Session 4.2

RIC Tsukuba report

Kouichi NAKASHIMA

Scientific Officer
Regional Instrument Centre Tsukuba
Observing Division, Observing Department
Japan Meteorological Agency

Outline

1. Overview of Meteorological Instrument Center

- Organization
- Main services
- Equipment

2. Introduction of RIC Tsukuba

- How to get information about RICs
- Services for Members
- Collaboration between RICs
- Other activities
- Ongoing activity

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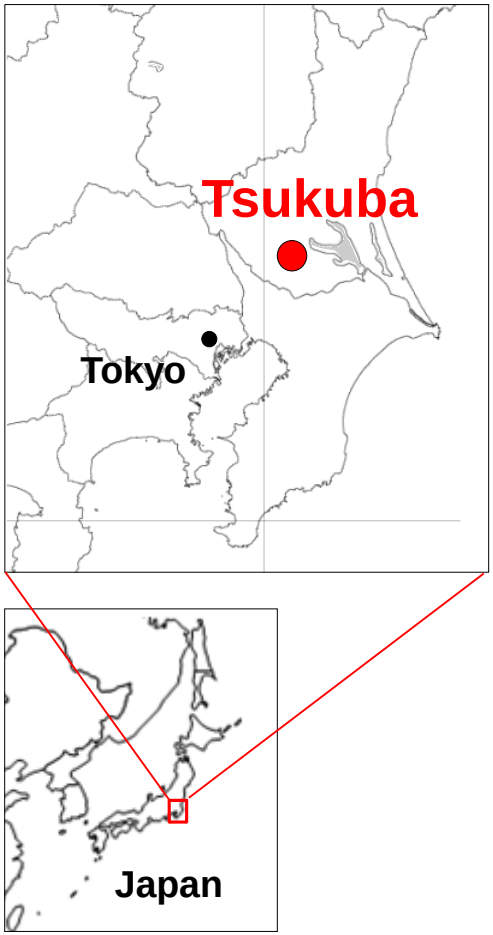
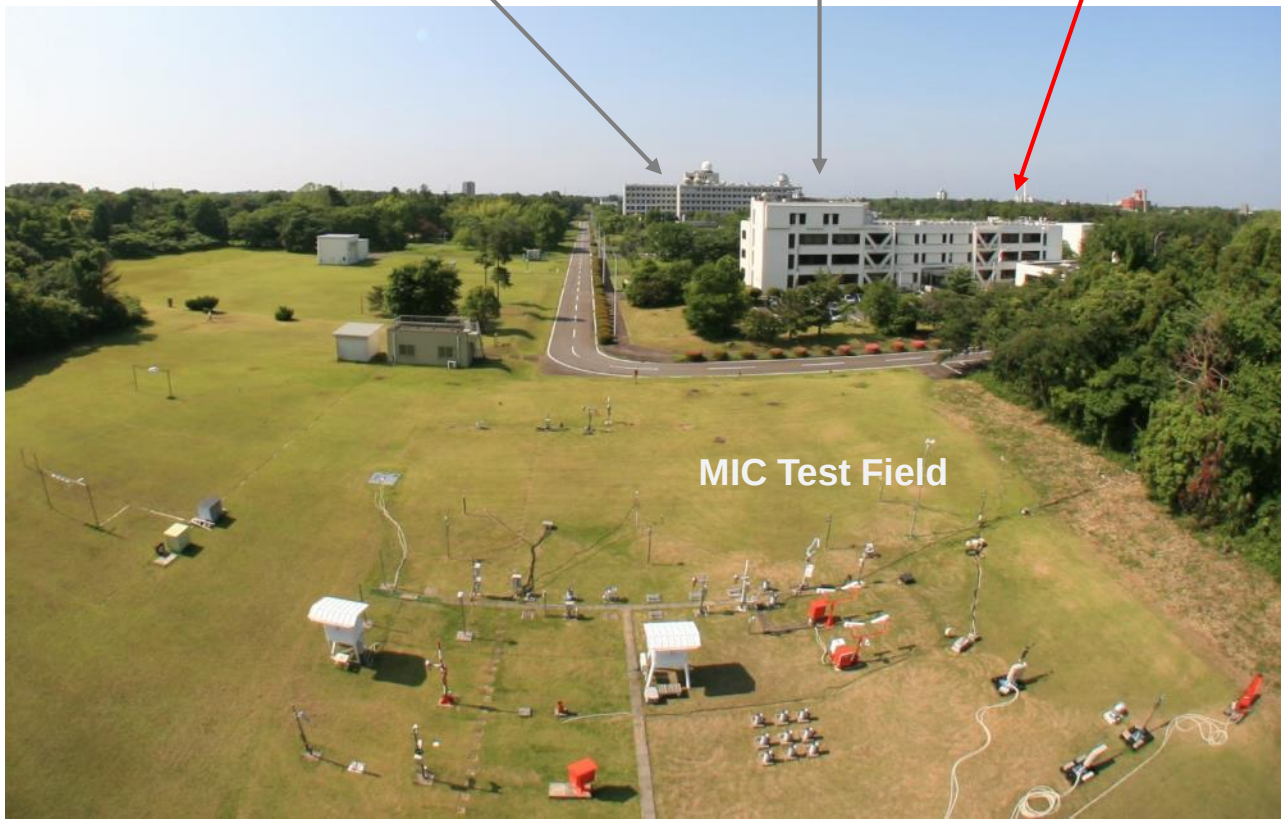
Location of MIC



Meteorological Research Institute

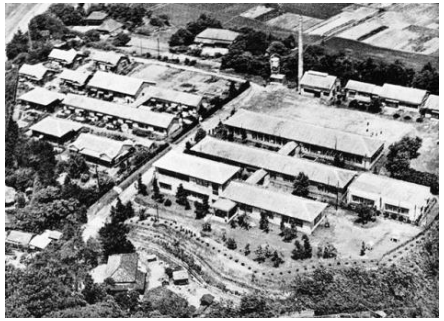
Aerological Observatory
GRUAN
WMO/RRC Tokyo

MIC
WMO/RIC Tsukuba



Development of MIC

A unique institution responsible for development of the meteorological instrumentation of JMA



