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| **World Meteorological Organization**  **Commission for Instruments and Methods of Observation**  **Second Session of the Expert Team on Operational Metrology (ET-OpMet)**  Tokyo, Japan, 27-30 November 2017 | **CIMO/ET-OpMet-2/Doc. 5.1** |
| Submitted by: Kouichi NAKASHIMA  20.11.2017 |

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# Overview of RIC reports and evaluation schemes, including proposals for improvements

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| **Summary and purpose of document**  This document provides information on overview of RIC reports and evaluation schemes, including proposals for improvements. |

**Action proposed**

The Meeting is invited to review this document and make recommendations

towards the completion of this task

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**Appendix:** I Detailed results of the reports

**STRENGTHENING RIC CAPABILITIES AND THEIR COMMUNICATION WITH MEMBERS**

**Overview of RIC reports and evaluation schemes, including proposals for improvements**

**1. Introduction**

The Seventeenth session of the World Meteorological Congress (Cg-17) urged Members hosting Regional Instrument Centres (RICs) to continue their efforts to maintain and improve their capabilities, including pursuing accreditation under ISO/IEC 17025 and encouraged them to proactively reach out to the Members of their Region thus supporting them in achieving the goals listed in the Regional WIGOS Implementation Plans. Cg-17 also requested regional associations (RAs) to monitor regional needs for RIC services and to ensure that their RICs are regularly evaluated.

Furthermore, the Commission for Instruments and Methods of Observation at its sixteenth session (CIM0-16), recognizing that strengthening the capabilities of the RICs is of critical importance to WIGOS, requested the WMO Secretariat to seek clarification from all Members hosting RICs on their plans and on-going willingness to provide their facilities to Members according to the agreed responsibilities of RICs.

Following these requests, and in accordance with the Terms of Reference (ToR) of RICs (\*1) available at https://www.wmo.int/pages/prog/www/IMOP/instrument-reg-centres.html, WMO secretariat requested for Permanent Representatives of Members of WMO hosting RICs to submit of "Repot of RIC (\*2)" and "Evaluation scheme for RICs (\*3)" in April 2017.

A total of 9 out of 15 RICs (60%) submitted their reports and evaluation schemes.

-Submitted RICs (9 RICs):

Algeria (RA-I), Morocco (RA-I), Kenya (RA-I), Japan (RA-II), Argentina (RA-III), Philippines (RA-V), France (RA-VI), Slovakia (RA-VI), Slovenia (RA-VI)

-Not submitted RICs (6 RICs):

Egypt (RA-I), Botswana (RA-I), China (RA-II), Barbados (RA-IV), Costa Rica (RA-IV), Australia (RA-V)

\*1: Corresponding ToR are as follows;

- A recognized authority must assess a RIC, at least every five years, to verify its capabilities and performance.

- A RIC must regularly inform Members and report (\*), on an annual basis, to the president of the regional association and to the WMO Secretariat on the services offered to Members and activities carried out. (\*) A Word file available here: RIC-Reporting Form (.docx) is recommended.

\*2: "Form for Regular Reporting of Regional Instrument Centres" available in an electronic version from:

http://www. wmo. int/ pages/prog/www/IMOP/RICs/Reporti ng\_form/Form\_for \_RIC\_Reporting\_2017 final .docx;

\*3: "Evaluation scheme for Regional Instrument Centres" available in an electronic version from:

http://www.wmo.int/ pages/prog/www/IMOP/RICs/Evaluation\_scheme/ Evaluation%20Scheme%20RIC%20En\_V\_2.2\_final .xls.

**2. Outlines of Results**

The outlines of the results are follows.

Detailed results are described in **Appendix I.**

1) The average of number of RIC’s staff is 7.6 persons (Managerial: 2.2, Technical: 5.3).

2) Three RICs (France, Slovakia, Slovenia) have organized and participated in interlaboratory comparison, and three RICs (Morocco, Kenya, Argentina) have participated in interlaboratory comparisons.

3) Three RICs (Japan, Slovakia, Slovenia) are already accredited ISO/IEC 17025 and three RICs (Algeria, Morocco, Kenya) are preparing concrete preparation for accreditation in the near future. One RIC (France) used to be accredited and voluntarily stopped the accreditation now for costs saving reasons.

