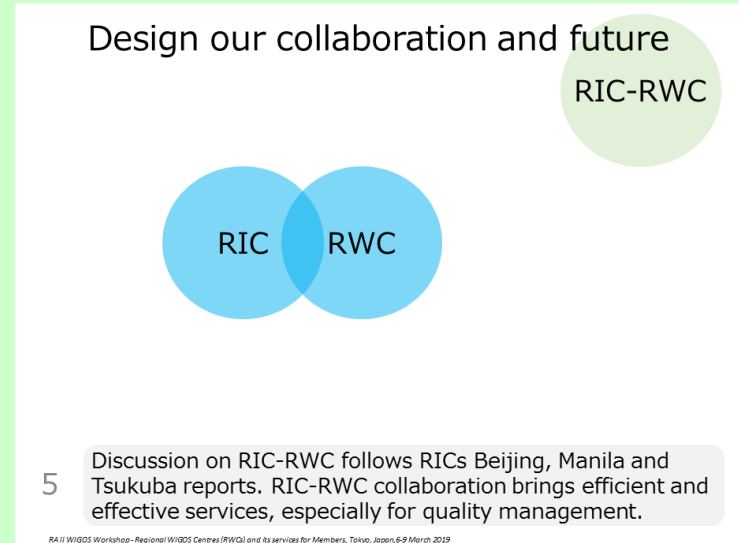
Recommendations (4)

10. WIGOS Task Team on Metadata is invited to consider inclusion of indicators of both classification schemes as optional metadata in the WIGOS Metadata Standard.
11. Members are encouraged to share their experience with maintenance and field calibrations by submission of relevant guidance material to be posted on CIMO Knowledge-sharing portal:
https://www.wmo.int/pages/prog/www/IMOP/Knowledge-sharing_Portal.html



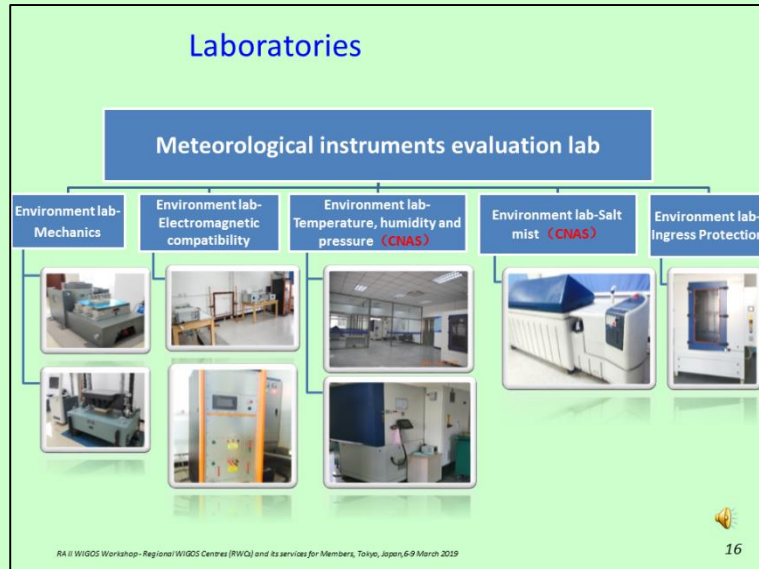
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[4.2] Introduction of RIC-RWC collaboration



- RIC-RWC collaboration brings efficient and effective services, especially for quality management.

[4.3] RIC Beijing report



- RIC Beijing activities
- International Collaboration

[4.4] RIC Manila report

Functions of the Main Instrument Center

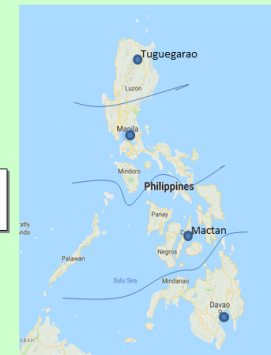
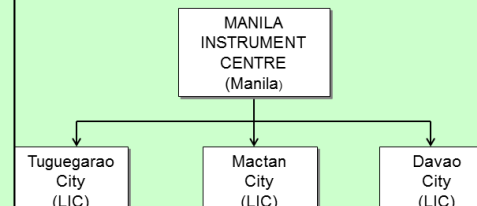
Serve as the centre for the national reference standard for basic meteorological instrument of the agency.



