

## KCDB REPORT TO THE 33rd JCRB MEETING

(covering the six-month period 01 September 2014 to 01 March 2015)

At the occasion of each JCRB meeting the KCDB Office prepares a report on the status of the KCDB. Each report describes the work of the KCDB Office during the previous six-month period, and the compilation of these reports to the JCRB thus provides a complete record of the evolution of the KCDB.

The previous report (JCRB-33/07.1), which covers the six-month period from 01 March 2014 to 01 September 2014, has not yet been discussed since the JCRB did not meet in September 2014. The present report (JCRB-33/07.2) covers the following six-month period, from 01 September 2014 to 01 March 2015. Both reports are now provided as working documents for the 33rd meeting of the JCRB, to be held on 18 and 19 March 2015 at the BIPM.

### Notes from the KCDB Office to users

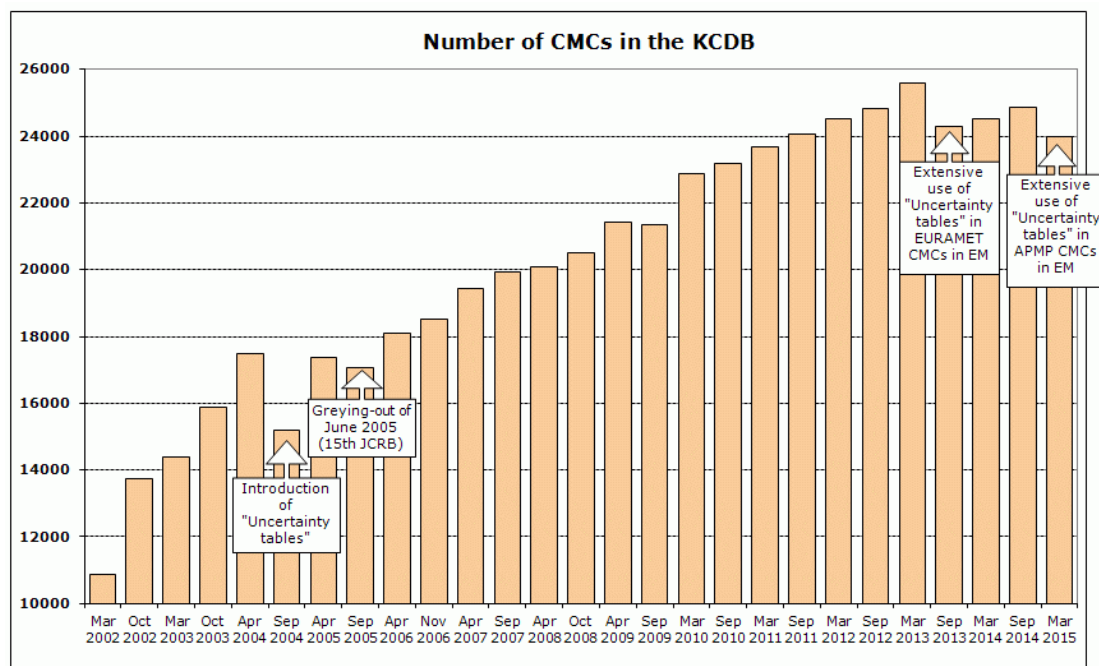
1. Statistics on the content of the KCDB are prepared by the KCDB Office and are available on-line from the [KCDB Statistics page](#). This includes the number of key and supplementary comparisons (updated in real-time), and PDF files showing the participation in key and supplementary comparisons (updated in May and November of each year) and the number of CMCs by metrology area and by country (updated in real-time).
2. The EXCEL files that are used to generate the PDF files displayed in the KCDB Statistics page are available from the [access-restricted JCRB CMC website](#) (link "[KCDB statistics](#)"). Note that these EXCEL files track all the changes (including greying-out and re-instatement of CMCs) and their dates, and thus allow some recollection of the history of the KCDB. In addition, many numbers that are not shown in the PDF files of statistics are given in the EXCEL files.
3. The KCDB Office provides on demand an additional EXCEL file containing the information of Appendix B of the KCDB, as a snapshot of the content of the database valid at a given date. This makes it possible to carry out statistical analysis using EXCEL functions or customized macro-functions. The file is compiled by the BIPM, using an SQL request named "Angela", and the delivery time is about two working days.
4. A box entitled "Related links" is provided on the left of each KCDB web page. It includes, among others, links to the KCDB Statistics page, to the KCDB FAQs page, and to the open-access CIPM MRA and JCRB documents, as well as to the open-access series of biannual KCDB Reports (located on the main BIPM website).