Three RICs (Algeria, Morocco, Kenya) are certificated to ISO9001.

4) Five RICs (Morocco, Kenya, Japan, Argentina, Slovenia) provided calibration services for other Members/countries since 2013.

5) Five RICs (Morocco, Kenya, Japan, Argentina, Slovenia) have been carried capacity out development/training activities since 2013 within the Region.

6) Four RICs (Japan, France, Slovakia, Slovenia) have provided services on capacity development and training outside the Region.

7) Six RICs (Algeria, Morocco, Kenya, Japan, Philippines, Slovenia) developed and published guidance documents, standard procedures or other publications since 2013.

8) Five RICs (Morocco, Japan, Argentina, Philippines, France) have collaborated with other RICs, RRCs, RTCs, NMHSs or NMIs on standardization of meteorological and other related environmental measurements.

9) Five RICs (Algeria, Kenya, Japan, Philippines, Slovenia) have been some changes in RIC’s capabilities since 2013.

10) Five RICs (Algeria, Morocco, Argentina, Philippines, Slovenia) have been some significant changes in RIC’s infrastructure since 2013.

11) Five RICs (Algeria, Morocco, Kenya, France, Slovakia, Slovenia) have been some changes in staffing since 2013.

12) Eight RICs (Algeria, Morocco, Kenya, Japan, Argentina, Philippines, Slovakia, Slovenia) has future Plans and some other relevant information.

**3. Proposals for improvements**

1) Only 9 out of 15 RICs submitted their reports and 6 RICs has not. The submission rate is only 60%. As it is stated in the ToR of RICs, the regular reporting of activities carried out and capabilities is very important for Members. It is highly required to submit the report by all RIC members.

2) According to the submitted reports, many RICs have published various documents such as guidance documents or other publications and have carried out various capacity development and training activities. As these documents and activity reports are useful not only for Members but also for other RICs to share knowledges and experiences, it is desirable that these are posted on the website or published more and accessible.

**Appendix 1**

**Detailed results of the reports**

A total of 9 out of 15 RICs submitted the form to the WMO secretariat.

-Submitted RICs (9 RICs):

Algeria (RA-I), Morocco (RA-I), Kenya (RA-I), Japan (RA-II), Argentina (RA-III), Philippines (RA-V), France (RA-VI), Slovakia (RA-VI), Slovenia (RA-VI)

-Not submitted RICs (6 RICs):

Egypt (RA-I), Botswana (RA-I), China (RA-II), Barbados (RA-IV), Costa Rica (RA-IV), Australia (RA-V)

**1) RIC’s staff**

The average of 9 RICs is as follows;

Managerial: 2.2

Technical: 5.3

Total: 7.6

**2) Interlaboratory Comparisons**

**2.1) Have you organized any interlaboratory comparison? (If yes, please specify the event(s) and final reports, including their web links, if available):**

Yes: 3/9 (France, Slovakia, Slovenia)

Comments by each RIC;

<France>

• In 2014, for both pressure and humidity calibration. The 3 participants were the 2 DWD laboratories in Hamburg and Munich and RIC Toulouse. Results were presented at TECO2014 in St Petersburg.

• In 2013 ILC organised for pressure, temperature and relative humidity calibration with Maroc Météo.

<Slovakia>

• 2008: Intercomparison between Calibration laboratories of central and eastern European countries (please see attached file for report)

<Slovenia>

• 2013: Bilateral interlaboratory comparison in the field of humidity standards between Slovenian and Serbian NMHS (protocol and report)

•2014: Bilateral interlaboratory comparison in the field of humidity, pressure and temperature standards between Slovenian and Serbian NMHS (protocol and report)

•2015: Bilateral interlaboratory comparison in the field of humidity and temperature standards between Slovenian and Serbian NMHS (protocol and report)

•2016: Bilateral interlaboratory comparison in the field of pressure standards between Slovenian and Serbian NMHS (protocol and report)

•2016: Intercomparison in the field of temperature, humidity and pressure in Regional Association VI in cooperation with MeteoMet 2 project

•2017: Bilateral interlaboratory comparison in the field of pressure standards between Slovenian and Serbian NMHS (protocol and report)

**2.2) Have you participated in any interlaboratory comparison? (If yes, please specify the event(s) and the report(s), including their web links, if available):**

