

MARCH 2023 REPORT ON THE KCDB TO THE JCRB

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KCDB Report to the JCRB¹

September 2022 to March 2023

Executive Summary

The KCDB 2.0 is a platform providing publicly available, peer reviewed, free and, searchable information on Calibration and Measurement Capabilities (CMCs) of National Metrology Institutes (NMIs) and Designated Institutes (DIs) participating in the CIPM MRA, as well as information on the supporting scientific comparisons. The platform also provides behind the scenes tools for the registration, review and publication processes used by the NMI and DI community, and additionally provides a tool for user-generated statistics. The KCDB provides an Application Programming Interface to search on CMCs. Early-stage work is being undertaken with regards to the database to understand what further developments might be needed in light of the digital transformation agenda.

The number of CMCs is approximately stable, with increasing information offset by the adoption of wider scope CMCs. The time for review has decreased significantly since the implementation of KCDB 2.0 in late 2019, for details see section 4.

The comparisons record is cumulative, so it increases over time, but the rate of increase is approximately stable; the majority of comparisons launched being repeats of outdated comparisons plus new supplementary comparisons within the RMOs.

Introduction

This report summarizes the major progress and evolution of the BIPM key comparison database (KCDB) over the last six months from September 2022 to March 2023.

The key comparison database - KCDB – is a supporting database for the implementation of the Mutual Recognition Arrangement of the International Committee for Weights and Measures (CIPM MRA) that was launched in 1999. It contains data on CMCs and comparison results of measurements in physics, ionizing radiation, chemistry and biology. The KCDB is an evidence-based database: all data included have been peer-reviewed by international groups of experts and approved for mutual recognition in a two-tier process.

The KCDB website www.bipm.org/kcdb gives access to the following services with open access to:

- searching on published CMCs in the KCDB
- searching on published comparison information, reports and results
- information on statistics and recent news on issues linked to CMCs and comparisons

¹ The KCDB Office provides the KCDB report, addressed to the Joint Committee of the Regional Metrology Institutes and the Bureau International des Poids et Mesures (JCRB), every 6 months. Those reports are made publicly available via the BIPM website: <https://www.bipm.org/en/cipm-mra/kcdb-reports>

- a set of supportive guidance documents.

The status of the database concerning **Calibration and Measurement Capabilities** is given in Section 1. In Section 2, recent information concerning **Comparisons** carried out within the framework of the CIPM MRA is summarized, and Section 3 highlights the status of **Associates** of the BIPM. The **performance of the system** is discussed in Section 4, and a short review on the software **status** is presented in Section 5. The **BIPM KCDB and digitalization** is highlighted in Section 6.

This report reflects the status as of 23 February 2023.

1. CIPM MRA Appendix C: Calibration and Measurement Capabilities

1.1. CMC statistics

There were² 25 833 (25 794) CMCs published in the KCDB on 23 February 2023 of which 19 695 (19 698) are in Physics and 6138 (6096) in Chemistry and Biology, see Figure 1. The total number of published CMCs remained almost the same over the last year.

The repartition of CMCs on metrology areas, expertise and state or economy is available in real-time from the KCDB home page in “CMC statistics”

<https://www.bipm.org/kcdb/cmc/statistics/public>

together with the distribution of published CMCs along the RMOs.

The recent publications of CMCs within the reporting period is listed in Table 1.

The significant decrease in the number of CMCs for COOMET is related to the transfer of CMCs from Georgia and Ukraine when their institutes became members of EURAMET as of 1 February 2023 and will process their CMCs within EURAMET.

The status of as yet unpublished CMCs that are placed on the platform is listed in Table 2; the number was 2364 compared to 1862 half a year earlier. This number can vary considerably, depending on the status of the review campaigns applied by some of the Consultative Committees.

² The numbers given within parenthesis represents the number of CMC reported a year earlier.

