



Regional WIGOS Project in RA II

“Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations”

19 March 2018

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Japan Meteorological Agency



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- History
- Aims and activities of this project
- Purpose of this workshop
- Summary



WMO RA II WIGOS IMPLEMENTATION PROJECTS

WIGOS Timeline

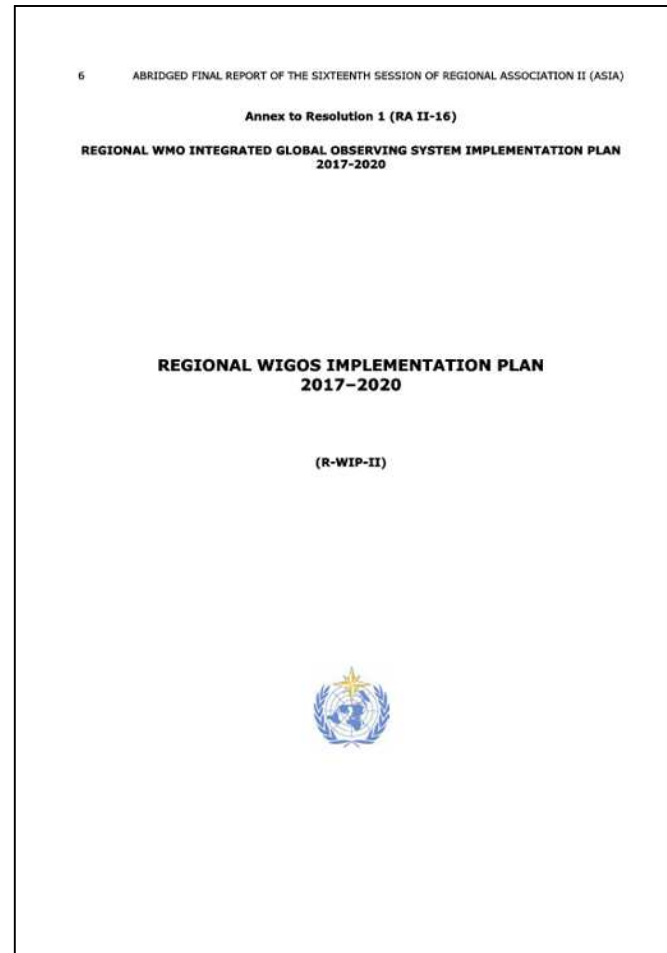


Resolution 23 (Cg-17)

PRE-OPERATIONAL PHASE OF THE WMO INTEGRATED GLOBAL OBSERVING SYSTEM

- Cg-17 decides that the development of WIGOS will continue during its pre-operational phase in the seventeenth financial period with the aim of having Members benefit from a fully operational WIGOS from 2020 onward;

Regional WIGOS Implementation Plan 2017-2020 (R-WIP-II)



RA II WIGOS Implementation Projects

ANNEX II

RA II WIGOS IMPLEMENTATION PROJECTS

No.	Project title	Project Coordinator(s)
I	Monitor and Review the Implementation of EGOS-IP in RA II	China; Hong Kong, China
II	The web-interface for sharing status of standardization and experience and monitoring synoptic observations in RA II	Republic of Korea
III	Capacity Building in Radar Techniques in the Southeast Asia	Japan, Thailand, Malaysia, and Indonesia (RA V)
IV	Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations	Japan, China
V	Developing a Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) in Asia Node	China
VI	Develop Support for NMHSs in Satellite Data, Products and Training	Japan, Republic of Korea

No. IV Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations

WORKING GROUP ON WMO INTEGRATED GLOBAL OBSERVING SYSTEM AND WMO INFORMATION SYSTEM (WG-WIGOS/WIS)

Chairperson: Mr Yongqing Chen, China

Expert Group on WIGOS (EG-WIGOS)