## 1. The CMC database

### 1.1. Content of the CMC database

As at 01 March 2015, the KCDB included a total of 23 969 CMCs:

- 14 180 in General Physics,
- 4 022 in Ionizing Radiation, and
- 5 767 in Chemistry.



*Number of CMCs registered in the KCDB since March 2002*

Over the period covered by this Report, 23 newly approved sets of CMCs were published (see Section 1.2 below), corresponding to a decrease of about 900 CMCs. This follows the publication of the set of CMCs APMP.EM.9.2014 on 11 November 2014, in which the CMCs files of the 12 APMP countries having CMCs published in the KCDB in Electricity and Magnetism had been reformatted using tables of uncertainties. This led to an abrupt decrease of exactly 1 029 CMCs. Note that this process had already been applied to the EURAMET EM CMCs in August 2013 (see Document JCRB-31/06).

One can conclude that the total number of CMCs published in the KCDB has now been globally stable since more than four years.

There were also some movements related to temporary removal and re-instatement of CMCs (see Section 1.3 below).

Details on the number of CMCs currently published in the KCDB, per country and per metrology area, are openly available in real-time from the [Statistics page of the KCDB](#) (PDF file).

## 1.2. New CMCs publication – see also [“CMCs News”](#)

The following sets of CMCs were published in the KCDB between 01 September 2014 and 01 March 2015:

- 11 September 2014; *COOMET.M.21.2014* (Mass Standards; BY, +6 CMCs; KZ, +6 CMCs; UA, +4 CMCs), total +16 CMCs.
- 29 September 2014; *SIM.AUV.2.2012* (Acoustics; BR, +43 CMCs; Vibration; BR, +8 CMCs).
- 06 October 2014; *APMP.M.36.2014* (KR, Density, +4 CMCs; KR, Force, +2 CMCs).
- 07 October 2014; *EURAMET.RI.20.2014* (Dosimetry, DE, +2 CMCs).
- 04 November 2014; *EURAMET.QM.26.2014* (GB, Cat 1, +1 CMC); *COOMET.QM.24.2014* (RU, Cat 9, +8 CMCs); and *APMP.QM.24.2014* (CN, Cat 11, +1 CMC).
- 11 November 2014; *APMP.EM.9.2014* (ID, -34 CMCs; JP, -82 CMCs; TW, -91 CMCs; NZ, -18 CMCs; CN, -94 CMCs; TH, -294 CMCs; SG, -102 CMCs; AU, -62 CMCs; MY, -46 CMCs; KR, -51 CMCs; IN, -21 CMCs; HK, -134 CMCs), **total -1029 CMCs**.
- 17 November 2014; *COOMET.M.22.2014* (BY, Pressure, +1 CMC).

- 26 November 2014; *EURAMET.M.38.2014* (CZ, Pressure, -1 CMC).
- 27 November 2014; *EURAMET.M.36.2014* (DE, Stiffness, +1 CMC).
- 27 November 2014; *SIM.QM.18.2014* (BR, Cat 1, +2 CMCs; CA, Cat 1, +4 CMCs; MX, Cat 1, +1 CMC; MX, Cat 2, +0 CMC; BR, Cat 2, +3 CMCs; BR, Cat 4, -3 CMCs; MX, Cat 4, +3 CMCs; US, Cat 4, +0 CMC; AR, Cat 5, +1 CMC; BR, Cat 5, +15 CMCs; PE, Cat 6, +2 CMCs; BR, Cat7, -4 CMCs; AR, Cat 8, +3 CMCs; AR, Cat 9, +3 CMCs; CA, Cat 10, +2 CMCs; AR, Cat 11, +2 CMCs; BR, Cat 11, +3 CMCs; MX, Cat 11, +1 CMC; PE, Cat 11, +1 CMC; BR, Cat 12, +2 CMCs), total +41 CMCs.
- 08 December 2014; *SIM.TF.11.2014* (CR, +11 CMCs).
- 29 December 2014; *COOMET.L.10.2014* (RU, +1 CMC).
- 19 January 2015; *EURAMET.PR.11.2014* (PT, +3 CMCs; FR, +1 CMC; CH, +4 CMCs) and also modification of ES in PR (+2 CMCs), total +10 CMCs.
- 19 January 2015; *APMP.M.37.2014* (TW, Mass Standards, -1 CMC).
- 20 January 2015; *SIM.PR.7.2014* (CA, +3 CMCs).
- 26 January 2015; *EURAMET.EM.12.2014* (AT, +0 CMCs; CZ, +6 CMCs; FI, +0 CMCs; FR, +11 CMCs; DE, +1 CMC; IE, -115 CMCs; IT, +24 CMCs; LT, +0 CMCs; NL, +21 CMCs; NO, +0 CMCs; RO, +3 CMCs; RS, +1 CMC; SI, -1 CMC; ES, +10 CMCs; CH, +3 CMCs; SE, +0 CMCs; TR, +3 CMCs; GB, -14 CMCs), total -47 CMCs.
- 27 January 2015; *EURAMET.AUV.15.2014* (FR, Vibration, +6 CMCs).
- 27 January 2015; *COOMET.AUV.7.2014* (Acoustics, BY, +17 CMCs; UA, +6 CMCs).
- 10 February 2015; *SIM.TF.10.2014* (CO, +13 CMCs), **first CMCs published for Colombia**.
- 17 February 2015; *APMP.M.38.2014* (JP, Fluid Flow, +2 CMCs).
- 17 February 2015; *APMP.M.39.2014* (KR, Fluid Flow, -5 CMCs).

