Interlaboratory Comparison (ILC) in RA-II, V and VI

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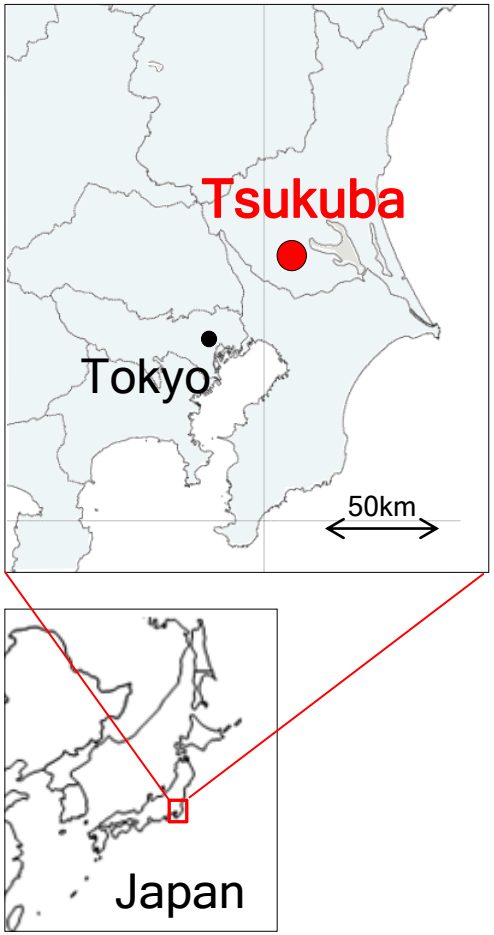
[1] Japan Meteorological Agency, Japan (JMA, RIC Tsukuba, RA-II)
[2] Philippine Atmospheric, Geophysical and Astronomical Services, Philippines (PAGASA, RIC Manila, RA-V)
[3] University of Ljubljana, Faculty of Electrical Engineering, Slovenia (UL-FE, RA-VI)
[4] Bureau of Meteorology, Australia (BoM, RIC Melbourne, RA-V)
[5] Slovenian Environment Agency, Slovenia (ARSO, RIC Ljubljana, RA-VI)
[6] Istituto Nazionale di Ricerca Metrologica, Italy (INRiM)
[7] China Meteorological Administration, China (CMA, RIC Beijing, RA-II)

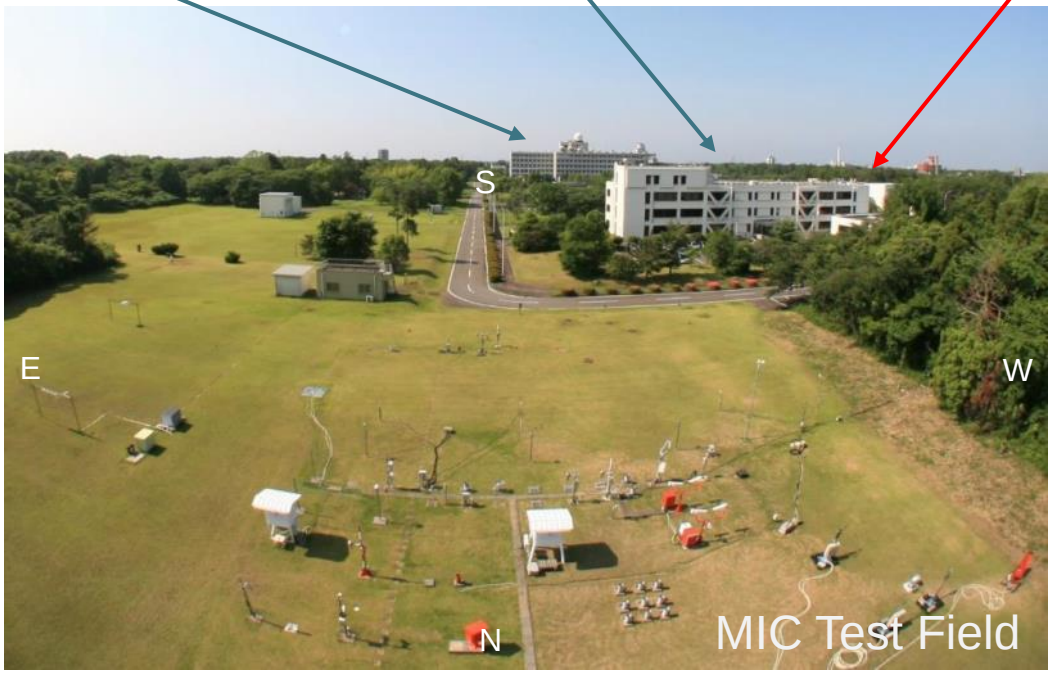
Regional Instrument Centre (RIC) Tsukuba



Meteorological Research Institute, JMA

Aerological Observatory, JMA
GRUAN
WMO/RRC Tokyo

MIC, JMA
WMO/RIC Tsukuba



Meteorological Instrument Center (MIC)
plays a practical role as RIC Tsukuba in JMA.