EG-WIGOS	Name	Member
Coordinator	Mr Yongqing Chen	China
Leader in Monitoring and Reviewing the Implementation of EGOS IP in RA II	Ms GUO Jianxia	China
Leader in the web-interface for sharing status of standardization and experience and monitoring synoptic observations in RA II	Mr Chulwoon Choi	Republic of Korea
Leader in Capacity-building in Radar Techniques in the Southeast Asia	Mr Koichiro Kakihara	Japan
Leader in Enhancing the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations	Mr Nobuyuki Tanaka	Japan
Leader in Developing a Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) in Asia Node	Mr ZHOU Qingliang	China
	Mr Hasan Aldashti	Kuwait
Leader in Developing Support for NMHSs in Satellite Data, Products and Training	Mr Hiroshi Kunimatsu	Japan
	Mr Dohyeong Kim	Republic of Korea
Leader of Task Team on Regional Basic Observing Network	Mr Nadeem Faisal	Pakistan
	Ms SHI Lijuan	China
Leader of Task Team on Aircraft Based Observations	Mr Mohammed Babidhan	Saudi Arabia

Key deliverables

1. Improvements of data quality at RBCN/RBSN (expected to be RBON) stations.
2. Enhancement of RICs Services
3. ISO/IEC 17025 certification.
4. Report on status on QC/QA procedures and site management in RA II.
5. Reports on status on meteorological instruments, calibration and training in RA II.

Coordinating Group

- Coordinator

Mr. Yoshiaki Hirano (Japan)

- Participating Member countries (26 countries)

Bahrain	Bangladesh	Bhutan	Cambodia	China
Hong Kong, China	India	Iran, Islamic Republic of	Japan	Kazakhstan
Kuwait	Kyrgyzstan	Lao People's Democratic Republic	Macao, China	Maldives
Mongolia	Myanmar	Oman	Pakistan	Republic of Korea
Russian Federation	Sri Lanka	Thailand	United Arab Emirates	Uzbekistan
Viet Nam				

Activities

Task #	Reference	Task	Key Deliverable	Activity	2017	2018	2019	2020	Responsible
WIGOS-04	RA II-16/Doc. 4.3(1), R-WIP-II-PJ-iv, ToR a-ii, vi, vii	Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations	1. Improvements of data quality at RBCN/RBSN (expected to be RBON) stations.	1.To provide technical support for instrument maintenance and calibration to RA II members by experts from RICs;	x	x	x	x	MrYoshiaki HIRANO (Project Coordinator in Enhancing the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations) and Coordination Group Members of Project IV
			2. Enhancement of RICs Services	2. To hold a WIGOS workshop for RA II Members;		x			
			3. ISO/IEC 17025 certification.	3. To develop training materials (to be prepared for publication as an WMO IMOP technical document);			x		
			4. Report on status on QC/QA procedures and site management in RA II.	4.Study and share the best practices on QA/QC procedures at surface observation through following process: • Conduct a survey on best practice on QA/QC procedures on surface observation by RA II Members and report the results.	x	x			
			5. Reports on status on meteorological instruments, calibration and training in RA II.	5.Seek, and promotion of, package-type cooperation (including calibration of standards, lectures and practices, and technical support) if funds are available.	x	x	x	x	
				6.Promotion of intercomparison (ILC: Interlaboratory Comparison) between RICs (including other RAs) such as RIC Tsukuba (RA II), RIC Beijing (RA II), RIC Melbourne (RA V), RIC Manila (RA V) and RIC Ljubljana (RA VI), and report the results.	x	x	x		
				7.Investigation on migration error in code forms of observation data;	x	x	x	x	
				8.To develop portal website to share outcomes of this project.	x	x	x	x	
				9. To submit a progress report to the coordinator of the EG by the end of every year and as requested by the coordinator when necessary.	x	x	x	x	



HISTORY

Overview of project No. IV

1. Improvements of data quality at RBCN/RBSN stations

(a) Monitoring Data Quality

The Coordinator checks data quality of RA II stations and identifies and requests RA II Members to identify technical issues, based on the following results:

- Questionnaire on the Surface, Climate, and Upper-air Observations and Quality Management in Regional Association II (Asia) (conducted in July 2010),
- Questionnaire on meteorological instruments, calibration and training in Regional Association II (Asia) (conducted in January 2012),
- 6-monthly monitoring reports by the Lead Centre for monitoring the quality of land surface observations in Region II.

(b) Survey on status on QA/QC procedures and site managements for the network of RBCN/RBSN stations, and report the results.

Based on requests from the Coordinator, the following Members will consider the possibility of technical support if funds are available, and share the summary of the technical missions with RA II Members:

- CMA, HKO, JMA, and KMA for Southeast Asia,
- IMD for South Asia,
- Roshydromet for Central Asia,
- Kuwait for Middle East.