Former MIC, 1956

Present MIC, 2019

1944
Established

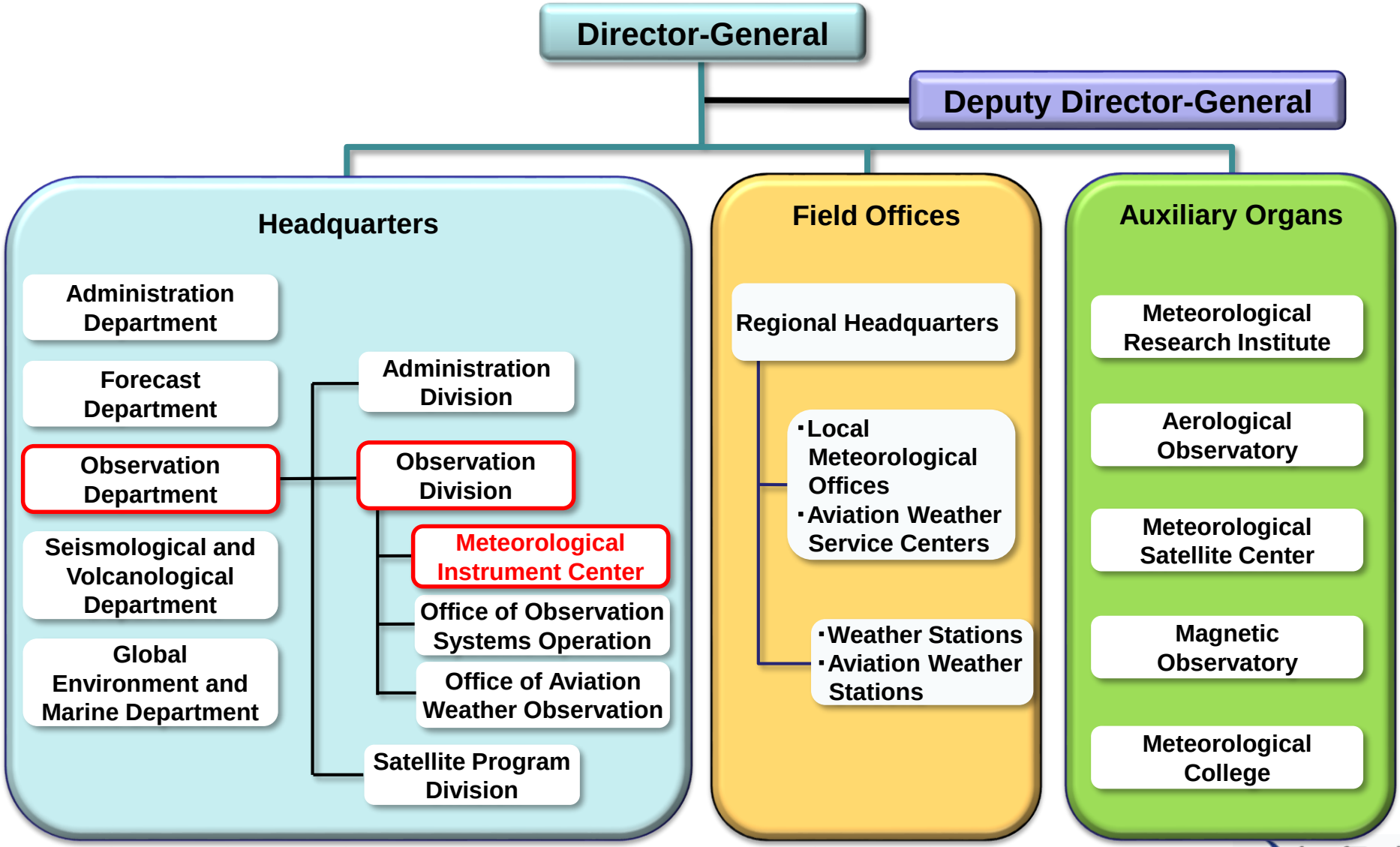
1975
Moved to Tsukuba

2012
Acquired ISO/IEC 17025 accreditation

1944 — **MIC had produced meteorological instruments** — **2019**

1996
Designated as WMO/RIC Tsukuba

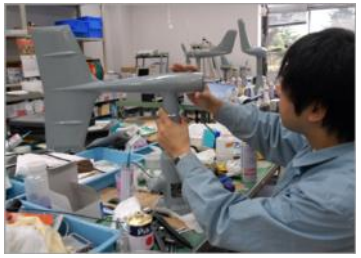
Organizational structure of JMA



Main Services of MIC

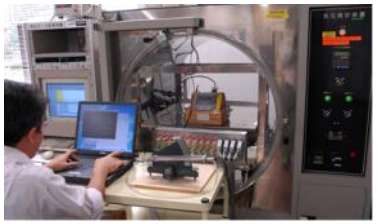
➢ Quality Assurance of Meteorological Instruments

To inspect meteorological equipment and to maintain standard instruments and their traceability, to ensure high-precision meteorological observations in Japan.



➢ Research and Development (R&D)

To carry out research and development of instruments and suitable methods and environment for observation.



➢ Responsibilities as WMO/RIC Tsukuba

To assist Members of RA II (Asia) through calibration and comparison with meteorological instruments, and to conduct training for the Members for fostering specialists in the instrument.

Maintenance and Inspection of Instruments in JMA

AWS Network of JMA (AMeDAS*)

Manned station: ■
Unmanned stations:
- rainfall, temperature, wind and sunshine duration ○
- rainfall ○
- snowfall +

About 1,300 Stations

Site maintenance (regularly)

Overhaul / Inspection at MIC (every 5 years)

Anemometer, Rain gauge, Pyranometer, Sunshine recorder, etc.

* AMeDAS: Automated Meteorological Data Acquisition System

Traceability of Meteorological Instruments in Japan

BIPM

International Standard
(SI unit)

NMIJ

National Primary Standard
(National Metrology Institute of Japan)

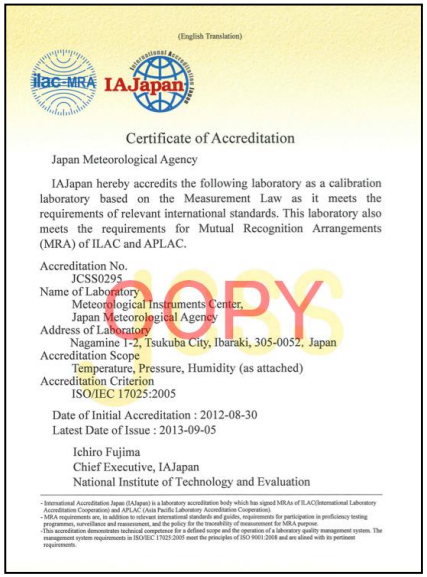
National meteorological standard
(JMA standard)

JMA

Working standards
(JMA sub-standard)

Working instruments
(Observation sites)

MIC



(English Translation)

Certificate of Accreditation

Japan Meteorological Agency

IAJapan hereby accredits the following laboratory as a calibration laboratory based on the Measurement Law as it meets the requirements of relevant international standards. This laboratory also meets the requirements for Mutual Recognition Arrangements (MRA) of ILAC and APLAC.

Accreditation No.
JCSS0295
Name of Laboratory
Meteorological Instruments Center,
Japan Meteorological Agency
Address of Laboratory
Nagamine 1-2, Tsukuba City, Ibaraki, 305-0052, Japan
Accreditation Scope
Temperature, Pressure, Humidity (as attached)
Accreditation Criterion
ISO/IEC 17025:2005

Date of Initial Accreditation : 2012-08-30
Latest Date of Issue : 2013-09-05

Ichiro Fujima
Chief Executive, IAJapan
National Institute of Technology and Evaluation

JMA is accredited to ISO/IEC17025

- **Temperature**
- **Pressure**
- **Humidity**

In Japan, the Meteorological Service Act requires all meteorological instruments used for public to meet certain technical and performance standards.