In addition, the KCDB Office has dealt with numerous corrections, such as editorial changes, range and/or uncertainty changes subsequent to results of key comparisons, changes in the full names of acronyms of laboratories, and also deletion of services that are no longer available according to the following list:

- 09 September 2014; NL, Surface Texture, -5 CMCs.
- 11 September 2014; BR, pH, -1 CMC.
- 12 September 2014; BG, PR, -2 CMCs; and TR, PR, -1 CMC.
- 22 December 2014; BR, Force, -11 CMCs.

### 1.3. CMCs: temporary removal and re-instatement

The situation regarding temporary removal (“greying-out”) and re-instatement of CMCs is available on-line from page 5 of the [Statistics page of the KCDB](#) (PDF file).

Since 01 September 2014, the following actions have been taken:

- 15 September 2014; greying-out of 1 CMC in QM (Cat 4) from MX.
- 11 November 2014; greying-out of 27 CMCs in EM from AU.
- 27 November 2014; greying-out of 4 CMCs in QM (Cat 7) from BR.
- 28 November 2014, re-instatement of 5 CMCs in EM from BE.
- 20 January 2015; definitive deletion of 2 CMCs in PR from Canada.

As at 01 March 2015, 154 CMCs were temporarily removed from the KCDB (see table below) against 129 as at 01 September 2014.

As at 01 March 2015, there remained only two CMC greyed-out from the KCDB more than five years ago.

- One of them is from Mexico, in RI (Neutron measurements). Request was received on 10 January 2014 to keep it in the grey zone over 2014, the time needed to fix-up the Quality System which covers this CMC. This is not yet done.
- Appropriate action has been taken by Bulgaria in order to re-instate the other CMC (Dimensional Metrology) that had reached the five-year limit for greyed-out status on 29 June 2014. The expected publication of the Final Report of a EURAMET key comparison in the field should soon help solving the problem.

The dates of the greying-out of CMCs are kept in the spreadsheet "Dates of CMCs greying-out" of the EXCEL file "CMCsNumber\_2015, available from the [access-restricted JCRB CMC website](#) (link "[KCDB statistics](#)").

	M	PR	EM	T	RI	L	QM	TF	Total
<b>APMP</b>									
AU			27						27
NZ			5						5
KR							5 Cat 6		5
TH					3				3
<b>Total APMP: 40</b>									
<b>EURAMET</b>									
BG						1 DimMet			1
BE			25					6	31
FI	3 Torque 3 Force								6
FR	3 FI Flow		3						6
IAEA					1 RI(I)				1
<b>Total EURAMET: 45</b>									
<b>SIM</b>									
MX		3	42		1 RI(III)		1 Cat 2 & 1 Cat 4		48
AR						1 DimMet			1
CA		4				11 DimMet			15
US					1 RI(I)				1
BR							4 Cat 7		4
<b>Total SIM: 69</b>									
<b>Total: 154</b>									
<b>greyed-out CMCs</b>									

*Number of CMCs temporary removed ("greyed-out") from the KCDB,  
by country and by metrology area, as at 01 March 2015*

**Follow-up of Action 17/1 from the 17th JCRB meeting**

"Future KCDB reports to the JCRB are to include the information on CMC statistics (per RMO) thus avoiding the inclusion of this information in the RMO reports to the JCRB".