Assurance and Management of Data Quality

2. Enhancement of RIC's Services

RICs plan to implement the following action items for further enhancement of their services in capacity building and calibration during the project:

- (a) Organization of a training workshop to improve understanding of calibration and maintenance of meteorological instruments according to needs of RA II Members to be identified by the "Questionnaire on Meteorological Instruments, Calibration and Training in Regional Association II (Asia)",
- (b) Development of training materials on calibration and maintenance of instruments (to be prepared for publication as an Instruments and Methods of Observation Programme (IMOP) technical document),
- (c) Obtaining the International Standard ISO/IEC 17025 – General requirements for the competence of testing and calibration laboratories – certification for air pressure, temperature, and humidity,
- (d) Development of RIC's Websites,
- (e) Intercomparison between RIC-Tsukuba and RIC-Beijing,
- (f) Reports on status on calibration instruments for surface-based observations in RA II (to be prepared for publication as an Instruments and Methods of Observation Programme (IMOP) technical document).

Calibration of Instruments

Implementation of activities

Three pronged approach

- ✓ Identifying current status and gap analysis by **Survey**
- ✓ Discussions and training by **Workshop**
- ✓ Sharing the results of survey and workshop through WMO/IOM **Report**

<Round 1>

- ✓ RA II Survey on Surface, Climate and Upper-air Observations and QM (2010)
- ✓ JMA/WMO Workshop on Quality Management in Surface, Climate and Upper-air Observations in RA II (Tokyo, Japan, 27-30 July 2010)
- ✓ WMO/IOM Report No. 111 (June 2011)

<Round 2>

- ✓ Survey on Meteorological Instruments, Calibration and Training (RA II) (2011-2012)
- ✓ JMA/WMO Training Workshop on Calibration and Maintenance of Meteorological Instruments in RA II (Tokyo&Tsukuba, Japan, 19-22 February 2013)
- ✓ WMO/IOM Report No. 122 (June 2015)

<Round 3>

- ✓ RA II Survey on Quality Management for Surface Meteorological Observations (2016-)
- ✓ Workshop (Tokyo, Japan, 19-23 March 2018)
- ✓ WMO/IOM Report (TBD)

Implementation of activities (1)

Three pronged approach

- ✓ Identifying current status and gap analysis by **Survey**
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- ✓ RA II Survey on Surface, Climate and Upper-air Observations and QM (2010)

✓ JMA
✓ CMA
✓ V

Survey on:

- Current Status of operation and capability of Members in RA II;
- Requirements of MNHSs;
- Gap Analysis between requirements and current status;
- Measurements to solve the problems.

<Round 2>

✓ S
✓ J
✓ I
✓ V

<Round 3>

- ✓ RA II Survey on Quality Management for Surface Meteorological Observations (2016-)
- ✓ Workshop (Tokyo, Japan, 19-23 March 2018)
- ✓ WMO/IOM Report (TBD)

Implementation of activities (2)

Three pronged approach

- ✓ Identifying current status and gap analysis by Survey
- ✓ Discussions and training by **Workshop**
- ✓ Sharing the results of survey and workshop through WMO/IOM Report

<Round 1>

- ✓ RA II Survey on Surface, Climate and Upper-air Observations and QM (2010)
- ✓ JMA QM Survey
- ✓ V

<Round 2>

- ✓ S
- ✓ J
- ✓ Ir
- ✓ V

Workshops are organized for:

- Recognizing the challenges;
- Discussion in order to solve the problems.

<Round 3>

- ✓ RA II Survey on Quality Management for Surface Meteorological Observations (2016-)
- ✓ **Workshop** (Tokyo, Japan, 19-23 March 2018)
- ✓ WMO/IOM Report (TBD)

Implementation of activities (3)

Three pronged approach

- ✓ Identifying current status and gap analysis by Survey
- ✓ Discussions and training by Workshop
- ✓ Sharing the results of survey and workshop through WMO/IOM **Report**

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Round 1 (Observations and QM)

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1. Improvements of data quality at RBCN/RBSN stations