気象庁

Calibration equipment
- Standard instruments of JMA -

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

COPY

Name of Laboratory
Meteorological Instrument Center, Observation Division, Observation Department, Japan Meteorological Agency

Address of Laboratory
1-2 Nagamine, Tsukuba-shi, 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 : 2017-08-29

Kyoko Yamasaki
Chief Executive, IAJapan
National Institute of Technology and Evaluation

MIC, JMA is accredited to ISO/IEC 17025
- Temperature
- Pressure
- Humidity

Standard thermometer

- Platinum resistance thermometer
  NSR-160
  (Netsushin, Japan)
- Alternating current bridge
  F-600
  (ASL, UK)
- Water triple-point cell
  (Hart Scientific, USA)
- 100Ω Standard resistor
  (Tinsley, UK)

Standard barometer

Air piston gauge
AV-02
(Futaba Sokki, Japan)

Standard hygrometer

Chilled-mirror dewpoint hygrometer

- Display
  DewStar S-1M-0
  (Shinyei technology, Japan)
- Sensor
  DewStar S-2S-0K
  (Shinyei technology, Japan)

気象庁

Calibration chambers

Chamber for thermometers

Liquid bath type
Range: - 85 - +50 ˚C
(Daiichi - Kagaku, Japan)

Air chamber type
Range: - 40 - +50 ˚C
(Espec, Japan)

Chamber for hygrometers

Wet and dry air mixing type
Range: 15 - 95 %RH
(Daiichi - Kagaku, Japan)

Wet and dry air mixing type
Range: 10 - 95%RH, -10 - +50 ˚C
(Daiichi - Kagaku, Japan)

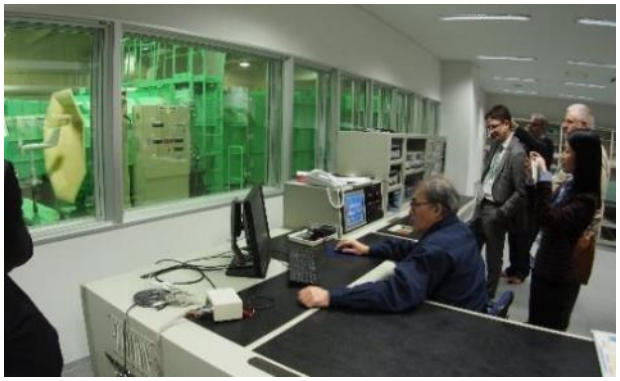
Chamber for barometers

Range: 4 - 1050 hPa
(Toyo Koatsu, Japan)

RIC Tsukuba supports WMO Members for calibration of their standards by using these standards and chambers.

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

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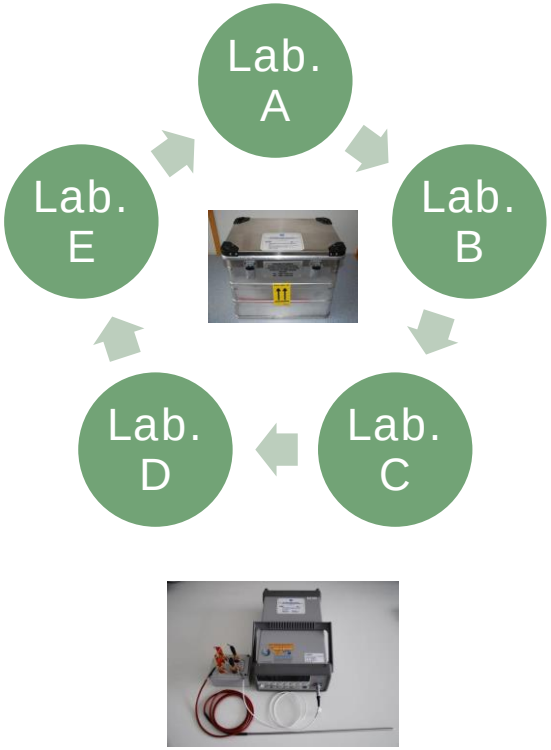
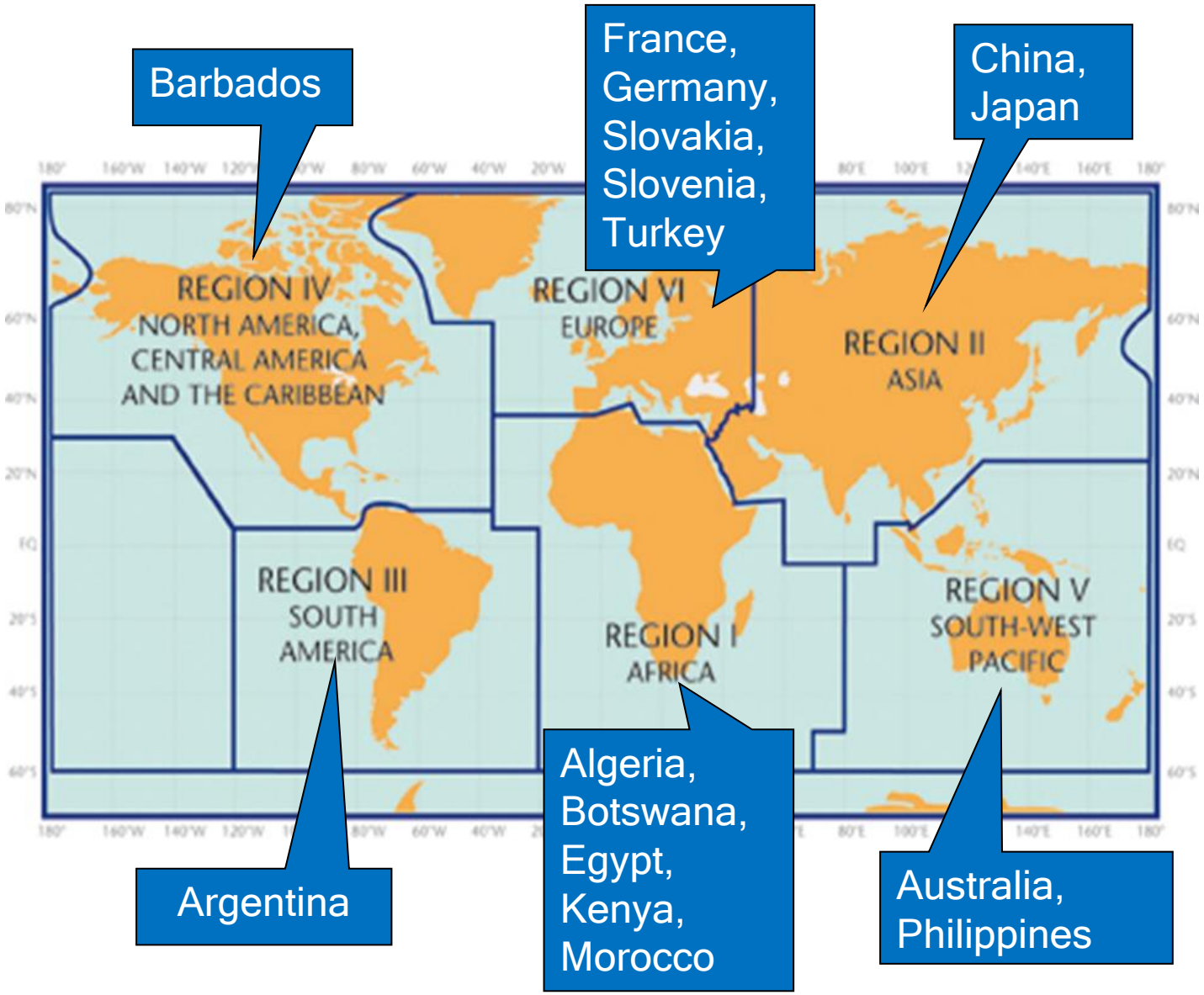
Introduction