Yes: 6/9 (Morocco, Kenya, Argentina, France, Slovakia, Slovenia)

Comments by each RIC;

<Morocco>

• Bilateral cooperation Moroccan Meteo & Meteo France

<Kenya>

We carried out an interlaboratory comparison of the following with Casablanca RIC in Morocco in November 2013

Pyranometer (s/no. 6013.1000.BG)

Resistance thermometer (S/no. 015799/11)

<Argentina>

Yes, presented in TECO 16, see IOM 125, Session 3, P3 (42) at:

<http://www.wmo.int/pages/prog/www/IMOP/publications/IOM-125_TECO_2016/TECO_2016-> Homepage.html

<Philippines>

Trial comparisons only with RIC-Japan for pressure and temperature last March 2016.

<France>

• In 2015 for temperature calibration, ILC organised by the accredited company Deltamu (http://www.deltamu.com/en).

• In 2016 for temperature, pressure and relative humidity calibration, ILC organised by the WMO TT-RIC in RA VI and the University of Ljubljana (Slovenia). Report to be published in 2017.

<Slovakia>

• 2008: Intercomparison between RA VI RICs

•2016/17: Intercomparison in the field of temperature, humidity and pressure MM-ILC-2015-THP (report should be available soon)

<Slovenia>

• 2016: Bilateral interlaboratory comparison in the field of temperature, humidity and pressure standards between Slovenian and Morocco NMHS; report presented at TECO 2016 Madrid: http://www.wmo.int/pages/prog/www/IMOP/publications/IOM-125\_TECO\_2016/Session\_3/O3 (10) \_Aziz\_CIL-Morocco.pdf

• 2016: Intercomparison in the field of temperature, humidity and pressure in Regional Association VI in cooperation with MeteoMet 2 project (MM-ILC-2015-THP); ILC finished; ILC report to be finished in May 2017

**3) Applied International Standards/Norms**

Is your RIC accredited according to ISO/IEC 17025? Is your RIC accredited according to ISO/IEC 17025?

Yes: 3/9 (Japan, Slovakia, Slovenia)

(Preparing to ISO/IEC 17025 accreditation: Algeria, Morocco, Kenya, Philippines)

(ISO 9001 accredited: Algeria, Argentina)

Comments by each RIC;

<Algeria>

No. It is actually Certified ISO 9001-2008, the ISO 17025 is planned for the end 2017.

<Morocco>

No. ISO17025 applied.

<Kenya>

No. We have already initiated the process of accreditation with the national laboratories accreditation body. We expect to be accredited in the course of 2017/2018 Financial year

<Argentina>

No. Certify by ISO:9001. Accreditation planned for medium range

<Japan>

Yes (please, specify the following):

Accreditation/certification body: National Institute of Technology and Evaluation (Japan)

Date of the last audit: 30-Aug-2016

Link to the Certificate of Accreditation: <http://www.nite.go.jp/en/iajapan/jcss/labsearch/pdf/d0295m-e.pdf>

<Philippines>

No. None yet due to building renovation, no training seminar for ISO 17025 accreditation and preparation but planning to apply.

<France>

• No (please, indicate if you have already applied any quality management system, and provide a reason for a lack of accreditation, if possible)

- The laboratory used to be accredited for pressure, temperature and relative humidity calibration according to ISO 17025. After moving the laboratory from Trappes to Toulouse, Meteo-France voluntarily stopped the accreditation, for costs saving reasons. The laboratory has since kept on working abiding by the ISO 17025 standard.

<Slovakia>

Yes (please, specify the following):

Accreditation/certification body: SNAS (Slovak national accreditation service)

Date of the last audit: April 2017

Link to the Certificate of Accreditation:

<https://ais.snas.sk/ais/#WebReports/1/list.accredited.subject.search.byfield/AccreditedSubjectsByFields>

<Slovenia>

Yes (please, specify the following):

Accreditation/certification body: Slovenian Accreditation

Date of the last audit: 10 February 2017

Link to the Certificate of Accreditation:

http://www.slo-akreditacija.si/acreditation/ministrstvo-za-okolje-in-prostor-agencija-republike-slovenije-za-okolje-lk/?lang=en

**4) Assessment by a recognized authority other than accreditation body**

Was your RIC assessed by a recognized authority other than an accreditation body? (e.g. certification body, NMI, another RIC)