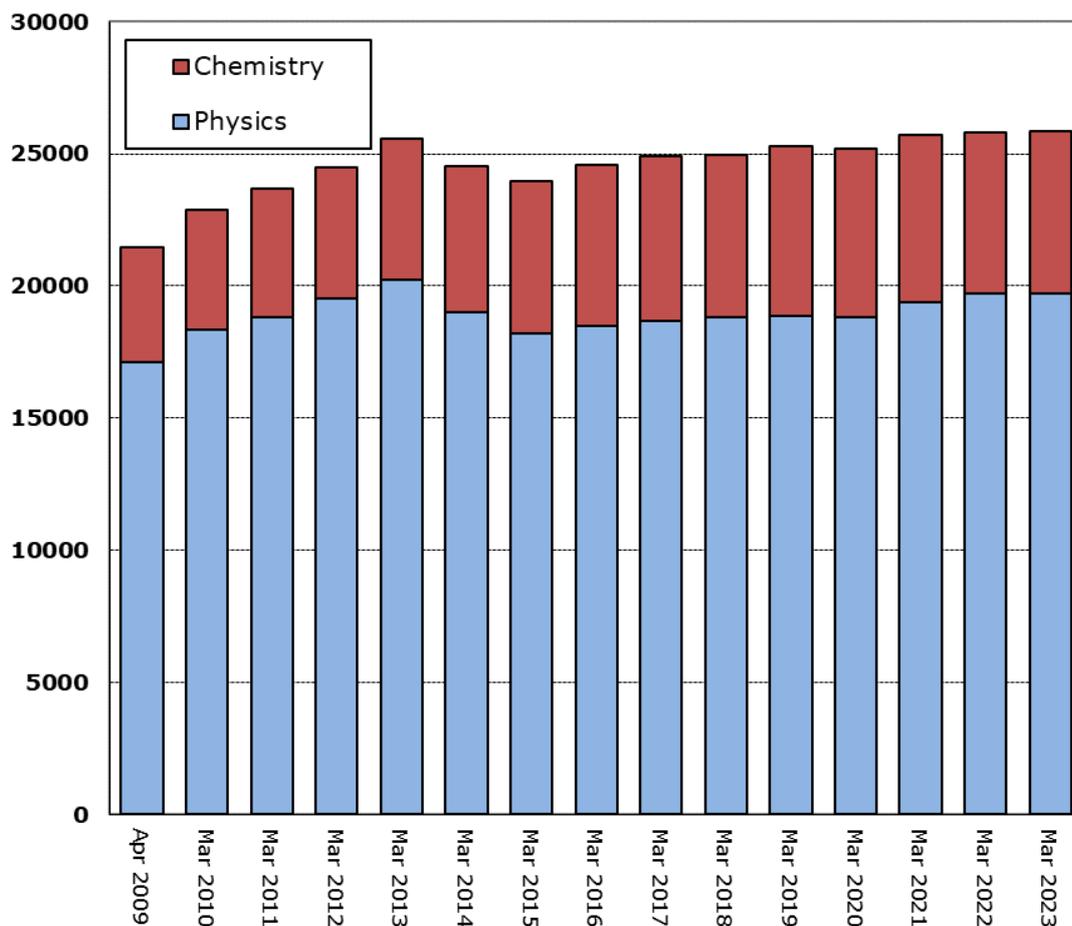


Figure 1 Number of CMCs registered in the KCDB since September 2009.

Table 1 Number of published CMCs in KCDB per RMO on 23 February 2023 (follow-up of Action 17/1 of JCRB 2006).