Calibration equipment

- Standard instruments of JMA -

Standard thermometer

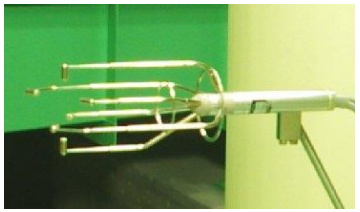
Platinum resistance thermometer sensor and alternating current bridge

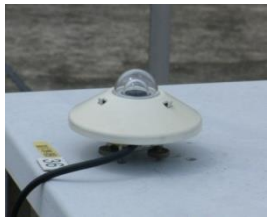
Standard hygrometer

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

Standard barometer

Air piston gauge type





Other Standard

Wind speed, Radiation, Precipitation, etc.

Calibration chambers

Chamber for thermometers

Liquid bath type
Range: - 85 ~ +50℃

Air chamber type
Range: -40 ~ +50℃

Chamber for hygrometers

Wet and dry air mixing type
Range: 15 ~ 95%RH

Wet and dry air mixing type
Range: 10 ~ 95%RH, -10 ~ +50℃

Chamber for barometers

Range: 4 ~ 1050 hPa

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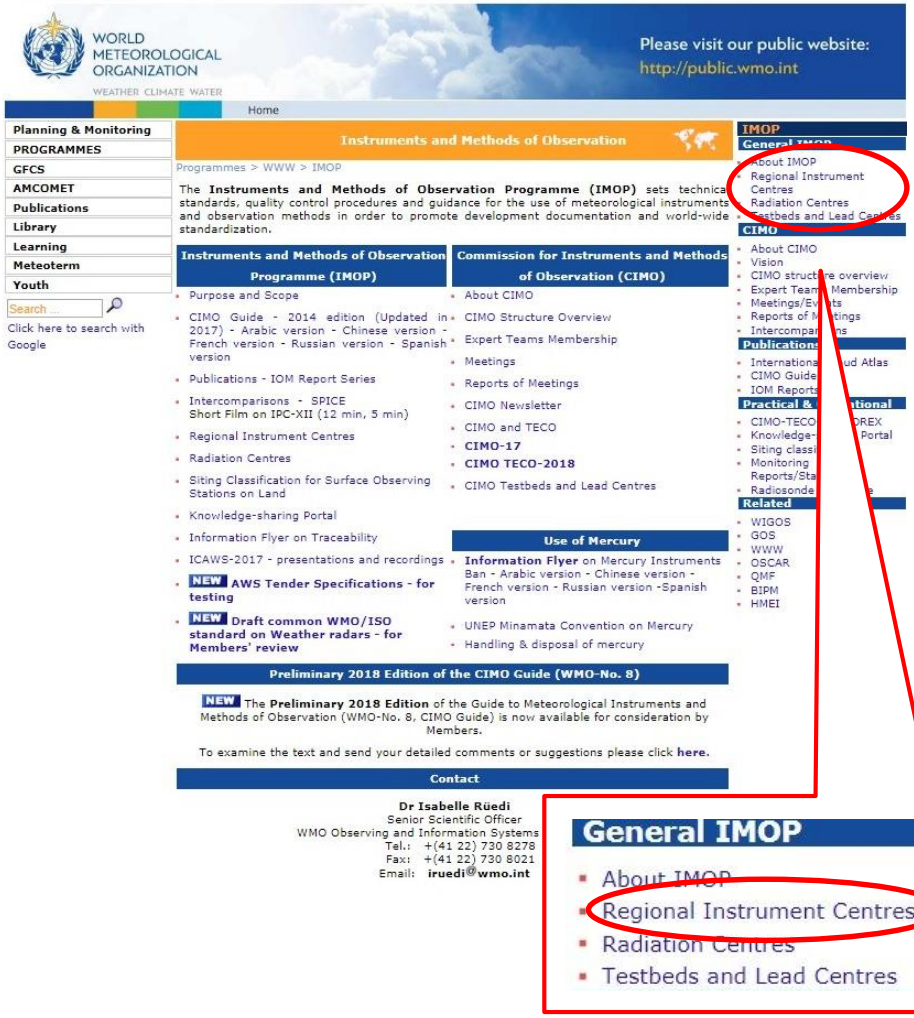
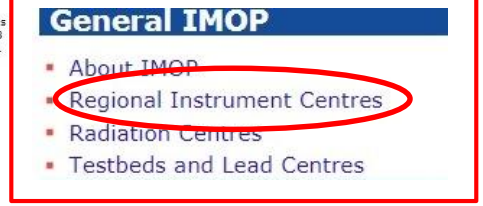
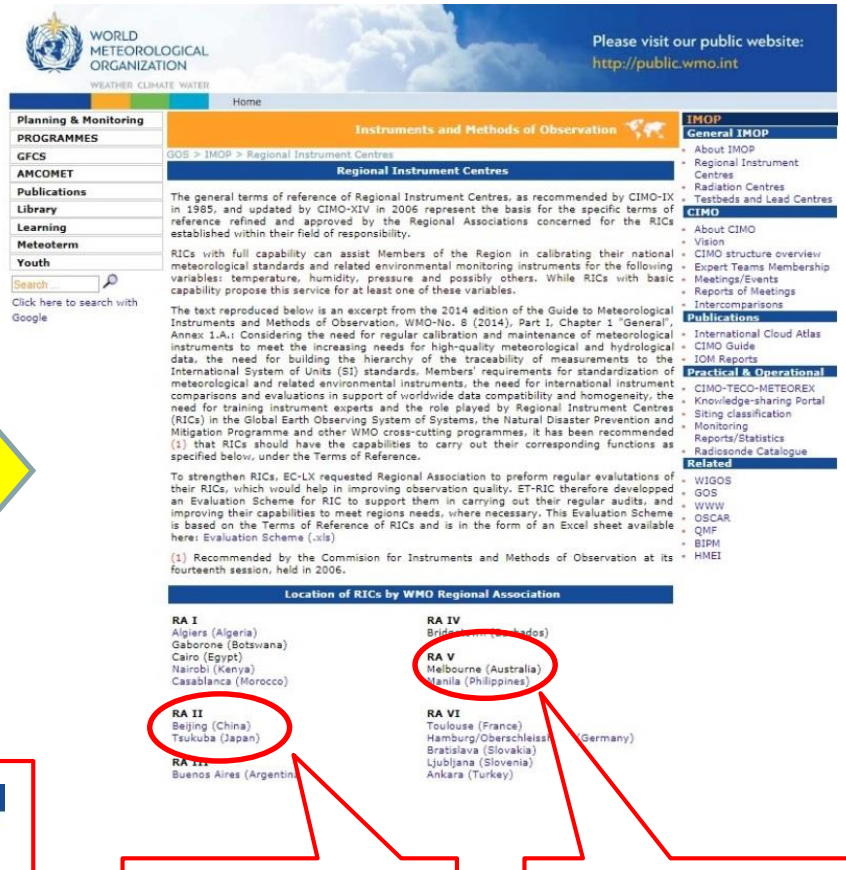
How to get information about RICs?