Yes: 6/9 (Algeria, Morocco, Kenya, Argentina, Philippines, France)

Comments by each RIC;

<Algeria>

Yes (please, specify the following):

Name of a recognized authority: Société Générale de Surveillance (SGS)

Date of the last assessment: 23/03/2017

Standard against which the assessment was carried out: ISO 9001/2008

<Morocco>

Yes (please, specify the following):

Name of a recognized authority: VERITAS

Date of the last assessment: 2016

Standard against which the assessment was carried out: ISO9001

<Kenya>

Yes (please, specify the following):

Name of a recognized authority: BUREAU VERITAS

Date of the last assessment: 25/2/2015

Standard against which the assessment was carried out: ISO 9001:2008

<Argentina>

Yes (please, specify the following):

Name of a recognized authority: INTI (National Metrology Reference

Date of the last assessment: Dec 2015

Standard against which the assessment was carried out: Pressure

<Philippines>

Name of a recognized authority: RIC-Tsukuba (Japan) visiting experts

Date of the last assessment: March 2016

Standard against which the assessment was carried out: Temp. & Pressure,

Intercomparisons trial only, a digital barometer (3 sensors) was donated from JICA project.

<France>

• Yes (please, specify the following):

Name of a recognized authority: Bertrand Blanquart

Date of the last assessment: November 2014

Standard against which the assessment was carried out: ISO 17025

**5) WMO/CIMO Evaluation Scheme (excel file) Have you filled out the WMO/CIMO Evaluation Scheme (excel) and submitted it to the WMO Secretariat?**

Yes: 5/9 (Morocco, Kenya, Japan, Philippines, Slovakia)

**6) Calibrations of the Members’ Instruments**

Which calibration services, were provided by your RIC for other Members/countries since 2013? (Please specify)

Yes: 5/9 (Morocco, Kenya, Japan, Argentina, Slovenia)

Comments by each RIC;

<Morocco>

Year, Type of instruments, Number of calibrated instruments, WMO Member/Country

2017, National Fix and mobile standard barometers, 04, Madagascar, Cameroun

2016, National Fix and mobile standard barometers, and network barometers, 13, Senegal

2016, Standard barometers, 02, Algeria

<Kenya>

Year, Type of instruments, Number of calibrated instruments, WMO Member/Country

2014, Ordinary Thermometer, 1, Malawi

2014, Aneroid Barometer, 2, Seychelles

2013, Aneroid Barometer, 1, Djibouti

2015, Aneroid Barometer, 1, Ghana

<Japan>

Year, Type of instruments, Number of calibrated instruments, WMO Member/Country

2013, Barometer, Thermometer Barometer: 1, Thermometer: 3, Bangladesh

2015, Anemometer, 6, Hong Kong, China

2015, Pyranometer, 1, Indonesia

2015, Barometer, Thermometer, Hygrometer Barometer: 1, Thermometer: 1, Hygrometer: 1, Fiji

2015, Barometer, 1, Philippines

2016, Barometer, Thermometer Barometer: 1, Thermometer: 3, Mozambique

2016, Barometer, 1, Sri Lanka

2016, Barometer, Thermometer, Hygrometer Barometer: 1, Thermometer: 1, Hygrometer: 1, Fiji

2017, Anemometer, 1, Philippines

<Argentina>

Year, Type of instruments, Number of calibrated instruments, WMO Member/Country

2013, Mercury barometer, 4, Paraguay

2014, AWS T, P, H sensors, 1, Paraguay

2015, Pressure sensors, 2, Paraguay

2017, Digital Barometer, 13, Paraguay

<Slovenia>

Year, Type of instruments, Number of calibrated instruments, WMO Member/Country

2013, Reference platinum resistance thermometers, capacitive hygrometer, reference barometer, 4, Serbia

2014, Reference platinum resistance thermometers, capacitive hygrometer, reference barometers, 5, Serbia

2015, Reference platinum resistance thermometers, capacitive hygrometers, reference barometers, 6, Serbia

2016, Reference platinum resistance thermometers, capacitive hygrometers, reference barometers, 5, Serbia

2017, Reference platinum resistance thermometers, capacitive hygrometers, reference barometers, 7, Serbia

**7) Capacity Development and Training Activities**

**7.1) Which capacity development/training activities have been carried out by your RIC since 2013 within the Region? (please specify events, WMO Members that participated and the number of participants)**

Yes: 5/9 (Morocco, Kenya, Japan, Argentina, Slovenia)

Comments by each RIC;

<Morocco>

• 2015: “Maintenance and Calibration of meteorological instruments”: Algeria, Tunisia, Mauritania, Senegal, Cape Verde, Cameroon, Comoros, Djibouti, Guinea, Guinea-Bissau, Haiti, Sao Tome and Principe, Madagascar, Benin (14 participants).