Status as at 01 March 2015

APMP: 5 348 CMCs  
COOMET: 2 264 CMCs  
EURAMET: 10 737 CMCs  
AFRIMETS: 446 CMCs  
SIM: 4 925 CMCs  
IAEA: 22 CMCs  
IRMM: 227 CMCs  
WMO: 0 CMCs  
ESA: 0 CMCs

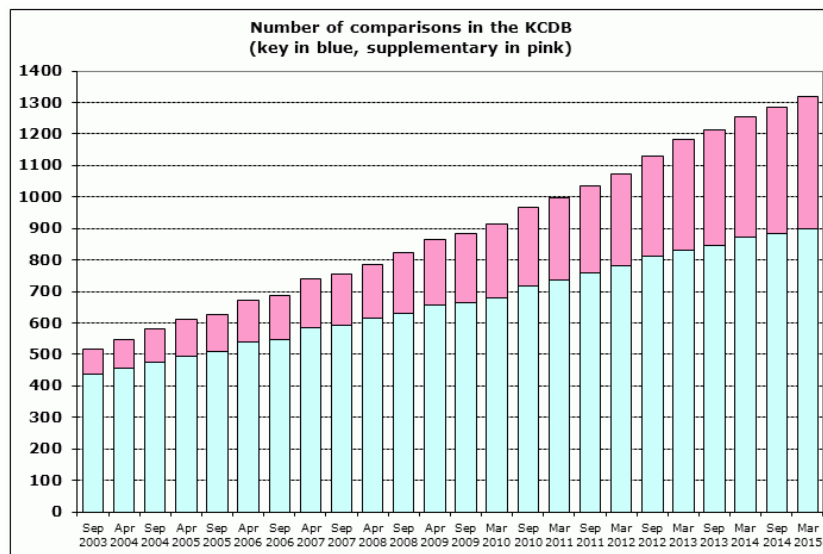
## 2. Key and supplementary comparisons database

### 2.1. Content of the database

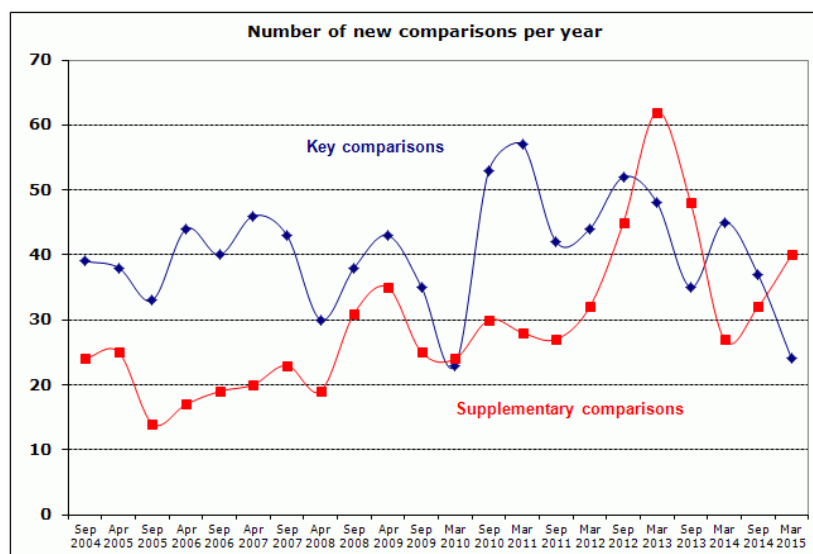
As at 01 March 2015, the database covered 898 key comparisons (89 from the BIPM, 436 from the CCs, 4 from AFRIMETS, 127 from APMP, 42 from COOMET, 147 from EURAMET, and 53 from SIM), and 421 supplementary comparisons.

Two new on-going BIPM key comparisons in the field of radioactivity [BIPM.RI\(II\)-K1.Ra-223](#) and [BIPM.RI\(II\)-K1.Y-90](#) were registered on 16 September 2014.

Graphs showing the evolution since September 2003 of the total number of key comparisons and of supplementary comparisons registered in the KCDB, and the number of new key and supplementary comparisons registered in the KCDB over the one-year period ending at the date indicated on the x-axis are given below.