- RIC Webpage on WMO website -







RA II
Beijing (China)
Tsukuba (Japan)

RA V
Melbourne (Australia)
Manila (Philippines)

http://www.wmo.int/pages/prog/www/IMOP/IMOP-home.html

How to get information about RICs?

- RIC Webpage on WMO website -

WORLD METEOROLOGICAL ORGANIZATION
WEATHER CLIMATE WATER

Please visit our public website:
http://public.wmo.int

Home

WWW > IMOP > Regional Instrument Centres

RIC at Tsukuba, Japan (Region II)

(Information on this webpage is based on the latest report from the RIC.
Please refer to the RIC's website for the latest information.)

General Information

Address: 1-2 Nagamine Tsukuba Ibaraki 305-0052, Japan

Website: http://www.jma.go.jp/jma/jma-eng/jma-center/ric/RIC_HP.html

Contact person: Kouichi NAKASHIMA

Email: kouichi.nakashima@met.kishou.go.jp; ric-tsukuba@met.kishou.go.jp

Tel: +81 298 51 4123

Fax:+81 298 51 1670

Calibration capabilities: Temperature, Relative Humidity, Atmospheric Pressure, Wind

Specific Information on instrument calibration capabilities

Temperature

Instrument Undergoing Calibration	Calibration Range	Reference standard, Equipment	Calibration and Measurement Capability (CMC)*	Traceability of Reference equipment	
				Last standard calibration date	Calibration body
Contact Type Thermometer	-40 to 50 °C	Platinum resistance thermometer NSR-160 (Netsushin)	-40 °C to < 0 °C: 45 mK, at 0 °C: 13 mK, 0 °C < to 50 °C: 36 mK	18 August 2017	Tanaka Kikinzoku Kogyo K.K. Isehara Works Thermometer Calibration Laboratory
		Triple point of water cell 5901C-G (Hart Scientific)		7 August 2017	Tanaka Kikinzoku Kogyo K.K. Isehara Works Thermometer Calibration Laboratory

Status of accreditation (date of the latest accreditation): 29 August 2017

Anemometer	0.5 to 90 m/s	From 20 to 90 m/s: Pitot tube JB1512154 (Tsukuba Rikaseiki, Japan) Differential pressure gauge MT210 (2 sets) (Yokogawa, Japan)	N/A	5 March 2018	National Metrology Institute of Japan

Status of accreditation:

Link to the accreditation certificate

Accreditation body:

* A **CMC (calibration and measurement capability)** is the smallest uncertainty of measurement that can be expected to be achieved by the RIC during a calibration. This CMC is evaluated by the RIC itself and described in the scope of accreditation of the RIC, if available.

Further Information

Report of the RIC (March 2018)

Report of the RIC (May 2017)

WMO OMM

World Meteorological Organization
Organisation météorologique mondiale
Organización Meteorológica Mundial
Всемирная метеорологическая организация
المنظمة العالمية للأرصاد الجوية
世界气象组织

Secrétariat
7 bis, avenue de la Paix – Case postale 2300
CH 1211 Genève 2 – Suisse
Tél.: +41 (0) 22 730 81 11
Fax: +41 (0) 22 730 81 81
wmo@wmo.int – www.wmo.int

Form for
Regular Reporting of Regional Instrument Centres

(please expand the cells as required to properly reflect your activities)

Terms of Reference for Regional Instrument Centres (RICs) are available under:
https://www.wmo.int/pages/prog/www/IMOP/instrument-reg-centres.html

Regional instrument Centre - General Information	
Name of RIC	RIC Tsukuba
RIC's website	http://www.jma.go.jp/jma/jma-eng/jma-center/ric/RIC_HP.html
Institute hosting RIC	Japan Meteorological Agency
City	Tsukuba
Country	Japan
Regional Association	Region II

Contact Person for the Regional Instrument Centre		
Courtesy Title	Mr	
First name	Kouichi	
Family name	NAKASHIMA	
Street and number	1-2 Nagamine	
Postal code	305-0052	
City	Tsukuba	
State/Province	Ibaraki	
Country	Japan	
Tel. number(s)	+81 298 51 4123	
Fax number(s)	+81 298 51 1670	
Email(s)	kouichi.nakashima@met.kishou.go.jp ric-tsukuba@met.kishou.go.jp	
Has contact person changed since 2013?	☒ Yes	☐ No

How to get information about RICs?

- RIC Tsukuba's own website -

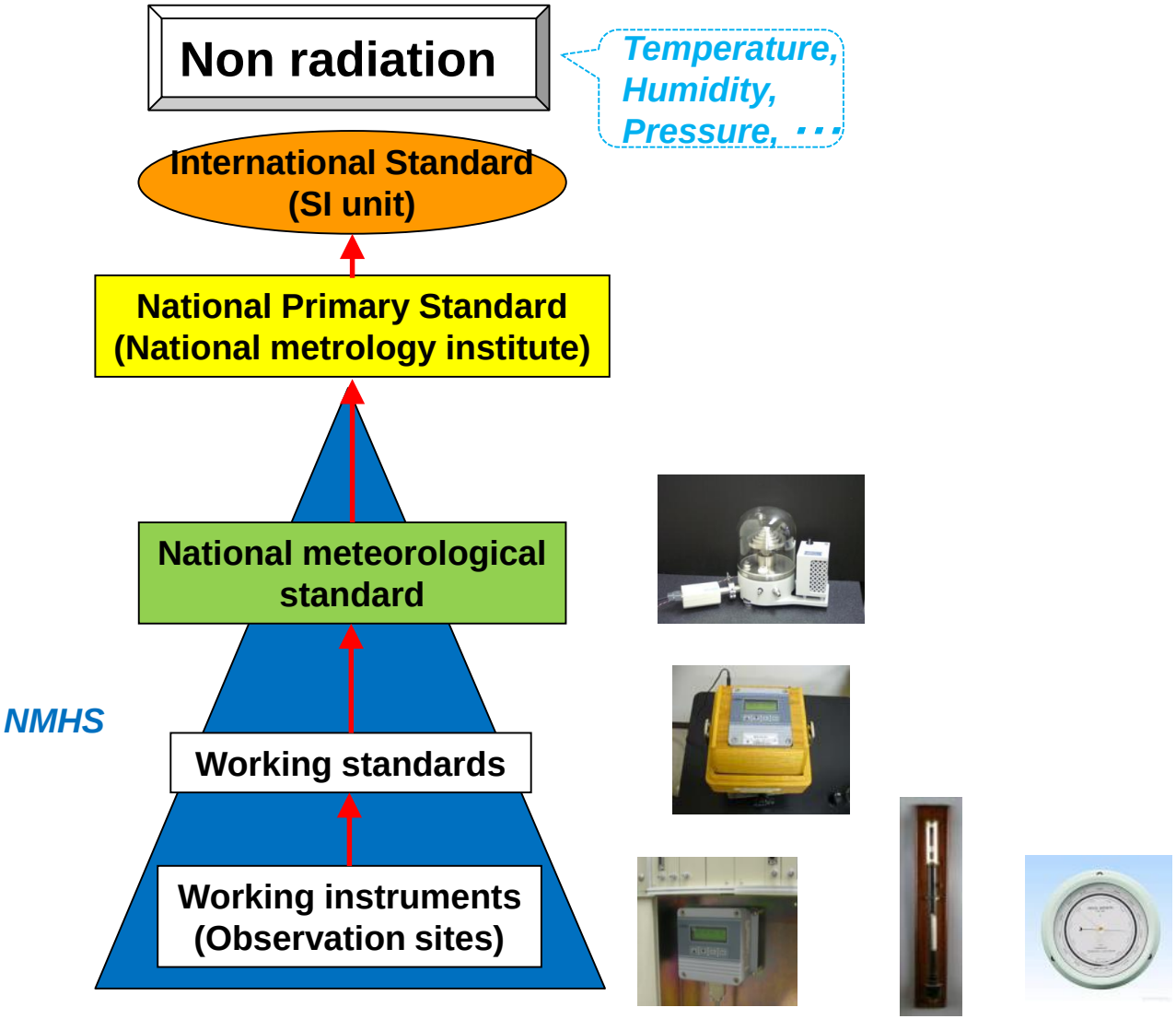
- About RICs
- Overview of RIC Tsukuba
- ISO/IEC 17025
- Quality control of observational instruments
- Activity
- Material