Why is ILC necessary?

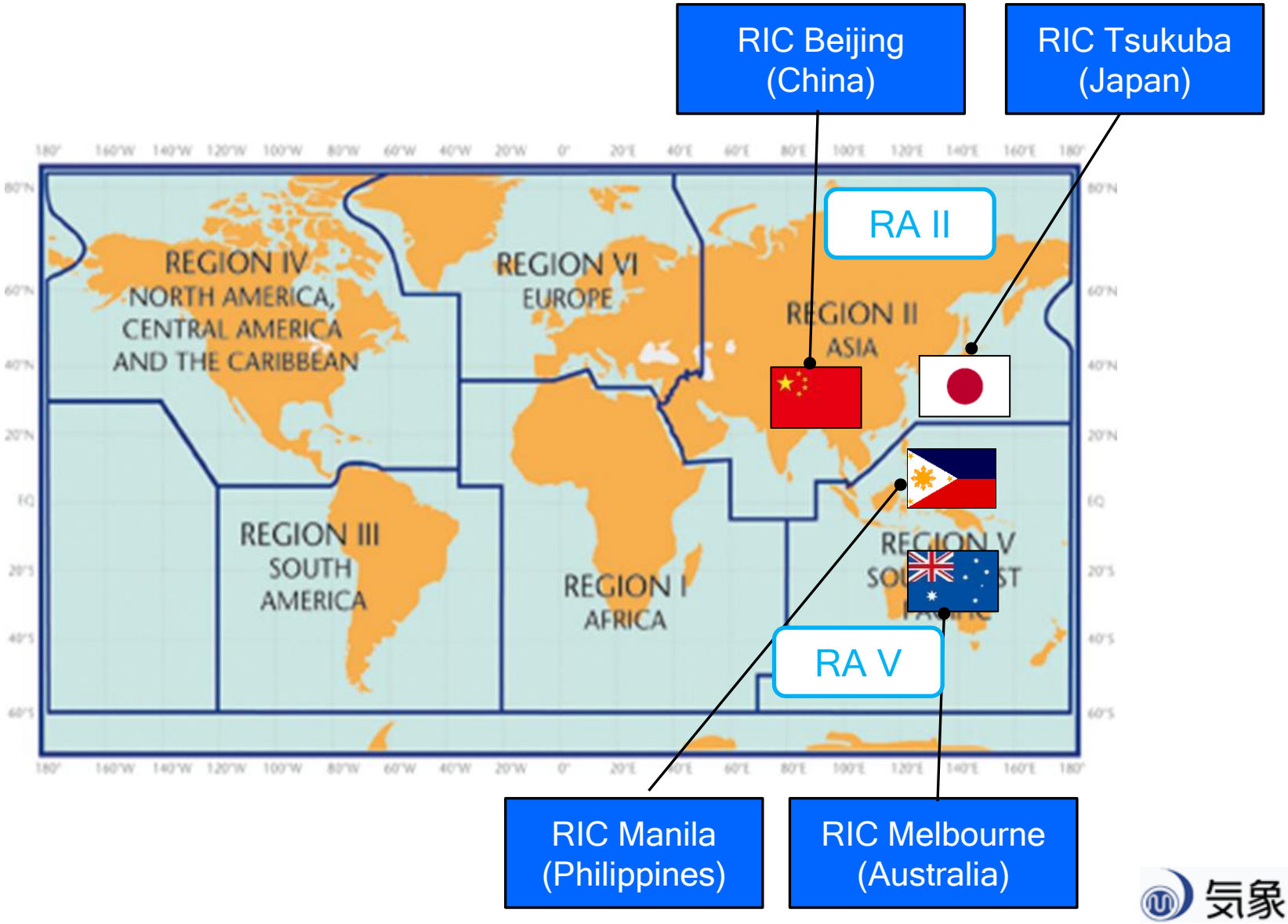


- ILC is highly effective in determining technical competence and monitoring measurement quality, as required for the acquisition and maintenance of ISO/IEC 17025 accreditation.
- The Terms of Reference for RICs also state that RICs must participate in, or organize ILC of standard calibration instruments and methods.
- ILC among RICs is one of the main tasks of CIMO ET-OpMet.
  Mr. Barcenas (RIC Manila) and Mr. Nakashima (RIC Tsukuba) are in charge of ILC in RA II and V in ET- OpMet.