*Total number of key comparisons and supplementary comparisons registered in the KCDB: evolution since September 2003*



*Number of new comparisons registered in the KCDB over the one-year period ending at the date indicated on the x-axis*

Since 2003, the average rate of registration of new key comparisons has been roughly constant in time at the level of about 40 new key comparisons per year, but a slight decrease is now observed, probably resulting from the strategy exercises carried out since 2013 and which led to some rationalization.

Updated graphs (PDF files) illustrating the participation in [key](#) and [supplementary](#) comparisons were made available from the [Statistics page of the KCDB](#) on 24 November 2014.

## 2.2. Key and supplementary comparisons: registration, suppression and modification

Since 01 September 2015, the following actions were taken:

- 09 September 2014; registration of [APMP.EM.RF-S6.CL](#).
- 12 September 2014; registration of [EURAMET.EM.M-S2](#).
- 16 September 2014; registration of [BIPM.RI\(II\)-K1.Ra-223](#) and [BIPM.RI\(II\)-K1.Y-90](#).
- 17 September 2014; registration of [EURAMET.PR-S6](#).
- 17 September 2014; deletion of EURAMET.PR-K2.b.1.
- 22 September 2014; registration of [EURAMET.PR-K4.2](#).
- 24 September 2014; registration of [APMP.M.T-K1](#).
- 25 September 2014; registration of [APMP.PR-S7](#).
- 10 October 2014; deletion of APMP.T-K3.7.
- 16 October 2014; registration of [CCEM-K2.2012](#) and [CCEM.RF-K26](#).
- 31 October 2014; registration of [CCT-K6.2](#), [COOMET.EM-S18](#), [COOMET.M.D-S1](#) and [SIM.T-S7](#).
- 04 November 2014; registration of [SIM.T-S8](#).
- 17 November 2014; registration of [COOMET.M.H-S2](#) and [COOMET.M.V-S1](#).
- 24 November 2014; registration of [APMP.L-K5.2014](#), [EURAMET.L-K3.2009.1](#) and [EURAMET.L-K7.2014](#).
- 25 November 2014; registration of [EURAMET.T-K9](#).
- 27 November 2014; registration of [APMP.L-K7.2014](#).
- 28 November 2014; registration of [SIM.M.FF-S8](#).
- 01 December 2014; registration of [EURAMET.M.M-K2.6](#).
- 08 December 2014; registration of [SIM.T-K6.5](#).
- 09 December 2014; registration of [COOMET.PR-K1.b.1](#).
- 16 December 2014; registration of [APMP.QM-S8](#).
- 19 December 2014; registration of [APMP.PR-S8](#).
- 23 December 2014; registration of [SIM.M.P-S10](#).
- 30 December 2014; registration of [APMP.L-S8](#).
- 13 January 2015; registration of [APMP.M.P-S7](#).
- 19 January 2015; registration of [EURAMET.M.M-K4.2015](#).
- 21 January 2015; registration of [EURAMET.M.FF-S7](#).
- 22 January 2015; registration of [EURAMET.PR-K4.3](#).
- 22 January 2015; deletion of EURAMET.PR-K6.3.
- 02 February 2015; registration of [AFRIMETS.M.M-S6](#).
- 03 February 2015; registration of [AFRIMETS.M.FF-K4.2.2015](#).
- 06 February 2015; registration of [COOMET.EM-S19](#).
- 11 February 2015; registration of [APMP.EM-S12](#).
- 12 February 2015; registration of [EURAMET.RI\(I\)-S12](#).

This resulted in an additional 15 key comparisons (18 new key comparisons and three deleted) and 21 supplementary comparisons registered in the KCDB over the six-month period covered by this report.

## 2.3. Published results of key and supplementary comparisons

As at 01 March 2015, among the 898 key comparisons that were registered:



- 88 corresponded to exercises prior to the implementation of the CIPM MRA, and will never have results published in the KCDB; they have been “Approved for provisional equivalence”;
- 78 of the 89 on-going BIPM key comparisons had results published in the KCDB; these are regularly extended as new data become available (15 new results were published since 01 September 2014); and
- another 486 CC and RMO key comparisons had their final reports approved and posted in the KCDB website, and corresponding tables of numbers and graphs entered in the database.

All together, the KCDB currently displays a total of about 2 350 graphs of equivalence, including more than 80 new graphs of equivalence published over the last six months.