etc.

http://www.jma.go.jp/jma/jma-eng/jma-center/ric/RIC_HP.html

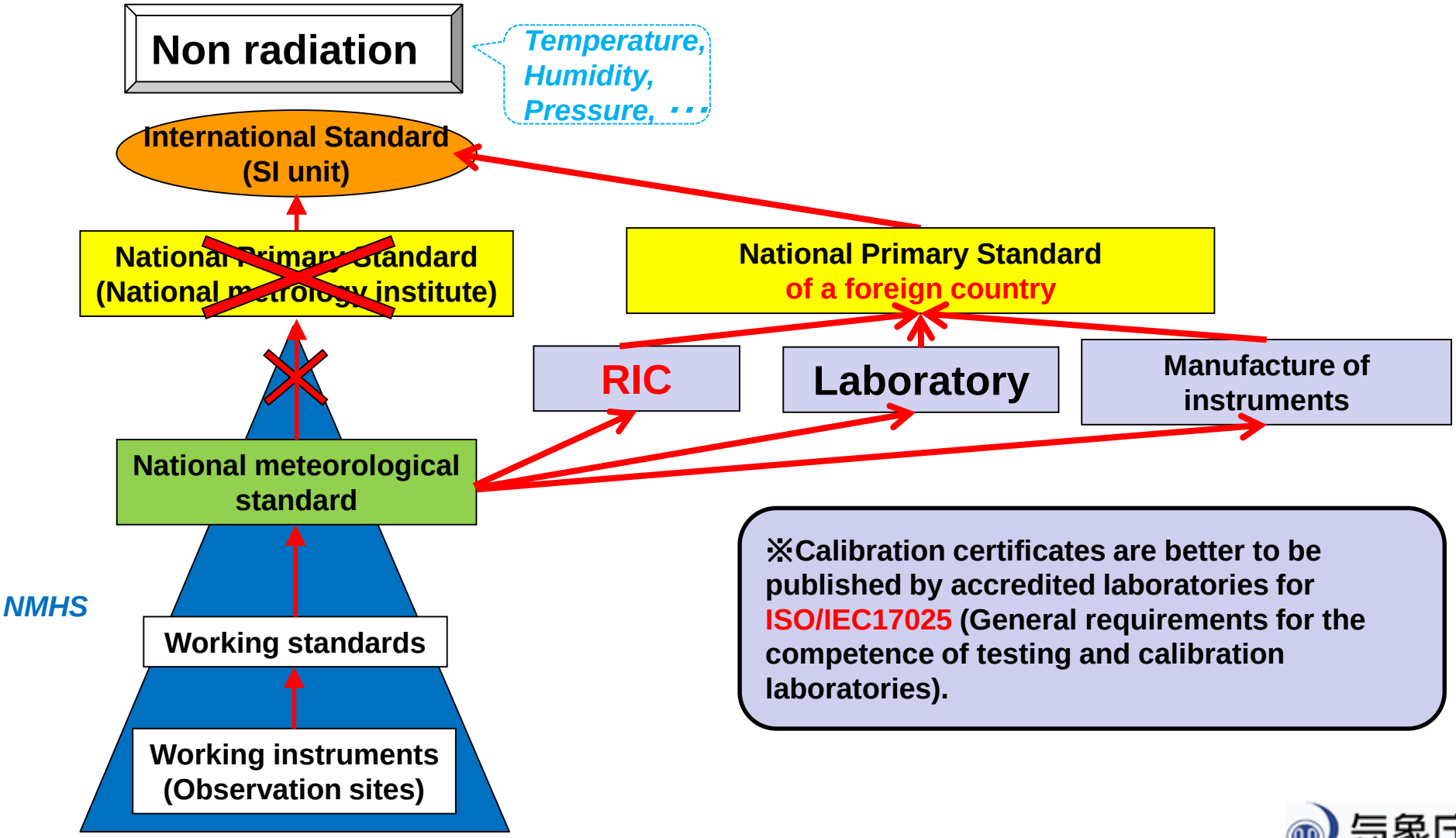
Services for Members

- Traceability in meteorological instruments -



Services for Members

- Traceability in meteorological instruments -



※Calibration certificates are better to be published by accredited laboratories for ISO/IEC17025 (General requirements for the competence of testing and calibration laboratories).

Services for Members

- Calibration for Members at RIC Tsukuba -

Month/year	Country/region	Standard instruments calibrated
Mar. 2000	Thailand	Barometer, thermometer
Oct. 2001	Republic of Korea	Anemometer
Aug. 2006	Philippines	Pyranometer
Apr. 2007	Thailand	Barometer, thermometer
Dec. 2007	Hong Kong, China	Barometer
Jun. 2010	Thailand	Barometer, thermometer, anemometer
Feb. 2012	Sultanate of Oman	Barometer, thermometer, hygrometer
Nov. 2012	Indonesia	Barometer, *thermometer,* hygrometer
Oct. 2013	Bangladesh	*Barometer,* thermometer, hygrometer
Jan. 2015	Hong Kong, China	Anemometer
May 2015	Indonesia	Pyranometer
Jun. 2015	Fiji	*Barometer, thermometer, hygrometer*
Nov. 2015	Philippines	*Barometer*
Jan. 2016	Mozambique	*Barometer, thermometer*
Jan. 2016	Sri Lanka	*Barometer*
Jun. 2016	Fiji	*Barometer, thermometer, hygrometer*
Jan. 2017	Philippines	Anemometer
Apr. 2018	Vanuatu	*Barometer*

Note: Red characters show the ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories) calibration.