• 2014: “Maintenance and Calibration of meteorological instruments”: Mali, Togo, Niger, Tunisia, Mauritania, Senegal, Cape Verde, Gabon, Burkina Fasso, Cameroon, Comoros, Djibouti, Sao Tome and Principe, Madagascar, Congo (15 participants).

• 2013: Metrology for Meteorology: Training of ASECNA Technicians in EAMAC-Niger (18 participants)

<Kenya>

• 2015-Instrument Maintenance and Calibration Course (IMCC), 24 Participants from Sudan, Seychelles, Zambia, Malawi, Tanzania, Ethiopia, Sierra Leone, Mauritius, Ghana, Rwanda, Gambia, South Sudan, Zimbabwe, Liberia, Swaziland, Burundi, Namibia, Mozambique, Somalia & Kenya,

• 2014-Instrument Maintenance and Calibration Course (IMCC), 24 Participants from Sudan, Seychelles, Sierra Leone, Mauritius, Ghana, Rwanda, Gambia, South Sudan, Zimbabwe, Swaziland, Burundi, Namibia, Mozambique, Kenya, Congo Brazzaville, Burkina Faso, Djibouti, Guinea, Mali, Senegal & Cote-devor

• 2013-Instrument Maintenance and Calibration Course (IMCC), 30 Participants from Sudan, Seychelles, Zambia, Malawi, Tanzania, Ethiopia, Mauritius, Ghana, Gambia, South Sudan, Zimbabwe, Burundi, Namibia, Mozambique, Kenya,

<Japan>

• JMA/WMO Training Workshop on Calibration and Maintenance of Meteorological Instruments in RA II (Japan, 19-20 Feb 2013)

In collaboration with WMO, JMA held a training workshop on calibration and maintenance of meteorological instruments in RA II. The workshop was attended by 13 experts in the region in addition to an expert from RIC Beijing. The documents and presentations on the workshop are available at:

http://www.jma.go.jp/jma/en/Activities/RIC\_Workshop\_2013/RIC\_Workshop\_2013.html

• Technical training for Bangladesh Meteorological Department (BMD)

Technical and practical training on thermometer and barometer calibration was conducted in 2013 at RIC Tsukuba with three invited BMD experts. Several months after the training, two RIC Tsukuba experts were dispatched to BMD to check staff proficiency and provide additional instruction on calibration activities.

<http://www.jma.go.jp/jma/jma-eng/jma->center/ric/Our%20activities/RICpackage/BMD/BMD.html

• Technical training for Department of Meteorology, Sri Lanka (DOM)

In February 2016, four DOM experts were invited to RIC Tsukuba for training on the importance of instrument traceability/calibration and practical training on thermometer and barometer calibration.

<http://www.jma.go.jp/jma/jma-eng/jma-> center/ric/Our%20activities/RICpackage/DOM/DOM.html

<Argentina>

• Nov 2015 RIC host the WMO training Workshop on Metrology for Spanish speaking countries of RA III and RA IV with 23 participants from 9 RA III members and 6 RA IV members.

• Mar 2017 RIC staff has been participated in the Workshop of Metrology for Meteorology and Climatology organized by PTB and hosted by INTI in Buenos Aires with the participation of members of RA III and RA IV.