RMO	Number of CMCs	
	2023-02-23	2022-09-01
AFRIMETS	736	730
APMP	6775	6756
COOMET	2175	2580
EURAMET	11645	11325
GULFMET	56	46
SIM	4446	4392
TOTAL	25833	25829

Table 2 Status of not yet published CMCs in KCDB on 23 February 2023

Status	number of CMCs	number of CMCs
	2023-02-23	2022-09-01
Draft	355	334
RMO: Submitted	241	279
RMO: Under Review	70	63
RMO: Review Completed	69	0
RMO: Accepted	344	21
RMO: Revision Requested	204	178
RMO: Revision Completed	6	13
Submitted to the JCRB	2	0
JCRB: Under Review	398	89
JCRB: Revision Requested	153	224
JCRB: Revision Completed	15	63
JCRB: Approved	28	141
JCRB: Waiting for VOTE	25	91
Greyed out	454	366
TOTAL	2364	1862

The total number of published CMCs during the last 6 months for each metrology area is listed in Table 3.

Table 3 Number of published CMCs per metrology area during the last 6 months.

Metrology area	Published CMCs	Published CMCs
	2023-02-23	2022-09-01
AUV	3	10
EM	95	133
L	23	35
M	30	65
PR	34	102
T	6	28
TF	1	18
QM	110	240
RI	6	16
TOTAL	308	647

1.2. Greyed out CMCs and reinstatements

There are presently 453 greyed out CMCs, compared to 366 CMCs 6 months earlier. This increase is associated with the significant greying-out of CMCs by KRISS (Republic of Korea) and VNIIM (Russian Federation) in Chemistry and Biology (QM). Table 4 displays all greyed out CMCs where the most recent events are highlighted in yellow and green for increased and decreased number of greyed-out CMCs, respectively.

Table 4 Status of greyed out CMCs on 23 February 2023

RMO	COUNTRY	AUV	EM	L	M	PR	QM	RI	T	TF	TOTAL
AFRIMETS	ZA				2			11			13
APMP	AU							5			5
APMP	IN			0							0
APMP	KR						80				80
APMP	NZ		1							2	3
APMP	SG			4							4
APMP	TH			0							0
APMP	CN							1			1
COOMET	KZ									21	21
COOMET	RU						40				40
EURAMET	BG						0				0
EURAMET	DE		1				56	3	1		61
EURAMET	ES							2			2
EURAMET	FI			0							0
EURAMET	FR						7				7
EURAMET	GB				6						6
EURAMET	IT		0		0		0	98			98
EURAMET	JRC						1	22			23
EURAMET	LT			9	12						21
EURAMET	LV		4								4
EURAMET	NO			1	4						5
EURAMET	PL			1			0				1
EURAMET	PT			1				1			2
EURAMET	SK						10				10
SIM	AR			1			6				7
SIM	BR				3						3
SIM	CA		7		1						8
SIM	MX					4	17				21
SIM	US		5			2					7
TOTAL:		0	18	17	28	6	217	143	1	23	453

 *Increased in number*
 *Decreased in number*

With regard to the current status on 23 February 2023, Table 5 lists the number of greyed-out CMCs in the KCDB that will reach the maximum possible 5 years as greyed-out within the next six months.

Table 5 CMCs reaching the limit of 5 years of being greyed-out within the next six months.

RMO	Metrology area	number	date limit greyed-out
AFRIMETS	Mass	2	4/2023
EURAMET	Ionizing radiation	22	7/2023
EURAMET	Chemistry and biology	1	5/2023
SIM	Mass	3	10/2023

A dynamically updated list of CMCs greyed-out is available for registered users from the KCDB 2.0 platform under the statistics menu (<https://www.bipm.org/kcdb/cmc/statistics/greyed-out>). There are a couple of older CMCs that are listed for which reinstatement was agreed well ahead of the recent CIPM MRA-G-13 changes.

2. CIPM MRA Appendix B: Key and supplementary comparisons

2.1. Comparison statistics

On 23 February 2023 the KCDB listed 1813 comparisons distributed as listed in Table 6; 1143 are key comparisons and 670 supplementary comparisons. This represents a total increase of 21 comparisons since 1 September 2022.

Table 6 Key and Supplementary Comparisons on 23 February 2023.