Services for Members

- RIC Tsukuba Package -

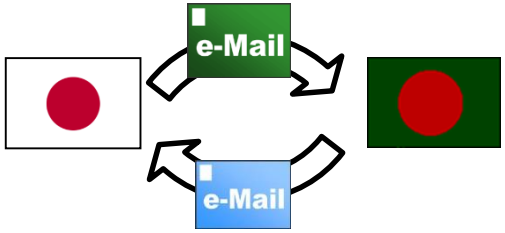
Synergy of the expertise of RIC Tsukuba in the instrument calibration and the international assistance mechanism of JICA

JMA — Calibration Technology

JICA — Bilateral Assistance

1. Survey
2. Provision of equipment
3. Training
4. Follow-up

Bangladesh in 2013



(JICA: Japan International Cooperation Agency)

Services for Members

- RIC Tsukuba Package -

For improving the quality of meteorological data

Training for Bangladesh staff (Bangladesh, Nov., 2013)

Training for Mozambique staff (RIC Tsukuba, Feb., 2016)

Training for 10 Pacific Island Countries staff (Fiji, Nov., 2015)

Training for Sri Lanka staff (RIC Tsukuba, Feb., 2016)

Services for Members

- RIC Tsukuba Package -

Training for Mozambique (Mozambique, Aug., 2016)

Services for Members

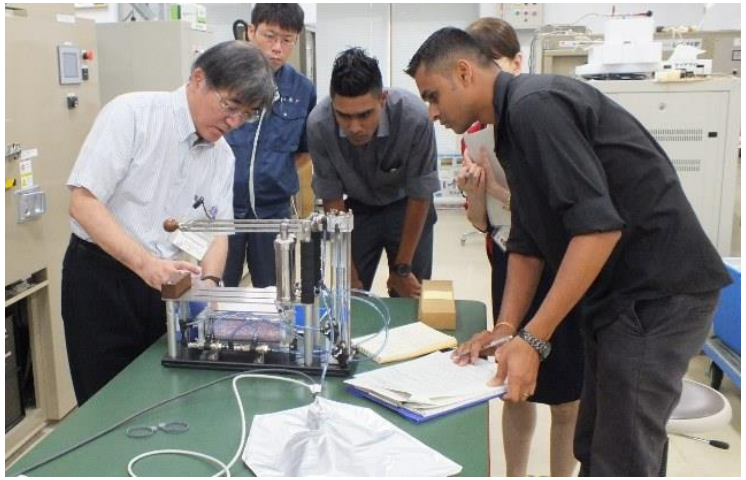
- RIC Tsukuba Package -

Training for Sri Lanka (Sri Lanka, June., 2017)

Services for Members

- RIC Tsukuba Package -

Training for Fiji (RIC Tsukuba, August, 2018)



Services for Members

- RIC Tsukuba Package -

Training for Pacific Island Countries (Fiji, Sep.- Oct., 2018)

Collaboration between RICs

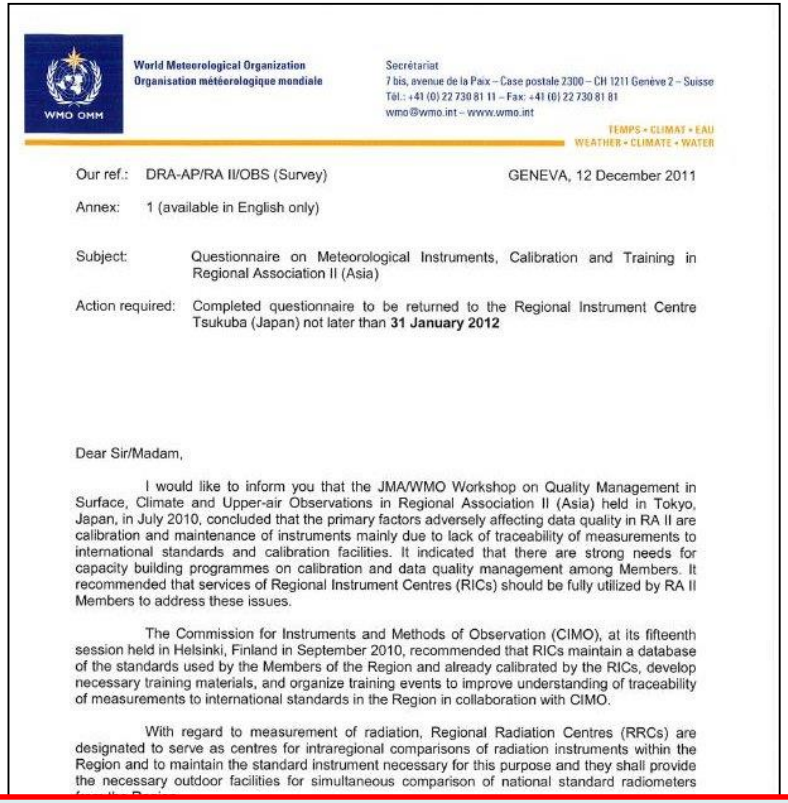
- Collaboration with RIC-Beijing and RIC-Manila -

RIC-Tsukuba and RIC-Beijing conducted reciprocal visits of their experts (2010)

Cooperation between RIC-Tsukuba and RIC-Manila (2016)

Other activities

- WMO Survey of Calibration of Meteorological Instruments in RA II -



World Meteorological Organization
Organisation météorologique mondiale

Secrétariat
7 bis, avenue de la Paix – Case postale 2300 – CH 1211 Genève 2 – Suisse
Tél.: +41 (0) 22 730 81 11 – Fax: +41 (0) 22 730 81 81
wmo@wmo.int – www.wmo.int

TEMPS • CLIMAT • EAU
WEATHER • CLIMATE • WATER

Our ref.: DRA-AP/RA II/OBS (Survey) GENEVA, 12 December 2011

Annex: 1 (available in English only)

Subject: Questionnaire on Meteorological Instruments, Calibration and Training in Regional Association II (Asia)

Action required: Completed questionnaire to be returned to the Regional Instrument Centre Tsukuba (Japan) not later than **31 January 2012**

Dear Sir/Madam,

I would like to inform you that the JMA/WMO Workshop on Quality Management in Surface, Climate and Upper-air Observations in Regional Association II (Asia) held in Tokyo, Japan, in July 2010, concluded that the primary factors adversely affecting data quality in RA II are calibration and maintenance of instruments mainly due to lack of traceability of measurements to international standards and calibration facilities. It indicated that there are strong needs for capacity building programmes on calibration and data quality management among Members. It recommended that services of Regional Instrument Centres (RICs) should be fully utilized by RA II Members to address these issues.