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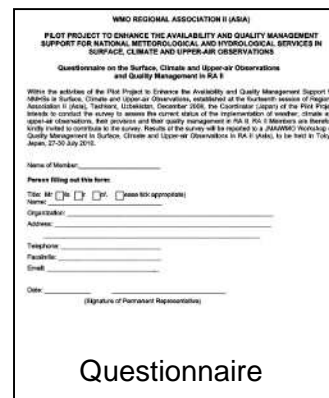
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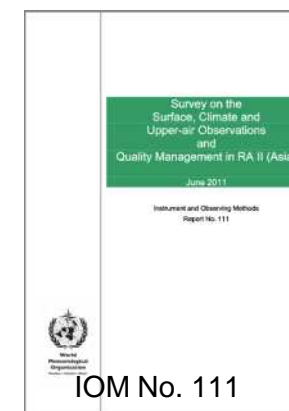
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Questionnaire



IOM No. 111

<http://www.wmo.int/pages/prog/www/IMOP/publications-IOM-series.html>



Workshop

Results of Survey and WS (Round 1)

The major conclusions drawn by the survey and workshop are:

- Problems with surface observations are due to the lack of appropriately calibrated instruments and maintenance support
- Problems with observational reports are due to the insufficient data quality and missing and irregular reports
- Improvement of QC methods are needed at different levels from maintenance and calibration of instrument to data availability
- Several NMHSs don't have any operational systems for QC
- Metadata are not updated with enough frequency

Round 2 (Instrument Calibration)

<Round 2>

- ✓ Survey on Meteorological Instruments, Calibration and Training (RA II) (2011-2012)
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QUESTIONNAIRE ON METEOROLOGICAL INSTRUMENTS, CALIBRATION AND TRAINING IN REGIONAL ASSOCIATION II (ASIA)

This questionnaire is based on the work of Regional Instrument Centre (RIC) Tsukuba and RIC Beijing together with Regional Calibration Centre (RCC) Tokyo and RCC Pune to assess the capability of calibration of the RA II Members as well as their needs for services provided by RICs and RRCs including provision of training materials and working visits to the Members.

Results of the survey will be utilized for RICs and RRCs to help enhance their capability and provide services for improvement of quality of observational data in RA II in an efficient and effective manner.

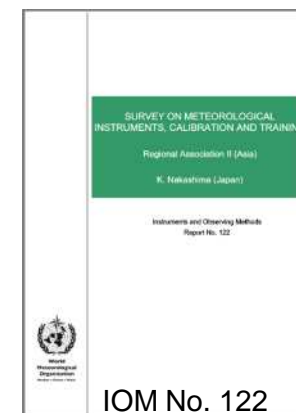
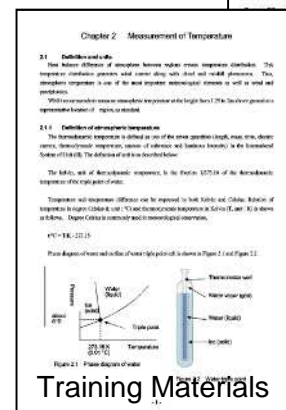
Name of Member: _____

Name: _____

☐ Dr ☐ Mr ☐ Ms (Please tick appropriate)

Signature of Permanent Representative: _____

Questionnaire



<http://www.wmo.int/pages/prog/www/IMOP/publications-IOM-series.html>

Workshop



Results of Survey and WS (Round 2)

The Survey revealed that not a few Members of RA II;

- obviously lack for **international traceability** of meteorological instruments.
- do not perform **regular inspection** of meteorological instruments.
- are still using **mercury instruments**.

JMA/WMO workshops and international activities of RIC Tsukuba also identified some countries who have:

- **No calibration equipment**
- **No manual of calibration**
- **No experience of calibration**

 Urgent need to establish the international traceability of meteorological instruments was emphasized.

Round 3 (QM on surface observation)

<Round 3>

- ✓ RA II Survey on Quality Management for Surface Meteorological Observations (2016-)
- ✓ Workshop (Tokyo, Japan, 19-23 2018)
- ✓ WMO/IOM Report (TBD)

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Questionnaire on Quality Management for Surface Meteorological Observations in RA II

RA II WIGOS Project to Enhance the Availability and Quality of Management Support for AMOs
in Surface, Climate and Upper-air Observations

At its 15th session held from 13 – 15 December 2012 in Doha, Qatar, the Regional Association II (RAII) of the World Meteorological Organization (WMO) decided to launch the regional WIGOS Integrated Global Observing System (IGOS) project to enhance the availability and quality of management support for National Meteorological and Hydrological Services (NMHSs) in surface, climate and upper-air observations. The project has two aims in particular: (i) data quality improvement for Regional Basic Climatological Network (RBCN)/Regional Basic Synoptic Network (RBSN) stations and (ii) capacity enhancement for the Regional Instrument Center at Tsukuba and Beijing. Improvement of surface meteorological observation quality is a major target among RA II Members, and this questionnaire survey (part of project activities) is intended to provide the sharing and exchange of information on the current status of quality assurance (QA) and quality control (QC) in surface meteorological observations conducted by these Members. The results will be analysed and made public to help RA II Members consider possible further improvements to their services.