Entity	KC	SC
BIPM	99	1
CC	564	34
AFRIMETS	8	30
APMP	151	123
COOMET	49	120
EURAMET	189	219
GULFMET	7	25
SIM	76	118
Total	1143	670

Figure 2 shows the evolution of the total number of key (dark blue) and of supplementary (light blue) comparisons registered in the KCDB since September 2003. The annual increase of key comparisons seems to have stabilized to around 30 on average, corresponding to an increase of 3 %. The ratio of supplementary comparisons, 20 % in 2006, keeps progressing and constitutes 37 % of all comparisons, see

Figure 3. The graphs include repeats of key comparisons.

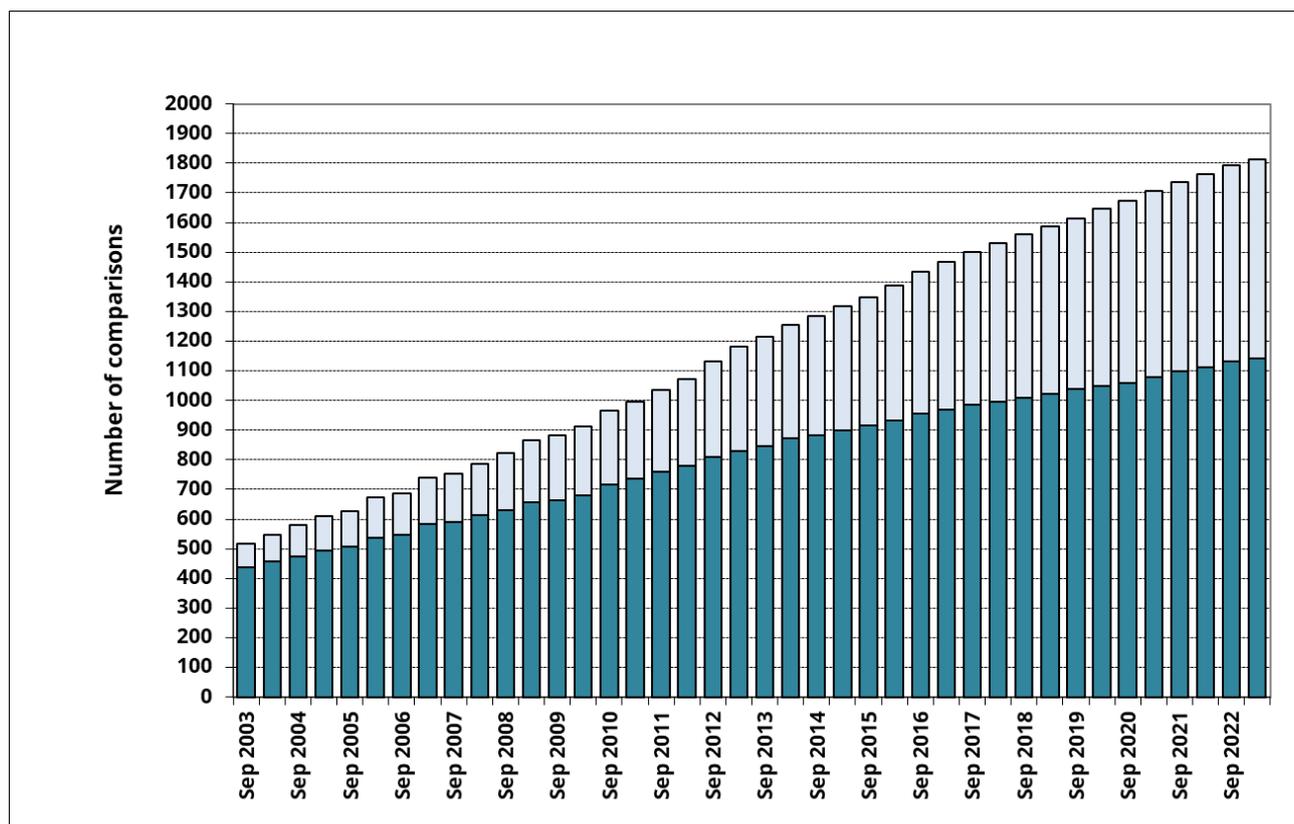


Figure 2 Total number of key comparisons (dark blue) and supplementary comparisons (light blue).