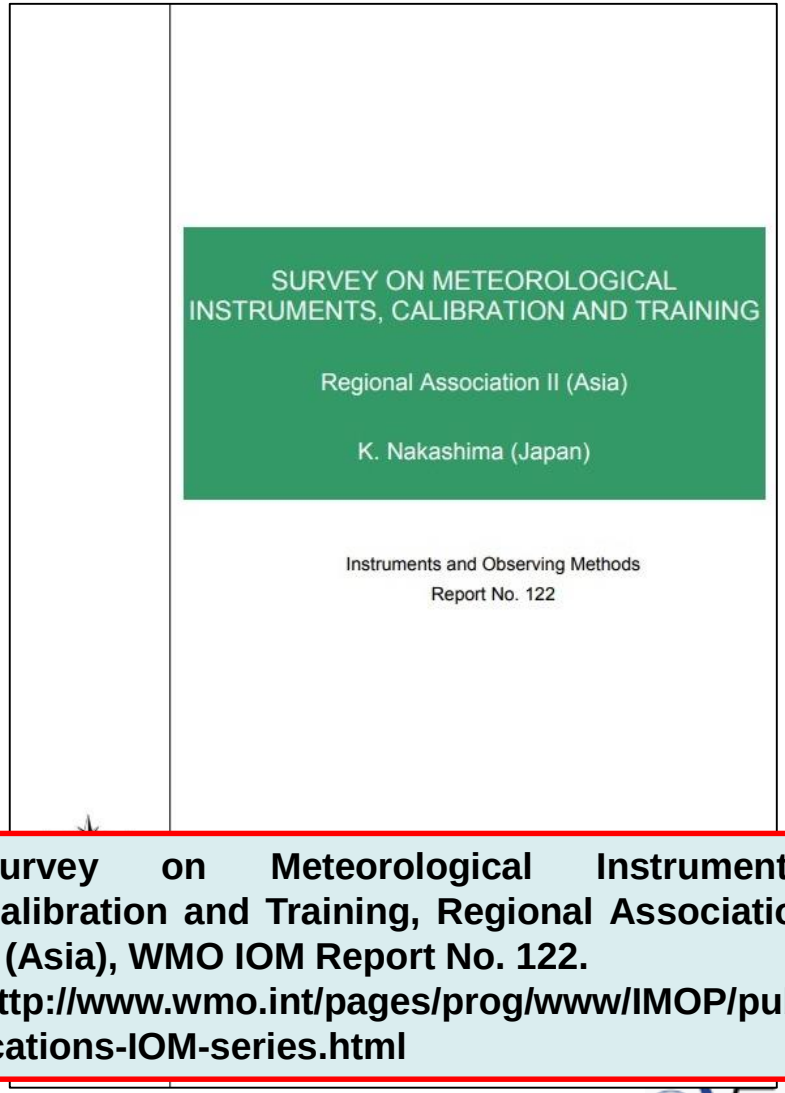
The Commission for Instruments and Methods of Observation (CIMO), at its fifteenth session held in Helsinki, Finland in September 2010, recommended that RICs maintain a database of the standards used by the Members of the Region and already calibrated by the RICs, develop necessary training materials, and organize training events to improve understanding of traceability of measurements to international standards in the Region in collaboration with CIMO.

With regard to measurement of radiation, Regional Radiation Centres (RRCs) are designated to serve as centres for intraregional comparisons of radiation instruments within the Region and to maintain the standard instrument necessary for this purpose and they shall provide the necessary outdoor facilities for simultaneous comparison of national standard radiometers

"Questionnaire on Meteorological Instruments, Calibration and Training in Regional Association II (Asia)"

Member : RIC Tsukuba, RIC Beijing, RRC Tokyo, RRC Pune

Date:12 December 2011



SURVEY ON METEOROLOGICAL INSTRUMENTS, CALIBRATION AND TRAINING

Regional Association II (Asia)

K. Nakashima (Japan)

Instruments and Observing Methods
Report No. 122

Survey on Meteorological Instruments, Calibration and Training, Regional Association II (Asia), WMO IOM Report No. 122. http://www.wmo.int/pages/prog/www/IMOP/publications-IOM-series.html

Other activities

- JMA/WMO Training Workshop on Calibration and Maintenance of Meteorological Instruments in RA II (ASIA) (19-22 February 2013 Tokyo, Tsukuba, Japan) -

http://www.jma.go.jp/jma/en/Activities/RIC_Workshop_2013/RIC_Workshop_2013.html

Other activities

- Second session of the WMO/CIMO Expert Team on Operational Metrology (ET-OpMet) (Tokyo, Japan, 27 - 30 November 2017) -

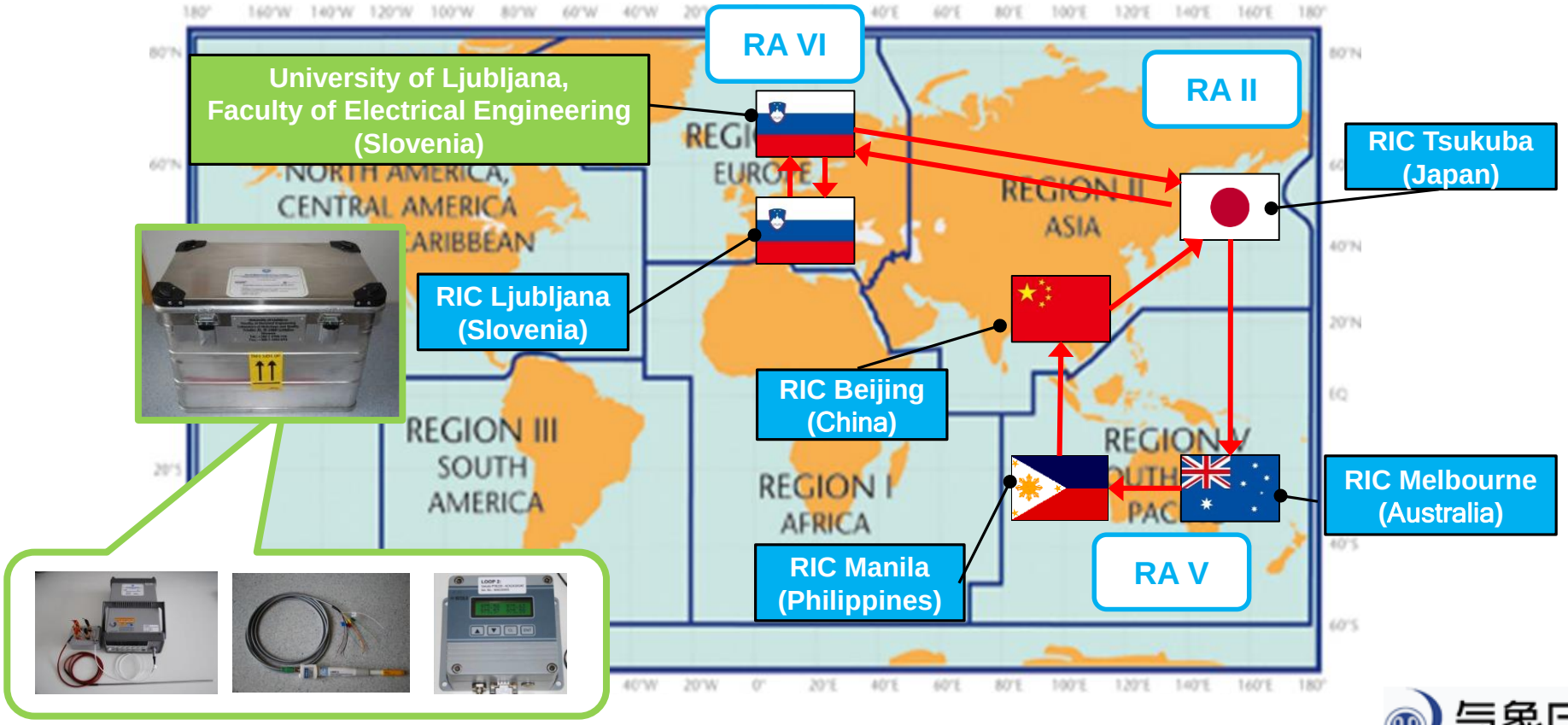
http://www.jma.go.jp/jma/en/photogallery/session_of_ET-OpMet_2017.html