<Slovenia>

• 2013: In the frame of WMO project “Building Resilience to Disasters in Western Balkans and Turkey” two field verification kits were deployed. Initial calibration, instructions and training were provided by RIC Ljubljana for following countries: Montenegro, Kosovo (under UN resolution 1244/99), Albania, Bosnia and Herzegovina and Former Yugoslav republic of Macedonia

• 2013: Training seminar on relative humidity calibration; Serbia; 4 participants

• 2014: Training seminar on temperature, air pressure and relative humidity calibration; Serbia; 1 participant

• 2016: Training seminar on temperature and relative humidity calibration; Serbia; 1 participant

**7.2) Has your RIC provided services on capacity development and training outside the Region? (If yes, please specify to whom and when)**

Yes: 4/9 (Japan, France, Slovakia, Slovakia)

Comments by each RIC;

<Japan>

• Technical training for Fiji Meteorological Service (FMS)

Technical and practical training on thermometer and barometer calibration was conducted at RIC Tsukuba in June 2015 with three invited FMS experts.

In November 2015, two RIC Tsukuba experts were subsequently dispatched to FMS to check staff proficiency and provide training on on-site calibration using traveling standard instruments at four AWS stations in Fiji.

In July 2016, three FMS experts were hosted at RIC Tsukuba to review methods of barometer and thermometer calibration and rain gauge maintenance.

<http://www.jma.go.jp/jma/jma-eng/jma-> center/ric/Our%20activities/RICpackage/FMS/FMS.html

• Technical training for National Institute of Meteorology of Mozambique (INAM)

In December 2015, four INAM experts were invited to RIC Tsukuba for training on the importance of instrument traceability/calibration and practical training on thermometer and barometer calibration.

Two RIC Tsukuba experts were subsequently dispatched to INAM to check staff proficiency and visit a local station to provide technical advice on on-site calibration.

<http://www.jma.go.jp/jma/jma-eng/jma-> center/ric/Our%20activities/RICpackage/INAM/INAM.html

<France>

• In 2013, training organised in Toulouse on ILCs for 2 people from Maroc Météo.

• In 2014, training organised in Toulouse on metrology for 1 person from Maroc Météo.

• In 2015, training organised in Algiers on pressure calibration and metrology for a group of people from the Office Nationale de la Météorologie of Algeria.

• In 2015, audit of the laboratory of metrology of Maroc Meteo in Casablanca, according to ISO 17025, carried out by Eliane Jeanney from Meteo-France.

• In 2016, training organised in Toulouse on calibration and metrology for 2 people from the Institut National de Meteorologie of Tunisia.

<Slovakia>

• 2014: consultations for colleagues from Oman

<Slovenia>

• 2015; Invited lecturer at WMO training workshop on metrology for RA III & IV Spanish speaking countries; Argentina; 2-6 November 2015

**7.3) Which guidance documents, standard procedures or other publications were developed and published by your RIC since 2013? (Please, include full reference and web-link if available)**

Yes: 6/9 (Algeria, Morocco, Kenya, Japan, Philippines, Slovenia)

Comments by each RIC;

<Algeria>

- Calibration procedures of instrument measurement of PTU (PQ.12.v.01)

- Operating mode of uncertainties calculations

- Operating mode of installation and control of the barometers network

<Morocco>

• “Results of CIL conducted by RIC-Casablanca in temperature, humidity and pressure”

• “Moroccan approach providing modern alternatives to replace dangerous and obsolete meteorological instruments”

www.wmocimo.net/wp-content/uploads/TECO-2016\_Final\_Programme\_20160922.pdf

<Kenya>

• Instruments Calibration Procedure-AMSK/PR-RIC 751-07

<Japan>

• JMA/WMO Training Workshop on Calibration and Maintenance of Meteorological Instruments in RA II (Japan, 19-20 Feb 2013)

The documents and presentations on the workshop are available at:

http://www.jma.go.jp/jma/en/Activities/RIC\_Workshop\_2013/RIC\_Workshop\_2013.html

• WMO IOM Report No. 122

Survey on Meteorological Instruments, Calibration and Training Regional Association II (Asia) (K. Nakashima (Japan), 2015)

The survey was conducted via a questionnaire which was based on the work of the Regional Instrument Centre (RIC) Tsukuba and RIC Beijing together with the Regional Radiation Centre (RRC) Tokyo and RRC Pune.

https://library.wmo.int/pmb\_ged/iom\_122\_en.pdf

• Training materials on traceability and calibration are on RIC Tsukuba's website.

http://www.jma.go.jp/jma/jma-eng/jma-center/ric/RIC\_HP.html

<Philippines>

Meteorological Instruments Maintenance Guideline and Manual - 2016 in cooperation with JICA Project. No web-link.