Please send the completed questionnaires to the Coordinator of the WIGOS project Coordination Group (contact details below e-mail preferred) at your earliest convenience by 30 June 2016.

M. Katsunori Tanaka
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Atmospheric Science Observation Department
Japan Meteorological Agency
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Facsimile: +81-3-5211-1760
E-mail: tanaka@met.jma.go.jp

Member name: _____

Questionnaire completed by:
 Title: Mr | Ms | Dr | Prof | _____
 Name: _____
 Organization: _____
 Address: _____
 Telephone: _____
 Facsimile: _____
 E-mail: _____

Date: _____

(Signature of Permanent Representative)

Questionnaire

Achievements of the project

- Coordinating Group of the project had been established, so that lively discussion among Members are facilitated.

- Publication of IOM reports:

- WMO (2011): Survey on Surface, Climate and Upper-air Observation and Quality Management in RA II (Asia)

http://www.wmo.int/pages/prog/www/IMOP/publications/IOM-111_Survey_RA-II/IOM-111_Survey_RA-II.pdf

- WMO (2015): Survey on Meteorological Instruments, Calibration and Training - Regional Association II (Asia)

http://library.wmo.int/pmb_ged/iom_122_en.pdf

Other activities

< Others >

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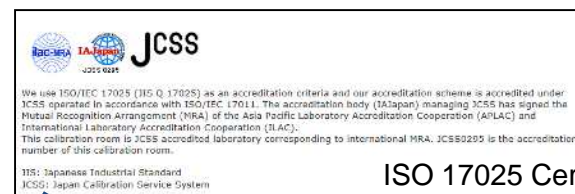
(e) Development of RIC's Websites

(f) Intercomparison between RIC-Tsukuba and RIC-Beijing.

(g) Reports on status on calibration instruments for surface-based observations in RA II (to be prepared for publication as an Instruments and Methods of Observation Programme (IMOP) technical document).



6-monthly monitoring report
<http://qc.kishou.go.jp/>



ISO 17025 Certification



RIC Tsukuba Website (now under renewal!)
http://www.jma.go.jp/jma/jma-eng/jma-center/ric/RIC_HP.html



Intercomparison between RIC Tsukuba (RA II) and RIC Manila (RA V) (March 2017)

Results of Survey and WS (Round 2)

The Survey revealed that not a few Members of RA II;