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On-Going Plan



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- PAGASA and RIC Manila activities
- Plans and Goals

[4.5] RIC Tsukuba report

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Calibration equipment

- Standard instruments of JMA -



Standard thermometer
Platinum resistance thermometer sensor
and alternating current bridge



Standard hygrometer
Dew point meter (electronic cooling type)
and platinum resistance thermometer



Standard barometer
Air piston gauge type



Other Standard
Wind speed, Radiation, Precipitation, etc.

気象庁
Japan Meteorological Agency

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Ongoing activity

- Interlaboratory comparison among RAIL, RA V and RA VI in 2018 -

RICs' Terms of Reference (TOR) Capabilities:
(f) A RIC must participate in, or organize, inter-laboratory comparisons of standard calibration instruments and methods;

In RA II and V, no ILC between RICs in RA II and RA V has yet been conducted.

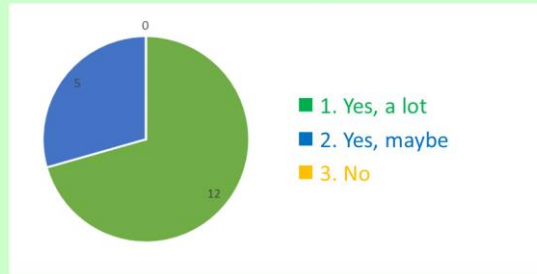
気象庁
Japan Meteorological Agency

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- MIC/JMA activities
- RIC Tsukuba activities

[4.6] Discussion: How do we encourage skilled staff?

Q4.6-1 Is translating documents into national languages useful for human resource development?

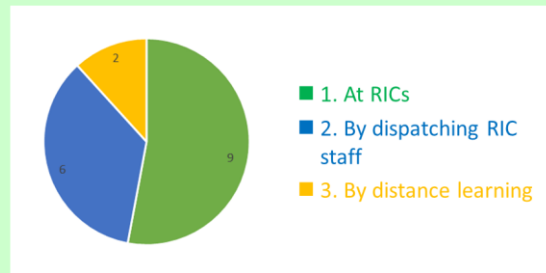


More than two thirds of NMHSs indicated that the documents written in national languages help develop human resources. What do you think about this result from the RICs' viewpoint?

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Q4.6-2 How should on-the-job trainings be provided?

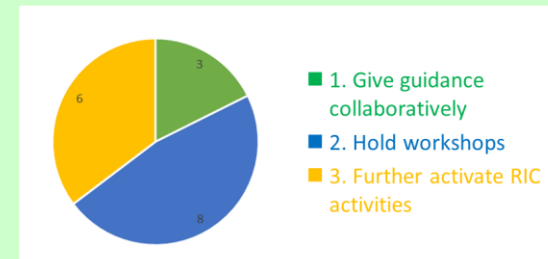


More than half of NMHSs said that OJT should be arranged at RICs. What do you think about this result from the RICs' viewpoint? Is that real on-the-job training?

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Q4.6-3 What do you think RICs should do to develop human resources?



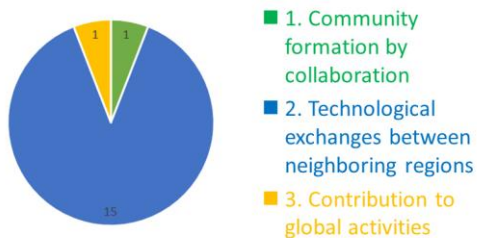
Almost half of NMHSs suggested to hold workshops. What do you think about this result from the RICs' viewpoint? Do you think RIC-RWC collaboration helps develop human resources?

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[4.7] Discussion: How do we develop an expert community based on inter-regional collaboration?

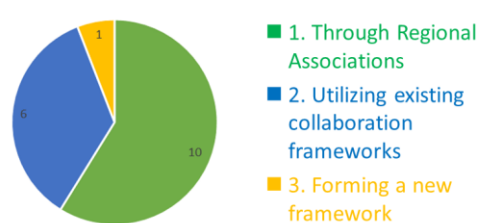
Q4.7-1 What is the biggest merit of inter-regional collaboration?



Most NMHSs indicated technological exchange was the biggest merit. Few NMHSs said an advantage was contribution to global activities.

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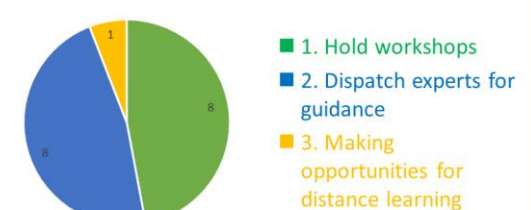
Q4.7-2 How should an expert community be formed?