Ongoing activity

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

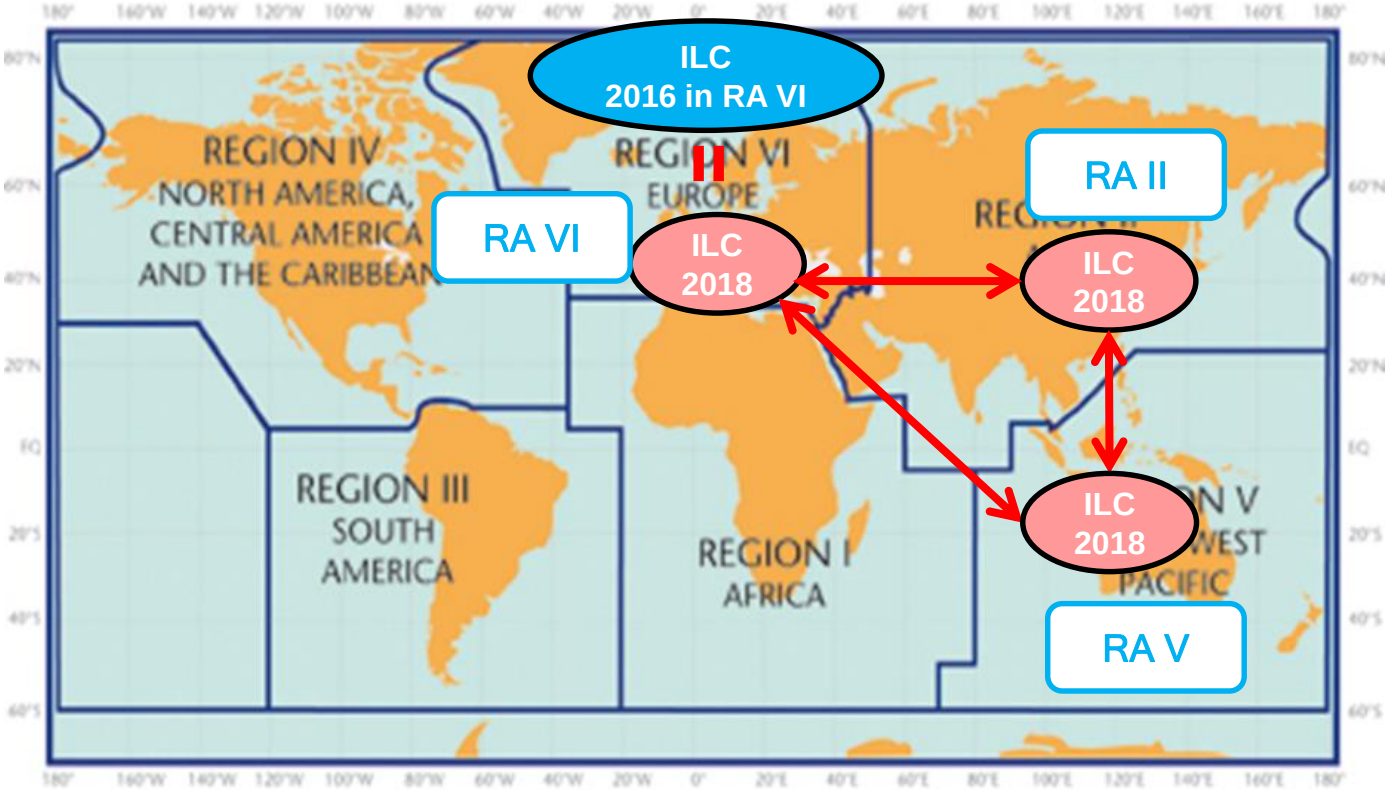
RICs' Terms of Reference (TOR) Capabilities:
(f) A RIC must participate in, or organize, inter-laboratory comparisons of standard calibration instruments and methods;

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



Ongoing activity

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



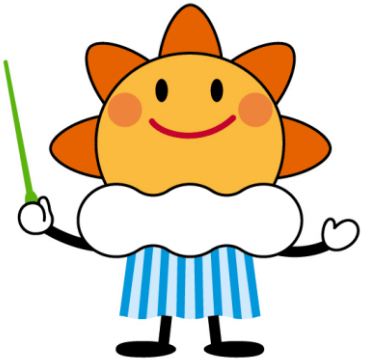
- **The outcomes will help to clarify the calibration capability of RICs in different regions.**
- **ILC results will be submitted to WMO for issuance in an IOM report.**
- **The ILC report, which will include correlation with the comparison in RA VI, is expected to be highly beneficial in its potential for worldwide linkage of results.**

CIMO TECO-2018 (8 - 11 October 2018, Amsterdam, The Netherlands)
https://www.wmocimo.net/wp-content/uploads/O1_10_Nakashima_-Interlaboratory-Comparison-ILC-in-RA-II-V-and-VI.pdf

Summary

- **Traceability and Calibration of instruments are essential for quality assurance of observation data.**
- **RICs can assist and advise Members in these areas.**
- **Feel free to contact RICs if you have any questions.**

Thank you for your attention !



Mascot of JMA ”Harerun”