The number of new key and supplementary comparisons registered in the KCDB over the one-year period ending at the date indicated on the the abscissa is illustrated in Figure 3.

Graphs generated in real-time illustrating the participation in key and supplementary comparisons are available under the Statistics menu on the KCDB home page:

- <https://www.bipm.org/kcdb/comparison/statistics/key>
- <https://www.bipm.org/kcdb/comparison/statistics/supplementary>

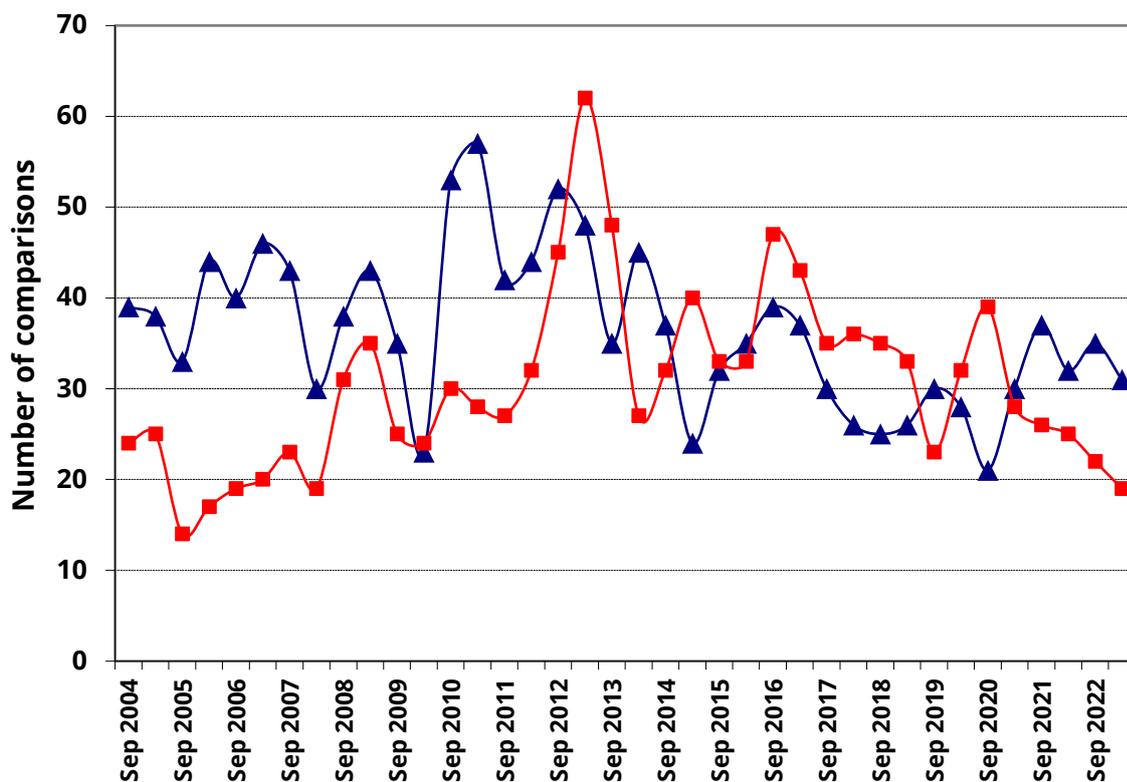


Figure 3 Number of new comparisons registered in the KCDB over the one-year period.