More than half NMHSs said an expert community should be formed through Regional Associations. Few NMHSs said it should be formed by a new framework.

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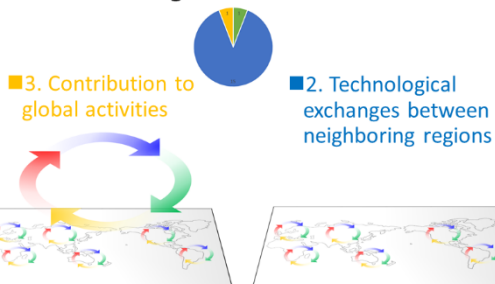
Q4.7-3 How should we develop future experts in an expert community?



Few NMHSs indicated that future experts should be developed by making opportunities for distance learning.

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Inter-regional collaboration



4 Inter-regional collaboration to help enhance worldwide activity. Do you think that we should discuss the collaboration from a wider point of view?

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Himawari products & JAXA/GSMAp

Southeast Asian Radar Network

Tokyo Action Plan 2018

6 Let's remember this chart. In the WIGOS era, we need to combine both existing and new frameworks to integrate observation systems.

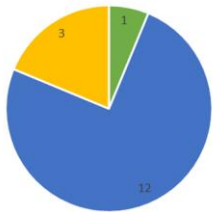
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MAQRUN FADZLI MOHD FAHMI
DIRECTOR
RADAR AND SATELLITE
METEOROLOGICAL DIVISION

[4.8] Discussion: How do we improve observing system? - Review of Tokyo Action Plan 2018 status -

Q4.8-1 What is necessary to accelerate the plan?



- 1. Increase JMA staff
- 2. Promote the plan by each member's collaboration
- 3. Explore more experts' participation

Three quarters of NMHSs suggested to promote the plan by each member's collaboration.

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Q4.8-2 What is necessary for qualitative improvement of rainfall observation network?



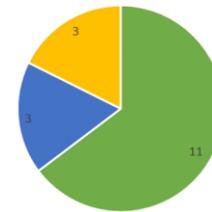
- 1. Introduce the latest technology
- 2. Develop experts or highly skilled people
- 3. Increase the number of rain gauges

Your opinions were divided on this question.

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Q4.8-3 What is necessary to improve skills of observers?



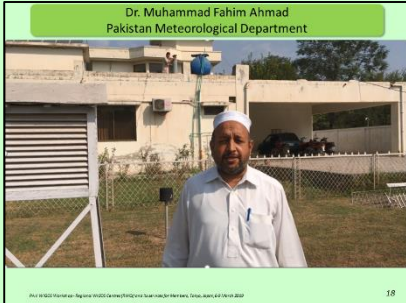
- 1. Training or technological transfer
- 2. Develop experts to be instructors
- 3. Training materials in national languages

Two thirds of NMHSs indicated that training or technological transfer is necessary.

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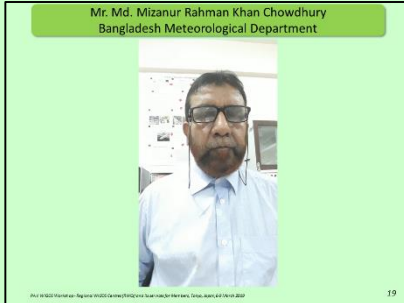
Dr. Muhammad Fahim Ahmad
Pakistan Meteorological Department



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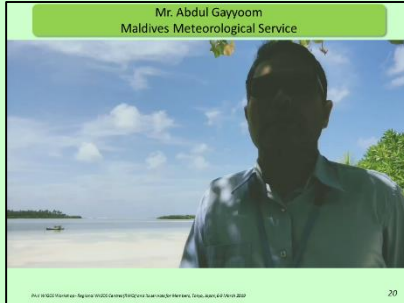
Mr. Md. Mizanur Rahman Khan Chowdhury
Bangladesh Meteorological Department



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Mr. Abdul Gayyoom
Maldives Meteorological Service



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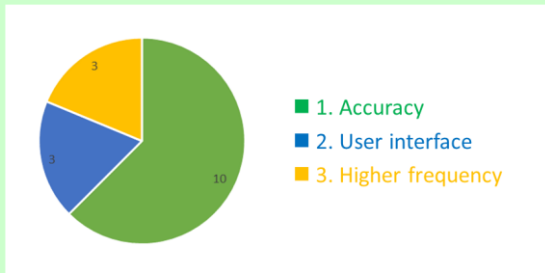
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L. G. LANZA

[4.9] Discussion: How do we develop products and train experts? - JMA's 10-year plan and collaborative approaches -

Q4.9-1 What are the points to be improved for HRP and HCAI provided by RSMC Tokyo for nowcasting?