The results of 215 RMO key comparisons (compared with 204 at the time of last report dated 01 September 2014) – 1 conducted by AFRIMETS, 72 by APMP, 27 by COOMET, 90 by EURAMET, and 25 by SIM – are published in the KCDB: see “[Comparisons News](#)” for the list of the most recent publications.

Linkage has also been carried out for 73 bilateral key comparisons subsequent to full-scale CC key comparisons; their results are included in the appropriate graphs of equivalence.

The final reports of 244 of the 421 supplementary comparisons registered in the KCDB were also posted in the KCDB as at 01 March 2015.

All together 68 % of the comparisons registered in the KCDB are ended and have their final reports posted in the KCDB, and also generally published in the [Metrologia Technical Supplement](#). This percentage has now been stable since several years.

### **3. Visits to the KCDB website**

The log-on statistics recorded for the year 2014 indicated that the average number of monthly visits stood at the level of 11 000, and the average number of KCDB web pages opened each month, at the level of 62 000.

As already observed, all pages are equally visited, including the News page and the Statistics page, and PDF files of comparison reports and of CMC lists are regularly downloaded. Visitors come from all over the world, and reach the KCDB website from links proposed in other websites (especially NMI websites), through Internet search engines, but mainly via personal bookmarking, direct URL address typing or using links given in e-mails.

### **4. The KCDB system**

In the global framework of the virtualization of all BIPM servers, the two front servers of the KCDB system, as well as the back-office server, are in the process of being virtualized. The BIPM IT team is responsible for this project, in collaboration with the outside company who has programmed the KCDB web application since its beginning.

### **5. The KCDB and the BIPM QMS**

A total number of 11 QMS Procedures cover all the KCDB work: registration of comparisons, publication of comparison results and of CMCs, creation of news, etc. These are always kept up-to-date according to the requirements of the BIPM Quality Manual, and were submitted to an internal audit 23 July 2013. No non-conformities were found and the audit Report contains two positive observations. Next audit is scheduled for July 2015. Most of the KCDB QMS procedures are kept confidential.

## 6. Participation of Associates of the CGPM in CIPM MRA activities

The following table summarizes the participation of NMIs of Associates of the CGPM in CIPM MRA activities as at 01 March 2015.

Associate of the CGPM	Date of becoming an Associate	Date of signature of the CIPM MRA	Total number of published CMCs	Total number of greyed-out CMCs	Date of publication of the first CMC	Number of key comparisons	Number of supplementary comparisons
Albania	10 September 2007	10 October 2007	7	0	05 April 2013	5	2
Azerbaijan	01 January 2015	28 January 2015	0	0	-	1	3
Bangladesh	29 March 2010	25 March 2011	0	0	-	0	2
Belarus	05 May 2003	14 October 2003	223	0	07 April 2004	34	31
Bolivia	04 April 2008	16 May 2008	0	0	-	4	13
Bosnia and Herzegovina	24 May 2011	15 June 2011	7	0	08 June 2012	6	3
Botswana	30 May 2012	26 July 2012	0	0	-	1	3
CARICOM	10 October 2005	12 October 2005	0	0	-	0	10
Chinese Taipei	26 April 2002	04 June 2002	348	0	21 October 2003	83	42
Costa Rica	29 January 2004	06 October 2004	105	0	26 November 2008	16	20
Cuba	19 December 2000	18 June 2001	96	0	02 May 2005	6	15
Ecuador	20 November 2000	15 April 2001	20	0	16 September 2011	4	16
Estonia	27 January 2005	23 March 2005	4	0	05 May 2014	6	10
Georgia	01 January 2008	17 June 2008	9	0	20 March 2014	4	5
Ghana	17 September 2009	24 February 2010	0	0	-	1	4
Hong Kong (China)	08 April 2000	31 May 2000	226	0	13 December 2000	63	17
Jamaica	15 September 2003	21 July 2004	22	0	24 August 2006	8	7
Latvia	11 January 2001	13 March 2001	59	0	23 March 2005	12	7
Lithuania	12 March 2001	12 April 2001	78	0	11 December 2003	17	14
Luxembourg	29 January 2014	01 October 2014	0	0	-	0	1
Macedonia, the FYR of	10 October 2006	14 November 2007	13	0	02 July 2013	4	6
Malta	11 April 2001	20 June 2001	0	0	-	2	3
Mauritius	05 October 2010	09 March 2011	0	0	-	3	2
Moldova, Rep. of	01 January 2007	14 November 2007	40	0	26 September 2013	2	6
Mongolia	07 August 2013	23 October 2013	0	0	-	3	1
Montenegro	01 August 2011	19 October 2011	0	0	-	4	3
Namibia	10 August 2012	16 October 2012	0	0	-	1	2
Oman	08 May 2012	20 November 2014	0	0	-	0	0
Panama	03 August 2003	16 September 2003	34	0	11 September 2006	9	14
Paraguay	06 May 2009	27 October 2009	23	0	31 January 2011	2	13
Peru	28 May 2009	17 November 2009	127	0	03 August 2010	14	27
Philippines	01 June 2002	19 December 2002	21	0	18 December 2013	11	5
Seychelles	10 September 2010	12 November 2010	0	0	-	1	1
Slovenia	02 June 2003	23 June 2003	203	0	11 May 2004	38	21
Sudan	26 June 2014	26 June 2014	0	0	-	0	1
Syrian Arab Republic	31 May 2012	17 September 2012	0	0	-	10	3
Ukraine	19 August 2002	14 October 2003	229	0	10 January 2005	41	49
Viet Nam	10 October 2003	16 September 2004	31	0	21 July 2010	28	8
Yemen	21 July 2014	17 November 2014	0	0	-	0	0
Zambia	10 December 2010	3 February 2011	0	0	-	1	3
Zimbabwe	14 September 2010	14 January 2011	0	0	-	1	3