<Slovenia>

• Quality assurance guide of measuring network; Internal document

• Standard operating procedures for temperature, relative humidity, air pressure, solar radiation calibrations were developed or upgraded

**8) Utilization of Resources and Capabilities of the Region**

**(Have you collaborated with other RICs, RRCs, RTCs, NMHSs or NMIs on standardization of meteorological and other related environmental measurements? If yes, please specify when and how)**

Yes: 5/9 (Morocco, Japan, Argentina, Philippines, France)

Comments by each RIC;

<Morocco>

Yes, within the participation in Expert team of Operational Metrology (ET-OpMet)

<Japan>

• RIC Tsukuba staff paid a visit to France’s RIC in December 2009 for discussions.

• A calibration trial using traveling standard instruments was conducted in collaboration with the Thai Meteorological Department (TMD) in Bangkok, Thailand, in February 2010.

• Staff from RIC Beijing and RIC Tsukuba (both in RA II) took part in an exchange visit program for discussions in February and March 2010.

• RIC Tsukuba staff paid a visit to RIC Manila in March 2016 and RIC Manila staff paid a visit to RIC Tsukuba in January 2017 for discussions.

<Argentina>

• RIC Buenos Aires are working in close collaboration with RTC Buenos Aires and RRC Buenos Aires in training and technical advice.

<Philippines>

• Indonesia's NMHS in 2009, by calibrating their brought barometer and thermometer.

<France>

• As a member of the WMO Expert Team on Operational Metrology, Francoise Montariol from the RIC laboratory in Toulouse has been working on such subjects.

**9) Recent Changes in Circumstance**

**9.1) Have there been any changes in your RIC’s capabilities since 2013? (If so, please specify)**

Yes: 5/9 (Algeria, Kenya, Japan, Philippines, Slovenia)

Comments by each RIC;

<Algeria>

• Yes,

- Acquisition of a full atmospheric pressure calibration chain;

- Acquisition of a full air temperature calibration chain;

- Strengthening of the relative humidity calibration equipment;

- Acquisition of the thermo-hygrometer sensors calibration software;

- Acquisition of Sensors pressure calibration software (manometers and Transmitters);

- Acquisition of fifty-five (55) digital barometers for which thirty-five (35) are already installed;

- Acquisition of forty-five (45) Sonic winds for which twenty-two (22) are installed.

<Kenya>

YES

• New officer in charge following retirement of the former assistant director

• Posting of some newly recruited technicians to the centre

<Japan>

RIC Tsukuba was accredited by ISO/IEC 17025 on pressure and humidity in 2013 in addition on temperature in 2012.

<Philippines>

• Newly acquired open type wind tunnel last 2014 with maximum specified wind speed of 75 m/s.

<Slovenia>

• Implementation of new RIC Ljubljana laboratory instrumentation for temperature, relative humidity and air pressure led to significant improved accredited calibration and measurement capabilities (CMCs).

**9.2) Have there been any significant changes in your RIC’s infrastructure since 2013? (If so, please specify)**

Yes: 5/9 (Algeria, Morocco, Argentina, Philippines, Slovenia)

Comments by each RIC;

<Algeria>

• Yes,

- Creation of three (03) air conditioned laboratories for the calibration of the pressure, temperature and moisture. The environment work (T = 23 ± 2 °C) c and U = 50 ± 2 %).

<Morocco>

Yes, in 2015, the RIC has annexed a training room to the laboratory.

<Argentina>

• Yes, in 2014/15 building internal renovation.

• In 2016 the mercury lab safety was improve.

<Philippines>,

• Building extension last 2016 to accommodate more laboratory space for equipment.

<Slovenia>

• RIC Ljubljana renewed and upgraded laboratory infrastructure (reference and working standards, medium generators, data acquisition units…) in the field of temperature, relative humidity, air pressure, solar radiation and precipitation calibrations in 2015. Also new laboratory building was build.

**9.3) Have there been any changes in your staffing since 2013? (If so, please specify)**

Yes: 5/9 (Algeria, Morocco, Kenya, France, Slovakia, Slovenia)

Comments by each RIC;

<Algeria>

• Yes,

- The staff has been strengthened by the recruitment of engineers and senior technicians in maintenance.

<Morocco>

Yes, replacement of two retired technicians.

<Kenya>

• Yes. We have two newly employed technicians who have diplomas in Electronics.