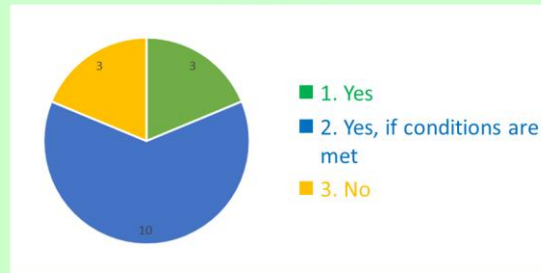


Two thirds of NMHSs indicated that "accuracy" should be well-considered.

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Q4.9-2 Are you willing to participate in the product development?

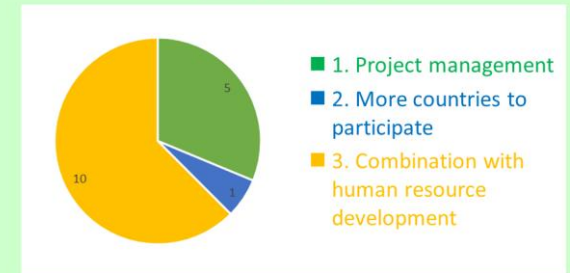


Two thirds of NMHSs said "Yes, if conditions are met" to participate in the product development. A clear understanding of conditions is needed.

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Q4.9-3 What are the important points for Phase II development work?

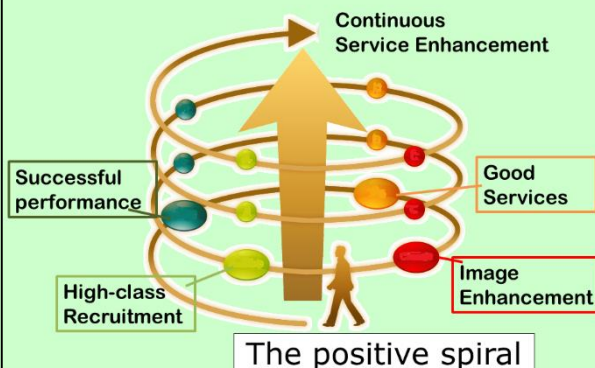


Two thirds of NMHSs indicated that combination with human resources development is important for Phase II work.

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If well-skilled staff works...



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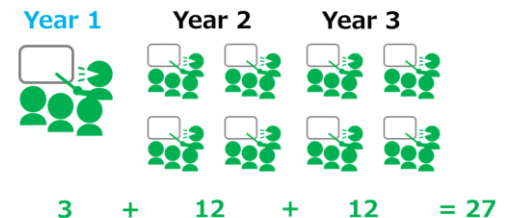
Tips for successful trainings

- To make a leader in the local office
- All documents and experience should be shared within their organization
- Establishment of human network among trainees
- Importance of continuous program review

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If instructors would be trained in Year 1



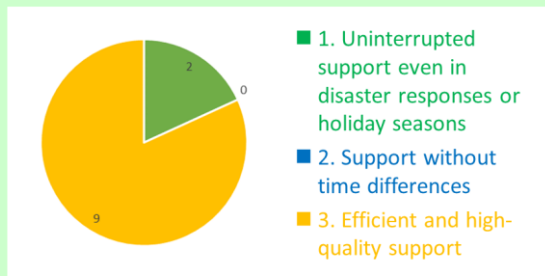
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[Discussion] 27 trainees can finish the training in 3 years.

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[4.10] Discussion: What can RWCs do for developing human resource in the region?

Q4.10-1 What do you expect from RWC's cooperation?

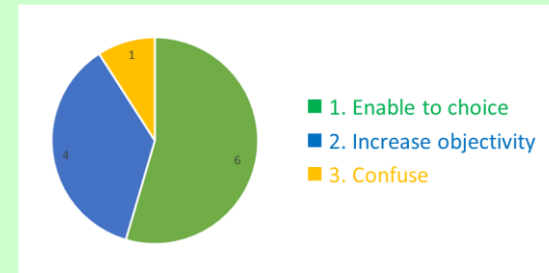


More than three quarters of NMHSs expected efficient and high-quality support from RWCs.

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Q4.10-2 How about receiving information or support from multiple RWCs?