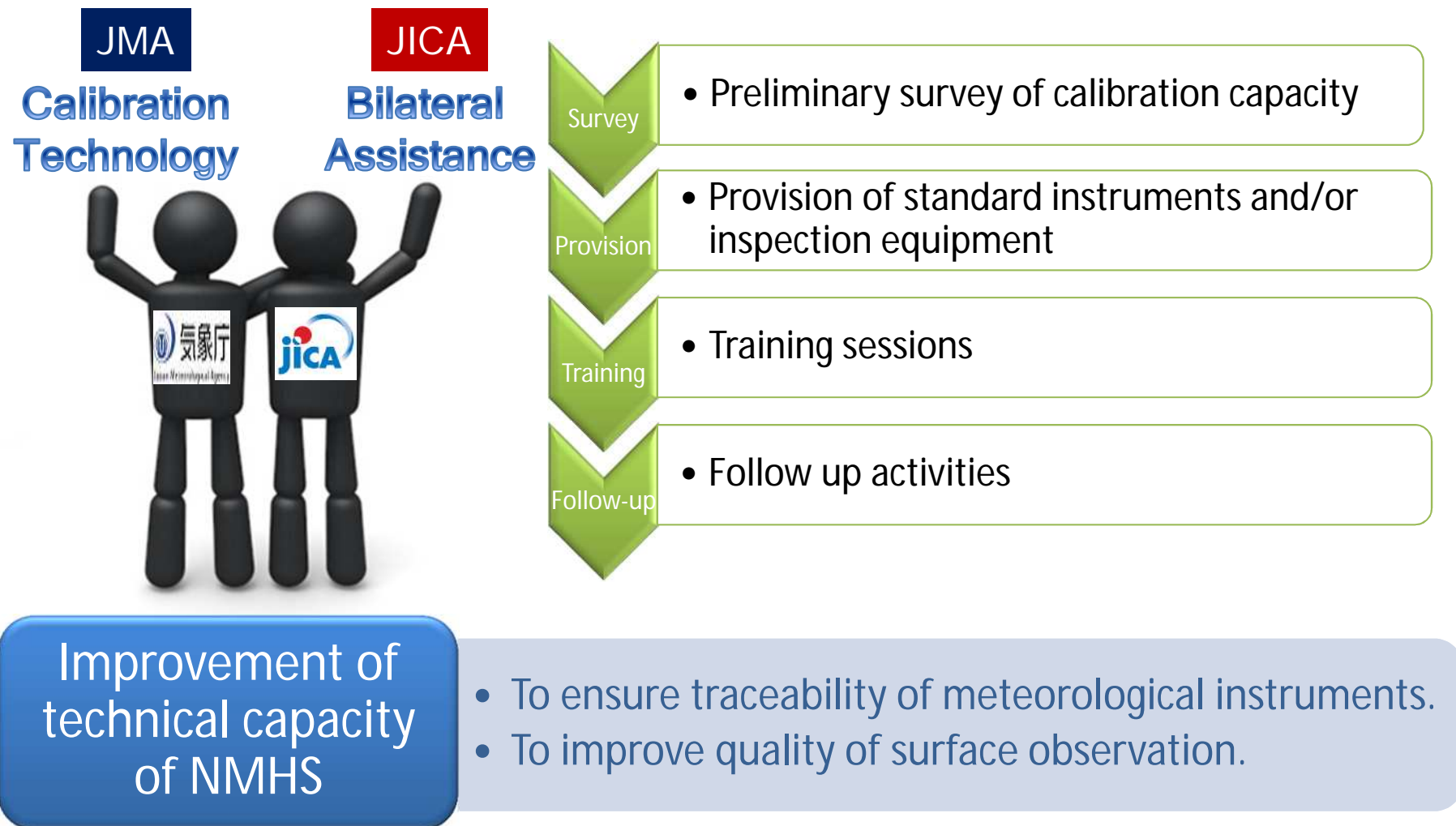
- obviously lack for **international traceability** of meteorological instruments.
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- **No calibration equipment**
- **No manual of calibration**
- **No experience of calibration**

 Urgent need to establish the international traceability of meteorological instruments was emphasized.

RIC Tsukuba Package



RIC Tsukuba Package for Bangladesh in 2013

RIC Tsukuba Package Improves Quality of Surface Observation

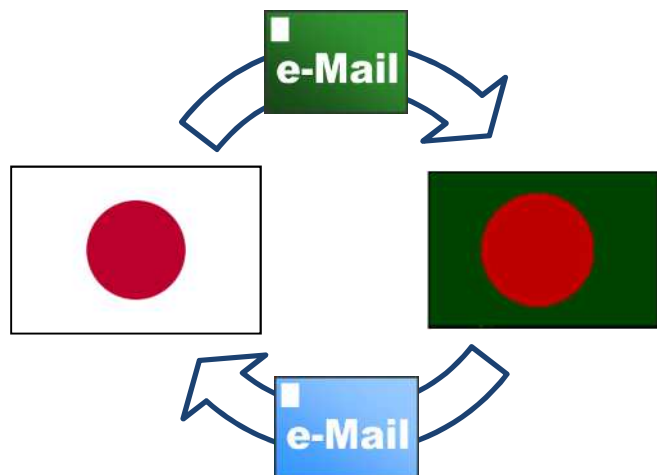
Survey



Provision



Follow-up







Training



(in Japan and Bangladesh)