### *CIPM MRA activity of the NMIs of Associates of the CGPM: important dates, number of published CMCs and participation in key and supplementary comparisons*

These numbers take into account all comparisons registered in the KCDB, whatever their statuses are, for which at least one laboratory of the Associate is listed in the participants list.

#### Note:

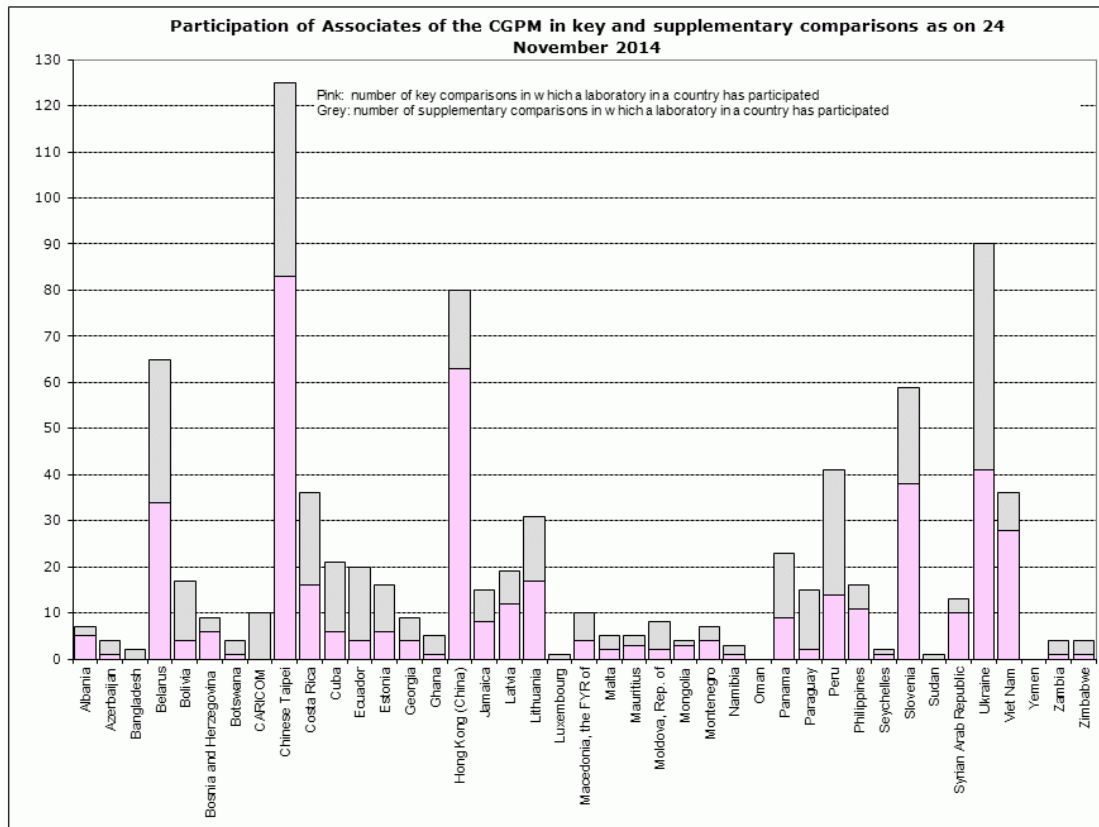
As the numbers on participation in key and supplementary comparisons change only slowly with time, the corresponding KCDB statistics are updated every six months. The numbers given here show the situation as at 24 November 2014. However, as the numbers of CMCs published in the KCDB can vary quickly, they are updated in real-time in all KCDB Statistics files. The numbers of CMCs given here show the situation as at 01 March 2015.