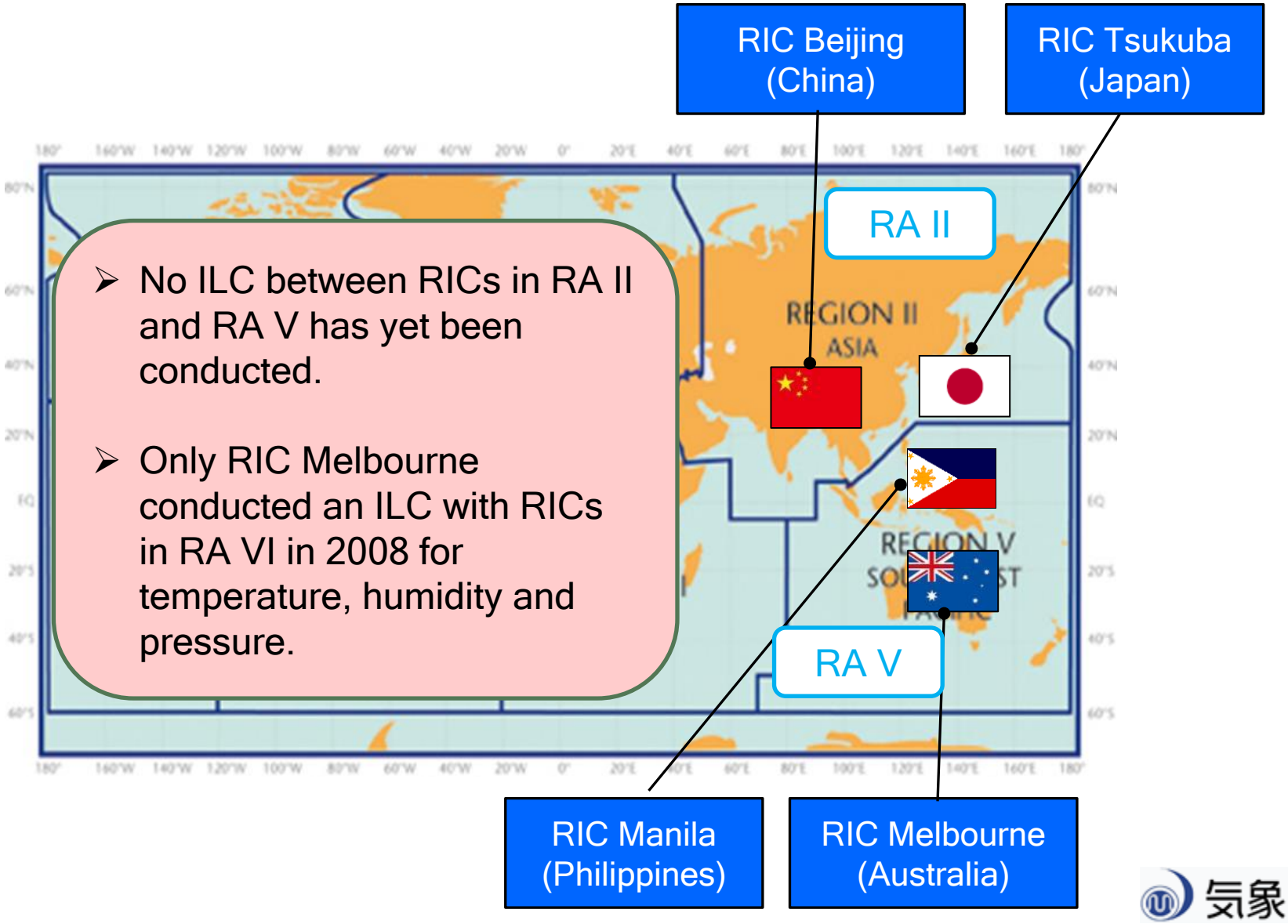
Regional Instrument Centres (RICs)



RICs in RA II and VI



RICs in RA II and VI

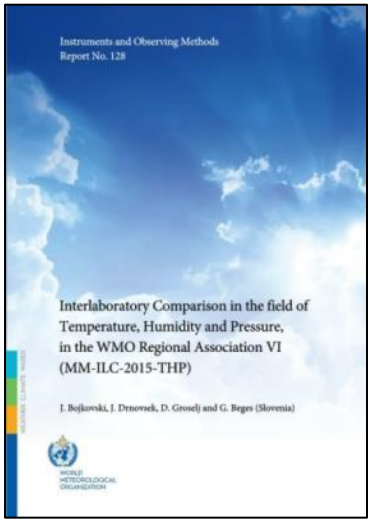


- No ILC between RICs in RA II and RA V has yet been conducted.
- Only RIC Melbourne conducted an ILC with RICs in RA VI in 2008 for temperature, humidity and pressure.