The following 22 comparisons were registered as new during the last 6 months:

- | | | |
|----------------------|---------------------|----------------|
| BIPM.RI(II)-K4.I-123 | EURAMET.EM-S45 | GULFMET.M.D-S1 |
| CCEM.RF-K28.W | EURAMET.EM-S46 | GULFMET.T-S2 |
| CCEM.RF-K29.W | EURAMET.EM-S47 | |
| CCM.FF-K1.2022 | EURAMET.L-S2.2.n01 | |
| CCQM-K154.e | EURAMET.M.FF-S18 | |
| CCQM-K158 | EURAMET.M.FF-S19 | |
| CCQM-K161 | EURAMET.M.P-K8.2023 | |
| CCQM-K162 | EURAMET.M.P-S19 | |
| CCQM-K166 | EURAMET.M.P-S20 | |
| CCQM-K168 | EURAMET.QM-S15 | |

The following 31 reports were published during the last 6 months:

BIPM.EM-K13 (NPLI 2022)	EURAMET.RI(II)-K2.Ho-166
BIPM.QM-K1 (DMDM 2022)	SIM.L-K3.2019
BIPM.RI(I)-K1 (KRIS 2022)	APMP.M.H-S5
BIPM.RI(I)-K1 (NMIJ-AIST 2022)	APMP.M.H-S6
BIPM.RI(I)-K2 (ARPANSA)	COOMET.L-S28
BIPM.RI(I)-K4 (KRIS)	EURAMET.M.FF-S14
BIPM.RI(I)-K7 (KRIS)	EURAMET.QM-S11
BIPM.RI(II)-K1.Ac-225 (POLATOM 2021)	EURAMET.QM-S14
BIPM.RI(II)-K1.Ce-139 (2022)	GULFMET.EM-S6
BIPM.RI(II)-K1.Ra-223 (POLATOM 2021)	GULFMET.EM-S7
BIPM.RI(II)-K1.Y-88 (Update 2022)	GULFMET.L-S1
BIPM.RI(II)-K1-Ba-133 (2022)	SIM.M.D-S6
CCAUUV.W-K2	
CCEM.RF-K27.W	
CCQM-K118	
CCQM-K154.c	
CCQM-K156	
CCQM-K173	

On 23 February 2023, the number of abandoned or superseded key and supplementary comparisons, stored in the KCDB archives, is 98.

2.2. Comparisons older than 5 years (Follow-up Action 33/3 of JCRB 2015)

Action 33/3: *The BIPM KCDB office, as part of the KCDB report to the JCRB, to identify Key and Supplementary Comparisons which were started 5 or more years ago and have not reached a conclusion.*

While “sleeping” Key Comparisons, connected to the Consultative Committees, have reduced in number since the follow-up action was triggered by the JCRB six years ago, the number of lasting supplementary RMO comparisons is roughly on the same level as in 2015 when this issue was pointed out by the JCRB.

The total number is illustrated in Figure 4. A list of the comparisons concerned is available in Appendix I.