There currently exist [41 Associates of the CGPM](#), and all of them participate in the CIPM MRA.

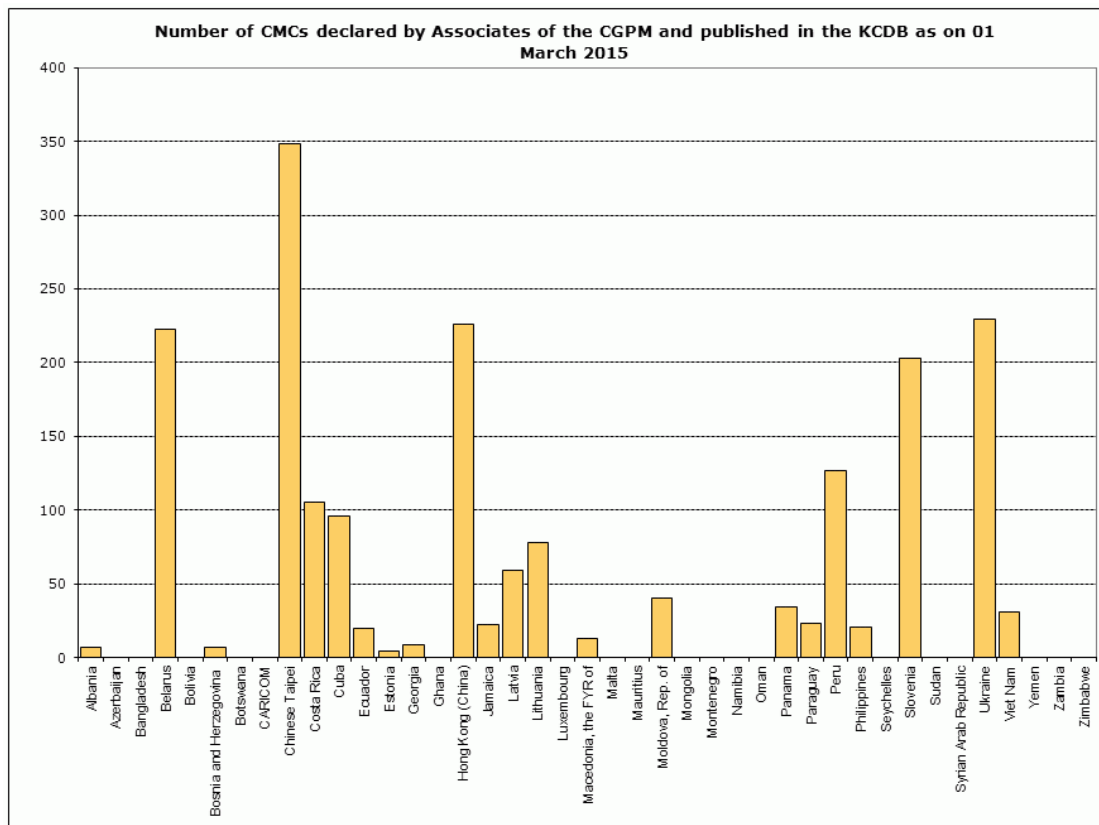
One observes that all of these 41 Associates, but two (Oman and Yemen) have at least one of their metrology institutes listed as participant in a key or a supplementary comparison, whereas only 22 of the 41 currently have CMCs published in the KCDB, as shown on the graphs below.

It is remarkable that no Associates have CMCs that are currently greyed-out.





Graph on the participation of Associates of the CGPM in key and supplementary comparisons



Graph on the number of CMCs declared by Associates of the CGPM