ILC in RA VI in 2016

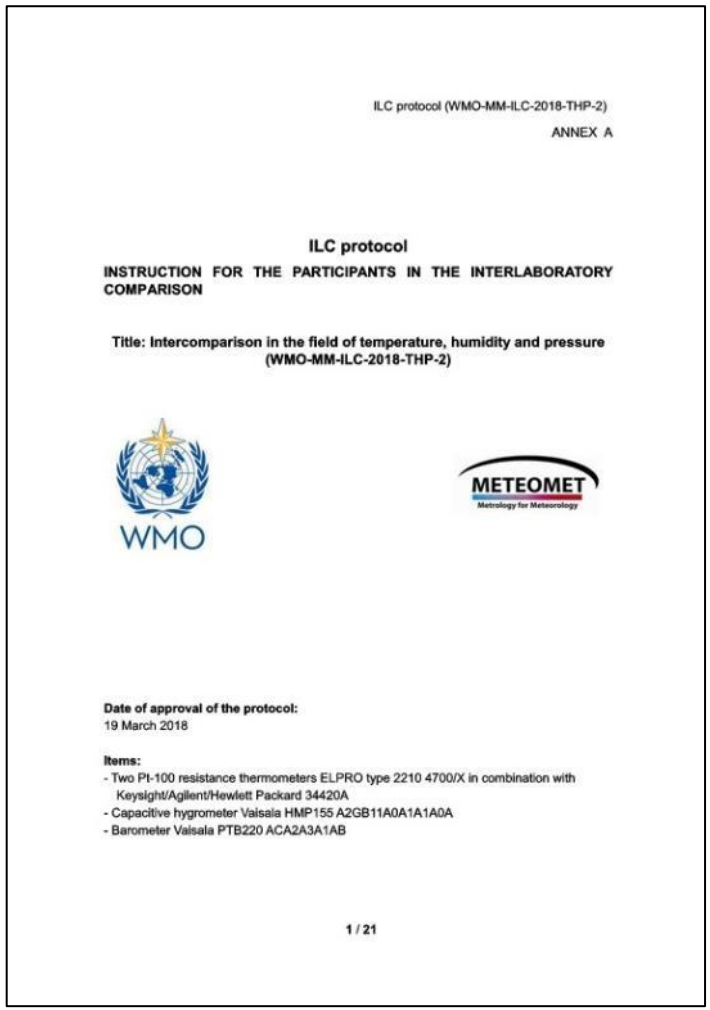
- The comparison in RA VI, titled “MM-ILC-2015-THP”, was conducted among 18 NMHSs in RA VI and MeteoMet2 project partner in 2016 focused on temperature, humidity and pressure measurements.

- This ILC was organized by the RIC Ljubljana and University of Ljubljana, Faculty of Electrical Engineering, Slovenia (UL-FE).



- WMO IOM Report, No.128
  J. Bojkovski, J. Drnovsek, D. Groselj and G. Beges (Slovenia), 2018: Interlaboratory Comparison in the field of Temperature, Humidity and Pressure, in the WMO Regional Association VI (MM-ILC-2015-THP). WMO IOM Report, No.128.
- CIMO TECO-2018
  P1_4 Results of WMO RA VI laboratory inter-comparison (Mr Drago Groselj (Slovenia) et al.)

Background and progress



ILC protocol (WMO-MM-ILC-2018-THP-2)

ANNEX A

ILC protocol

INSTRUCTION FOR THE PARTICIPANTS IN THE INTERLABORATORY COMPARISON

Title: Intercomparison in the field of temperature, humidity and pressure (WMO-MM-ILC-2018-THP-2)

WMO

METEOMET
Metrology for Meteorology

Date of approval of the protocol:
19 March 2018

Items:
- Two Pt-100 resistance thermometers ELPRO type 2210 4700/X in combination with Keysight/Agilent/Hewlett Packard 34420A
- Capacitive hygrometer Vaisala HMP155 A2GB11A0A1A1A0A
- Barometer Vaisala PTB220 ACA2A3A1AB

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- Discussions on ILC between RIC Tsukuba and RA VI began in May 2017, and RIC Tsukuba confirmed its intention to participate in ILC for RICs in RA II and V.
- An invitation letter was issued by WMO to all potential participants in February 2018.
- The ILC was officially approved and implemented in March 2018 once all partners had signed the Memorandum of Cooperation (MOC).

- This is the first official ILC between RICs in RA II and RA V.
- This ILC is organized by RIC Tsukuba in cooperation with University of Ljubljana (UL-FE) and RIC Ljubljana based on ILC protocol prepared within MeteoMet project.