Some achievement of RIC Tsukuba Packages

Month/year	Country/region		Standard instruments calibrated	Training
Oct 2013		Bangladesh	Barometer, thermometer, hygrometer	Barometer, thermometer, hygrometer
Nov 2013*		Bangladesh		Barometer, thermometer
Jun 2015		Fiji	Barometer, thermometer, hygrometer	Barometer, thermometer
Nov 2015*		Fiji		Barometer, thermometer, hygrometer, rain gauge
Dec 2015		Mozambique	Barometer, thermometer	Barometer, thermometer, hygrometer
Feb 2016		Sri Lanka	Barometer	Barometer, thermometer, hygrometer
Jul 2016		Fiji	Barometer, thermometer, hygrometer	Barometer, thermometer, hygrometer, rain gauge
Aug 2016*		Mozambique		Barometer, thermometer
Nov 2016*		Fiji		Barometer, thermometer, hygrometer
Jan 2017*		Sri Lanka		Barometer, thermometer
Jun 2017*		Sri Lanka		Barometer, thermometer, Hygrometer

Note: Red characters show the ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories) calibration. *: dispatch experts from RIC Tsukuba

AIMS AND ACTIVITIES OF THIS PROJECT

Aim and Benefits

- Project Title

Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations

- Timescale

2017-2020

- Aim

This project aims at improvement of data quality at RBCN/RBSN (RBON) stations and enhancement of services of RA II RICs.

- Benefits

RA II Members, especially those with technical issues on data quality of observations, will potentially benefit from this project.

Plan/Activities of project No. IV (R-WIP-II)

1. Improvements of data quality at RBCN/RBSN (expected to be RBON) stations

The coordinator plans to implement the following action items for improvements of data quality at RBCN/RBSN (RBON) during the project:

- (a) Quality monitoring of surface and upper-air observations in RA II under the framework of WDQMS (WIGOS Data Quality Monitoring System), and incident management.
- (b) Study and share the best practices on QA/QC procedures at surface observation through following process:
 - Conduct a survey on best practice on QA/QC procedures on surface observation by RA II Members and report the results.
 - Develop a website on QA/QC of observation data in RA II.
- (c) Possibility of technical support and information sharing within sub-regional area.

Based on requests from the coordinator, the following Members will consider the possibility of technical support if funds are available, and share the summary of the technical missions with RA II Members:

- CMA, HKO, JMA, and KMA for Southeast Asia,
- IMD for South Asia,
- Roshydromet for Central Asia,
- Kuwait for Middle East.

Assurance and Management of Data Quality

2. Enhancement of RICs Services

RICs plan to implement the following action items for further enhancement of their services in capacity-building and calibration during the project:

- (a) Organization of a training workshop on in-situ check and calibration of instruments at observation stations, as well as instrument maintenance management and field environment.
- (b) Seek, and promotion of, package-type cooperation (including calibration of standards, lectures and practices, and technical support) if funds are available.
- (c) Maintaining and expansion of elements for the International Standard ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.
- (d) Promotion of intercomparison between RICs (including other RAs).
- (e) Update of training materials on calibration and maintenance of instruments and sharing through RIC's website.
- (f) Development of database of RIC's calibration results and sharing through RIC's website.

Calibration of Instruments

3. Investigation on migration error in code forms of observation data.

The coordinator, with collaboration with EG-WIS, conducts a survey on a status on data migration from observation signals into Table Driven Code Forms (TDCF) in RA II and share the results with Members.

TDCF migration

Implementation of activities

Three pronged approach

- ✓ Identifying current status and gap analysis by **Survey**
- ✓ Discussions and training by **Workshop**
- ✓ Sharing the results of survey and workshop through WMO/IOM **Report**

<Round 1>

- ✓ RA II Survey on Surface, Climate and Upper-air Observations and QM (2010)
- ✓ JMA/WMO Workshop on Quality Management in Surface, Climate and Upper-air Observations in RA II (Tokyo, Japan, 27-30 July 2010)
- ✓ WMO/IOM Report No. 111 (June 2011)

<Round 2>

- ✓ Survey on Meteorological Instruments, Calibration and Training (RA II) (2011-2012)
- ✓ JMA/WMO Training Workshop on Calibration and Maintenance of Meteorological Instruments in RA II (Tokyo&Tsukuba, Japan, 19-22 February 2013)
- ✓ WMO/IOM Report No. 122 (June 2015)

<Round 3>

- ✓ RA II Survey on Quality Management for Surface Meteorological Observations (2016-)
- ✓ Workshop (Tokyo, Japan, 19-23 March 2018)
- ✓ WMO/IOM Report (TBD)

Round 3 (QM on surface observation)

<Round 3>

- ✓ RA II Survey on Quality Management for Surface Meteorological Observations (2016-)
- ✓ Workshop (Tokyo, Japan, 19-23 March 2018)
- ✓ WMO/IOM Report (TBD)

1. Improvements of data quality at RBCN/RBSN (expected to be RBON) stations
The coordinator plans to implement the following action items for improvements of data quality at RBCN/RBSN (RBON) during the project:

(a) Quality monitoring of surface and upper-air observations in RA II under the framework of WDQMS (WIGOS Data Quality Monitoring System), and incident management.