<France>

• Head of RIC retired end of 2015, deputy Head became Head.

• New deputy Head first in January 2014, then again in October 2016.

• One laboratory expert retired beginning of 2016. New staff arrived later in 2016.

• Another laboratory expert retires end of October 2017.

<Slovakia>

• One technician retired in 2016

• New head of the Calibration laboratory in march 2017

<Slovenia>

• New laboratory operator was employed in 2015.

**10) Future Plans and any other relevant information**

**(Please provide plans/projects of your RIC for 2017, and add any other information you find relevant about your RIC)**

Yes: 8/9 (Algeria, Morocco, Kenya, Japan, Argentina, Philippines, Slovakia, Slovenia)

Comments by each RIC;

<Algeria>

The main and strategic objectives for 2017:

- Accreditation of the laboratory of calibration according to the ISO 17025- 2005 version;

- Renewal and automation of the observing network instruments;

- Ensure the compliance of the maintenance procedures according to the standards and regulations.

<Morocco>

Audit for accreditation ISO 17025

<Kenya>

• Acquisition and Installation of wind tunnel

• Accreditation of the RIC

• Capacity Building to enhance skills

<Japan>

• So-called “RIC-Tsukuba Package”, combination of the following cooperative activities which has been incorporated into Japan International Cooperation Agency (JICA) technical projects and are intended to support the establishment of international traceability for meteorological instruments and capacity building, have been successfully implemented in some NMHSs (i.e. Bangladesh, Fiji, Mozambique and Sri Lanka) since 2013:

(a) Preliminary survey,

(b) Provision of standard instruments and/or inspection equipment,

(c) On-the-job training,

(d) Follow-up.

• Enhancement of RICs Services

According to Regional WIGOS Implementation Project in RA II "Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations" at WMO RA II 16th session (February 2017, Abu Dhabi, United Arab Emirates), RICs plan to implement the following action items for further enhancement of their services in capacity-building and calibration during the project (2017-2020);

(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.

<Argentina>

• The plans are in progress under the agreement with INTI. See IOM 125, P3 (42) of TECO16.

• Plans include:

• Staff training: Introductory course to ISO/IEC 17025 and uncertainty evaluation (under agreement with INTI and PTB program)

• Review of measurements procedures and testing and calibration procedures. Upgrade management and technical staff.

• Tender for a new climatic chamber (in progress during 2017).

• Wind tunnel upgrade.

<Philippines>

• Acquisition process of additional two (2) wind tunnels at other PAGASA Regional Services Division (Visayas & Mindanao) as prelude to establishment of Local Instrument Centres.

<Slovakia>

• There is a calibration event for the operators of brewer spectrophotometers from various central European countries held every two years in regional workplace in Gánovce. It is organized by the Aerology and radiation centre of SHMU in Poprad-Gánovce using a device from Canada as a calibration standard. The next event is due next week.

<Slovenia>

• Chair of ET-OpMet

• Head of TDI TT on RICs in RAVI

• Member of BIPM CCT Task Group for Environment

• We plan to develop calibration procedures and uncertainty evaluation for solar radiation and precipitation calibrations in 2017.

• RIC Ljubljana also preforms accredited calibration for air quality parameters: CO, SO2, NOx and ozone.

• RIC Ljubljana was non-funding partner in MeteoMet and follow-up MeteoMet 2 project.

**11) Are you in agreement with publishing this reporting form on WMO/CIMO website?**

Yes: 9/9 (Algeria, Morocco, Kenya, Japan, Argentina, Philippines, France, Slovakia, Slovenia

Algeria)

**12) Specific information on Instrument Calibration Capabilities**

**12.1) Temperature status of accreditation:**

Yes 3/9 (Japan, Slovakia, Slovenia)

**12.2) Relative Humidity status of accreditation:**

Yes: 3/9 (Japan, Slovakia, Slovenia)

**12.3) Atmospheric pressure status of accreditation:**

Yes: 3/9 (Japan, Slovakia, Slovenia)

**12.4) Wind status of accreditation:**

Yes: 1/9 (Slovakia)

**12.5) Precipitation status of accreditation:**

Yes: 1/9 (Slovakia)

**12.6) Air quality status of accreditation:**

Yes: 2/9 (Slovakia, Slovenia)