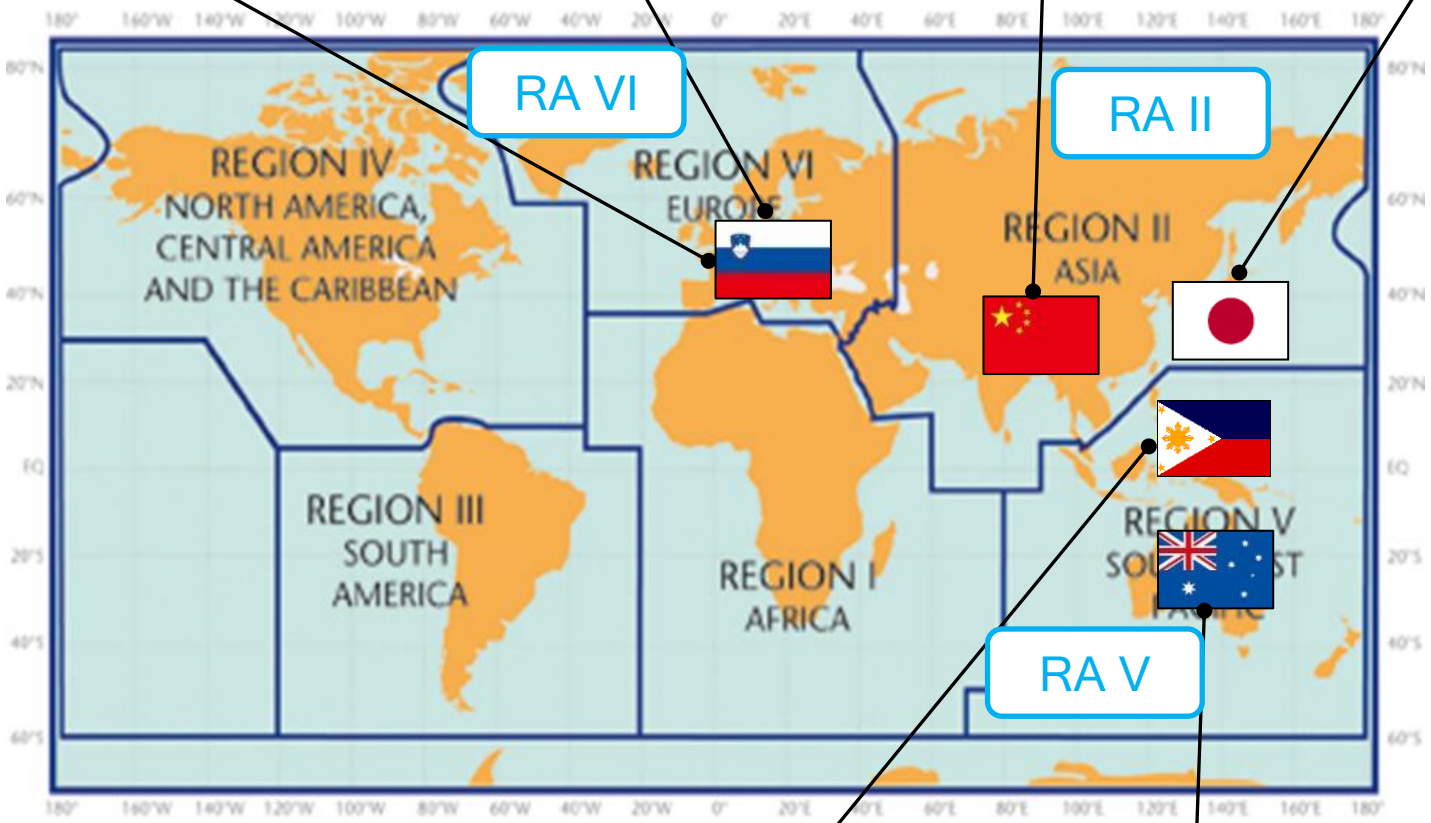
ILC partners

University of Ljubljana (Slovenia)

RIC Ljubljana (Slovenia)

RIC Beijing (China)

RIC Tsukuba (Japan)



INRiM (Italy)

METEOMET
Metrology for Meteorology

RIC Manila (Philippines)

RIC Melbourne (Australia)

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Equipment and measuring points

Measuring quantity	Temperature	Relative humidity	Air Pressure
Measuring instrument	Digital readout, 2 x Pt100	Capacitive hygrometer	Barometer
Manufacturer	Hewlett Packard, ELPRO	Vaisala	Vaisala
Type	34420A, 2210 4700/X	HMP155	PTB220
Measuring points	-30, -20, -10, 0, 10, 20, 30, 40 °C	10, 20, 35, 55, 75, 90, 95 %r.h.	800, 850, 900, 950, 1000, 1050, 1100 hPa
Appearance			

- Equipment is provided by UL-FE and RIC Ljubljana.
- Same as the ILC in RA VI “MM-ILC-2015-THP”