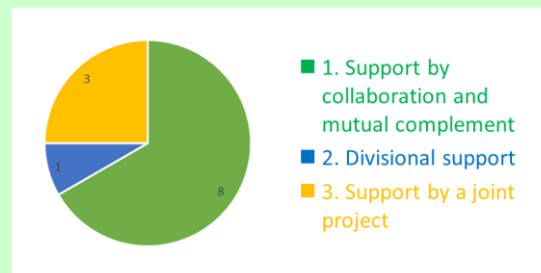


Most of NMHSs indicated positive opinions about receiving information or support from multiple RWCs.

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Q4.10-3 What RWC should do to develop human resources?



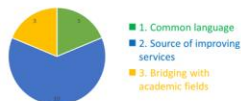
Two thirds of NMHSs expected support by collaboration and mutual complement from multiple RWCs.

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[4.11] Discussion summary - Development framework as RWCs optional functions -

Q4.11-1 What is the role of science in our collaboration?



- The role of science in our collaboration is the role of science in our collaboration. *Dr. Duong van Khanh (VietNam)*
- The role of science would be as common platform for collaboration and also to improve services. *Mr. Phuntsho Namgyal (Bhutan)*
- Service for users can be improved under science researches. *Dr. Amgalan Ganbat (Mongolia)*

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Q4.11-2 What is the role of technology in our collaboration?

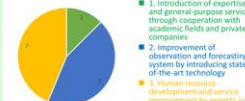


- The role of technology in our collaboration is means of improving services. *Dr. Duong van Khanh (VietNam)*
- The technology would facilitate generation of reliable and timely transmission of information. It can also definitely help in improving services by improving quality of information combined with reliable transmission/dissemination. *Mr. Phuntsho Namgyal (Bhutan)*
- Renovation of technology can contribute to improving service and Generation and transmission of information as well for sharing information. *Dr. Amgalan Ganbat (Mongolia)*

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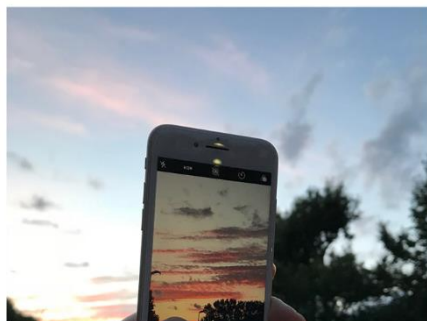
Q4.11-3 How should we use science and technology for improving professional skills and improving operations?



- We use science and technology for improving professional skills and improving operations for Human resource development and service improvement by experts in science and technology. *Dr. Duong van Khanh (VietNam)*
- We could use science and technology to improve models and processes for forecasting and observation. Besides, we can use science and technology for capacity building. *Mr. Phuntsho Namgyal (Bhutan)*
- In our case we prefer choosing (3), i.e. capacity building on professional skills. *Dr. Amgalan Ganbat (Mongolia)*

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We need to gain an insight into the low-cost instruments and social media that are really growing fast. Such a new power(s) might innovate observation ...

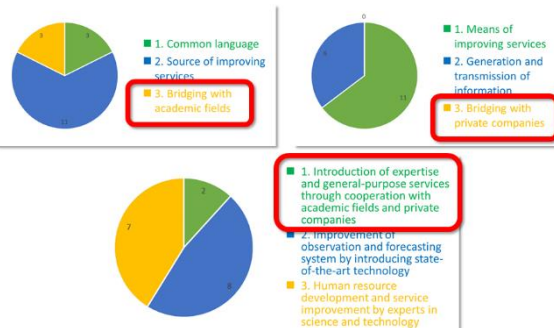
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dramatically and rapidly. We are facing great waves of new data. We should recognize such great waves and prepare for them.

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This is the reason why the options contained the words "academic" and "private companies".

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Session 5

Wrap up of the workshop

[5.1] Future operation and activities of RWCs

[5.2] Outcomes of the workshop

[5.1] Future operation and activities of RWCs

Future operation and activities of RWCs

- Supporting Members to register/correct in OSCAR/surface database through sharing expertise or experience
- Establishing Evaluation and Incident Management functions and providing incident information through WDQMS with close communication, especially on silent stations
- Sharing experience and seeking collaboration through coordination mechanism among RWCs in pilot mode
- Collaborating with relevant bodies such as RIC or RTC in technical support for Members
- Holding workshops or training events, or participating in such events as lecturers, with utilizing webinar or video conference as needed
- Promoting human resource development by “teaching how to teach” approach