(b) Study and share the best practices on QA/QC procedures at surface observation through following process:

- Conduct a survey on best practice on QA/QC procedures on surface observation by RA II Members and report the results.
- Develop a website on QA/QC of observation data in RA II.

(c) Possibility of technical support and information sharing within sub-regional area.
Based on requests from the coordinator, the following Members will consider the possibility of technical support if funds are available, and share the summary of the technical missions with RA II Members:

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- Kuwait for Middle East.

2. Enhancement of RICs Services
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(b) Seek, and promotion of, package-type cooperation (including calibration of standards, lectures and practices, and technical support) if funds are available.

(c) Maintaining and expansion of elements for the International Standard ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.

(d) Promotion of intercomparison between RICs (including other RAs).

(e) Update of training materials on calibration and maintenance of instruments and sharing through RIC's website.

(f) Development of database of RIC's calibration results and sharing through RIC's website.

3. Investigation on migration error in code forms of observation data.
The coordinator, with collaboration with EG-WIS, conducts a survey on a status on data migration from observation signals into Table Driven Code Forms (TDCF) in RA II and share the results with Members.

Questionnaire on Quality Management for Surface Meteorological Observations in RA II

RA II WIGOS Project to Enhance the Availability and Quality of Management Support for AMOSs
in Surface, Climate and Upper-air Observations

At its 10th session held from 11 - 13 December 2012 in Doha, Qatar, the Regional Association II (RAII) of the World Meteorological Organization (WMO) decided to launch the regional WIGOS Integrated Global Observing System (WIGOS) project to enhance the availability and quality of management support for National Meteorological and Hydrological Services (NMHSs) in surface, climate and upper-air observations. The project has two aims in particular: (i) data quality improvement for Regional Basic Climatological Network (RBCN)/Regional Basic Synoptic Network (RBSN) stations and (ii) capacity enhancement for the Regional Instrument Center at Tsukuba and Beijing. Improvement of surface meteorological observation quality is a major target among RA II Members, and this questionnaire survey (part of project activities) is intended to provide the sharing and exchange of information on the current status of quality assurance (QA) and quality control (QC) in surface meteorological observations conducted by these Members. The results will be analyzed and made public to help RA II Members consider possible further improvements to their services.

Please send the completed questionnaire to the Coordinator of the WIGOS project Coordination Group (contact details below e-mail preferred) at your earliest convenience by 30 June 2016.

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Member name: _____

Questionnaire completed by: _____

Title: Mr | Ms | Dr | Prof | _____

Name: _____

Organization: _____

Address: _____

Telephone: _____

Facsimile: _____

E-mail: _____

Date: _____

(Signature of Permanent Representative)

Questionnaire



OBJECTIVE OF THIS WORKSHOP

Objectives of the workshop

- Following the aims of the regional WIGOS project, the objectives of the workshop are:
 - 1) To facilitate implementation of WIGOS in RA II and improvement of data quality at RBCN/RBSN (expected to be RBON) stations under the framework of WDQMS (WIGOS Data Quality Monitoring System);
 - 2) To improve data quality at surface observation in RA II through studying and sharing the best practices on QA/QC procedures, especially in rainfall (based on results of questionnaire conducted in 2016); and,
 - 3) To enhance in-situ check and calibration of instruments at observation stations, as well as instrument maintenance management and field environment in RA II.



SUMMARY

Summary

- The three pronged approach has been taken by coordinating group to implement activities of this project.
 - Identifying current status and gap analysis by Survey
 - Discussions and training by Workshop
 - Sharing the results of survey and workshop through WMO/IOM Report
- Round one (Observations and QM)
- Round two (Instrument Calibration)
- Round three (QM on surface observation)

Thank you for your attention.

For further information ...

<http://www.jma.go.jp/jma/indexe.html>