Schedule

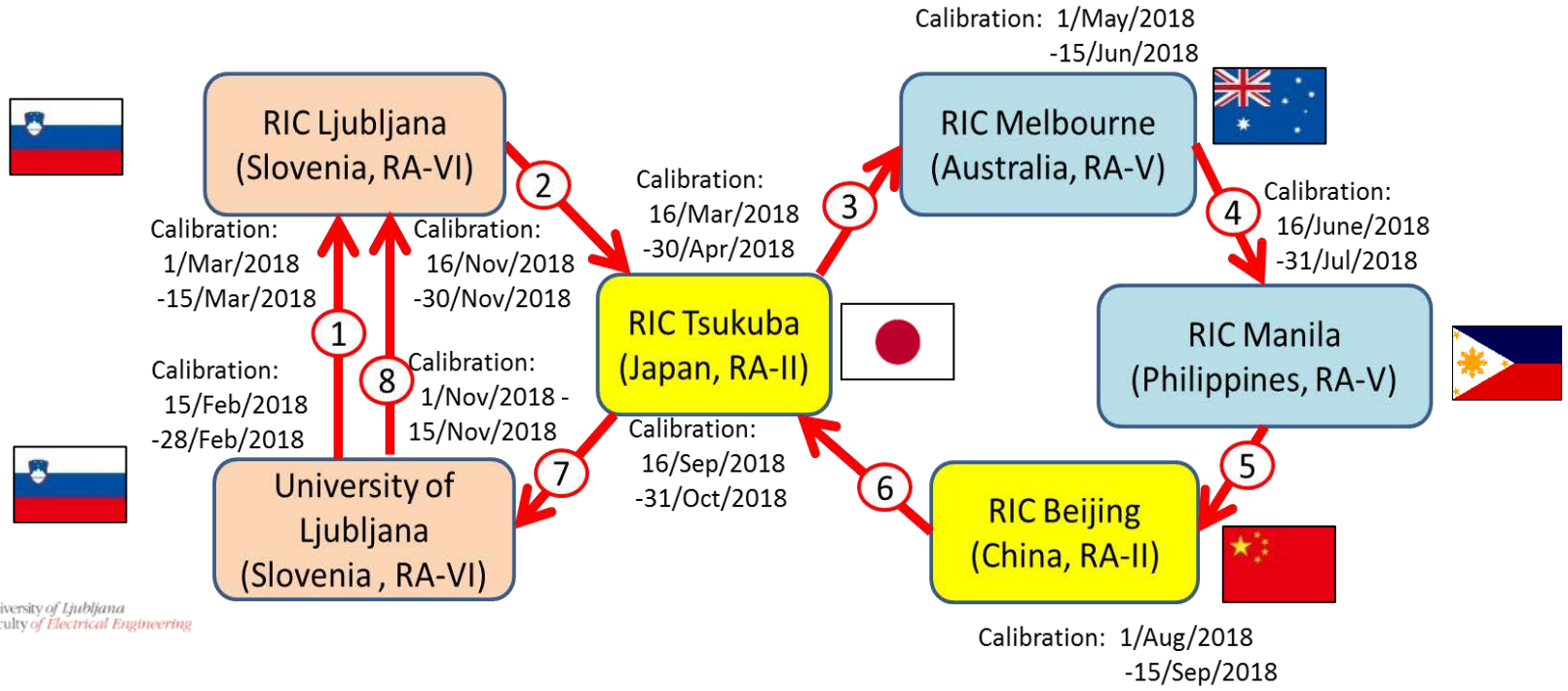
		Year	2018																				2019			
		Month	2		3		4		5		6		7		8		9		10		11		12		1		2	
		Day	1-15	16-28	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-28
Name	Country	Region																										
University of Ljubljana	Slovenia	RA-VI		X																								
RIC Ljubljana	Slovenia	RA-VI			X																							
RIC Tsukuba	Japan	RA-II				X	X	X																				
RIC Melbourne	Australia	RA-V							X	X	X																	
RIC Manila	Philippines	RA-V										X	X	X														
RIC Beijing	China	RA-II													X	X	X											
RIC Tsukuba	Japan	RA-II																X	X	X								
University of Ljubljana	Slovenia	RA-VI																			X							
RIC Ljubljana	Slovenia	RA-VI																				X						
ILC report																												

Calibration

Report

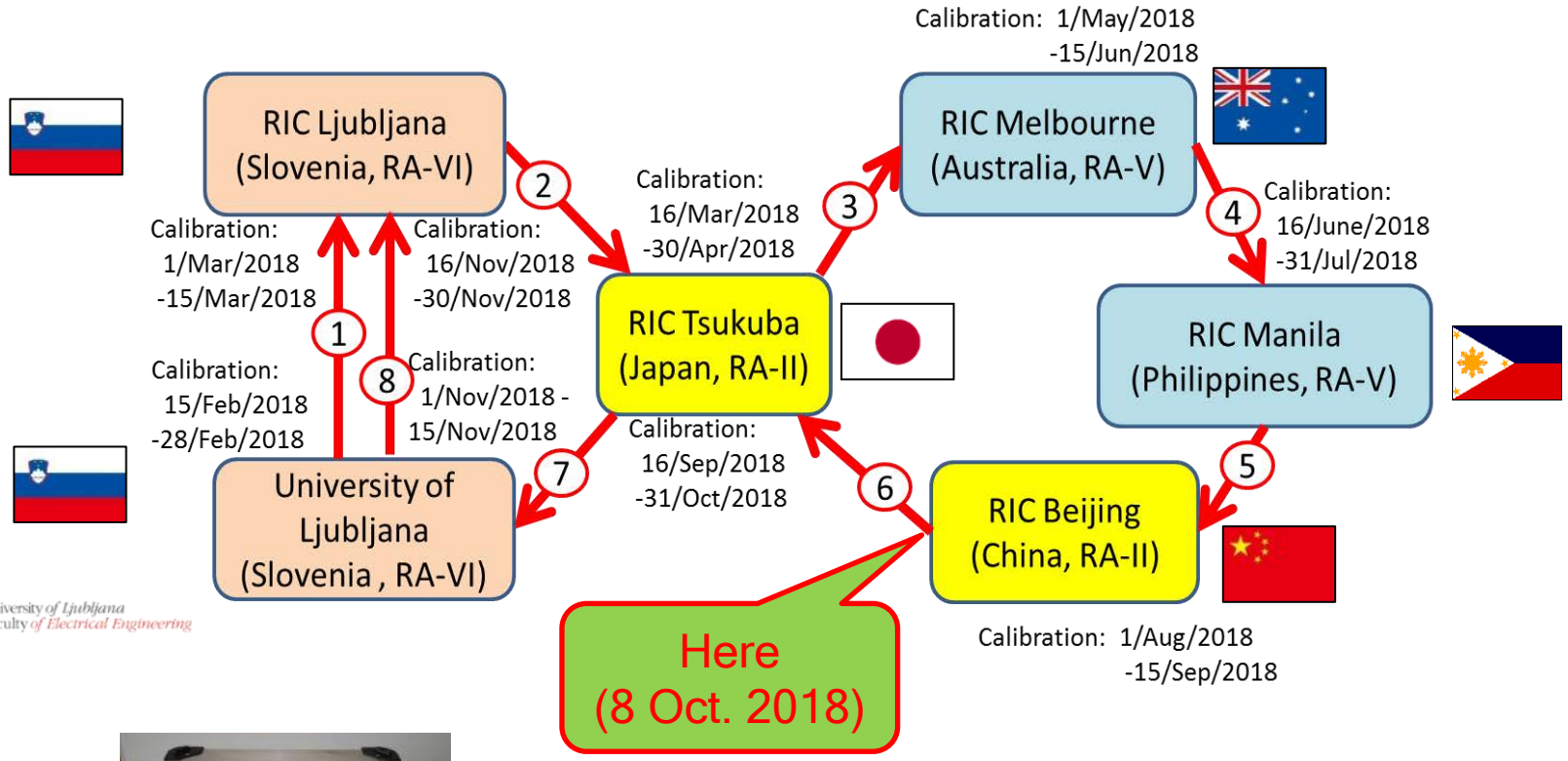
- Calibration of equipment will be planed between Feb. 2018 - Nov. 2018.
- Each laboratory in RA II and V has 1.5 months for calibration including transport to the next laboratory.

Rooting plan



- The drift of equipment will be evaluated by pre and post calibration by RIC Ljubljana, UL-FE and RIC Tsukuba, to identify any changes during transportation and handling.

Rooting plan



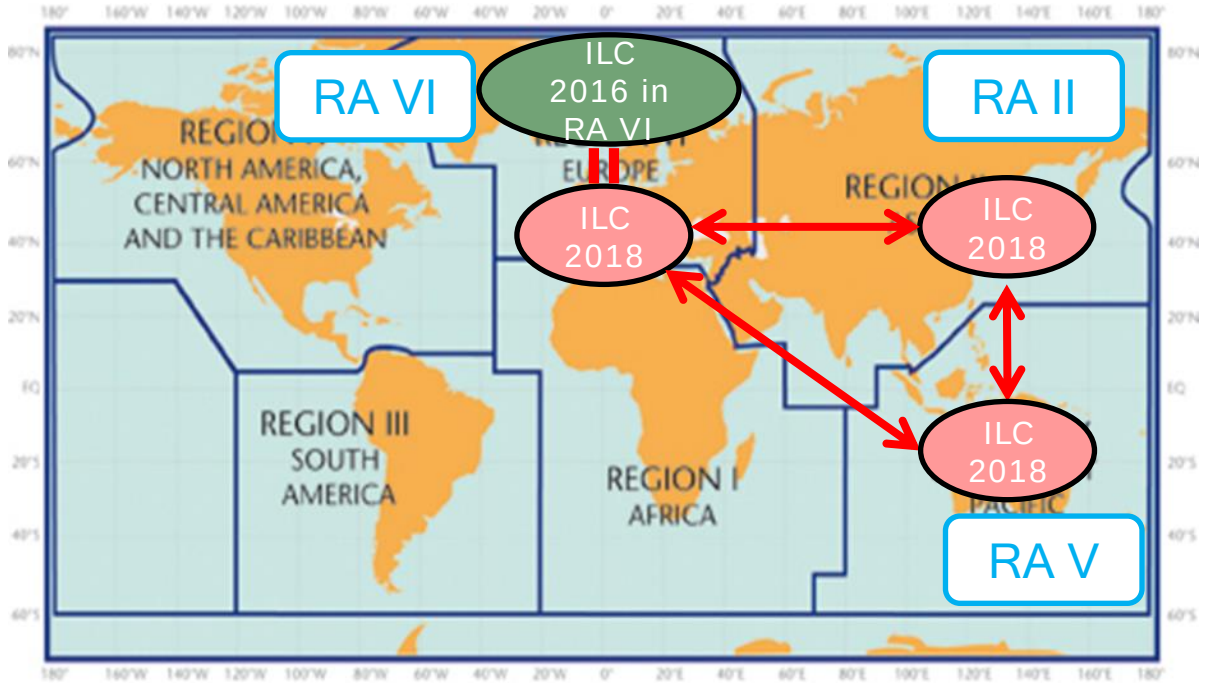
- The drift of equipment will be evaluated by pre and post calibration by RIC Ljubljana, UL-FE and RIC Tsukuba, to identify any changes during transportation and handling.

Result and reporting

- The evaluation of measurement results will be based on En number.
- The reference values used to calculate the results are defined by the weighted mean of RIC Tsukuba, UL-FE and RIC Ljubljana values.
- ILC results are expected to correlate with those of MM-ILC-2015-THP, and will be submitted to WMO for issuance in an IOM report.
- The outcomes will also be presented to the CCT[1] Working Group for Environment and at the CCT plenary at BIPM[2] as a key activity in line with WMO's signing of the MRA in 2010.

[1] Consultative Committee for Thermometry of the International Committee for weights and measures (Comité International des Poids et Mesures)
[2] Bureau International des Poids et Mesures

Summary



- This will be the first ILC conducted among three regions.
- The outcomes will help to clarify the calibration capability of RICs in different regions.
- 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.

THANK YOU FOR YOUR ATTENTION