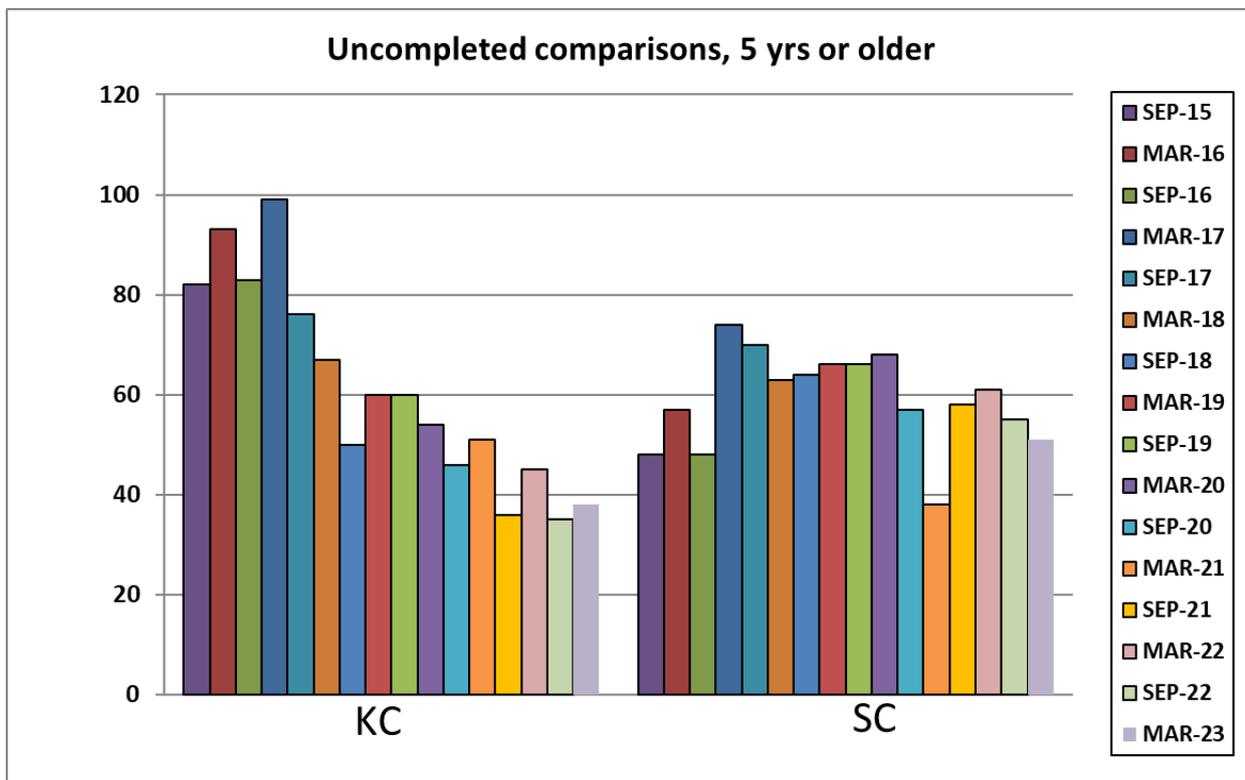


Figure 4 Histogram showing the number of incomplete comparisons that started more than 5 years ago.

3. Participation of Associates of the CGPM in CIPM MRA activities

Table 6 summarizes the participation of the [36 Associates of the CGPM](#) in CIPM MRA activities as of 23 February 2023.³

³ These numbers take into account all comparisons registered in the KCDB, disregarding status, for which at least one laboratory of the Associate is listed in the participants list.

Table 7 CIPM MRA activity of the Associates of the CGPM: number of published CMCs and participation in key and supplementary comparisons.

Country	Published CMCs	Greyed out CMCs	Key Comparisons	Supplementary Comparisons
Albania	10		7	5
Azerbaijan	32		1	8
Bangladesh			2	3
Bolivia	21		11	32
Bosnia and Herzegovina	82		16	19
Botswana	3		1	5
Cambodia				
CARICOM (Caribbean Community)	1		1	11
Chinese Taipei	397		110	50
Ethiopia				4
Georgia	65		6	18
Ghana			2	7
Hong Kong, China	298		108	32
Jamaica	22		6	11
Kuwait			3	4
Latvia	15		15	10
Luxembourg	10	4	5	4
Malta			3	3
Mauritius			2	3
Moldova, Republic of	76		6	20
Mongolia	21		5	4
Namibia	7			3
North Macedonia	21		10	11
Oman				1
Panama	37		8	22
Paraguay	8		2	19
Peru	113		31	42
Philippines	33		15	11
Qatar			3	2
Sri Lanka	2		10	2
Syrian Arab Republic			11	3
Tanzania				1
Uzbekistan			4	6
Viet Nam	31		39	9
Zambia	11		2	7
Zimbabwe	19		1	3
TOTAL	1335	4	446	395

The repartition of CMCs and comparisons among Associates is illustrated in Figure 5 and Figure 6, respectively.

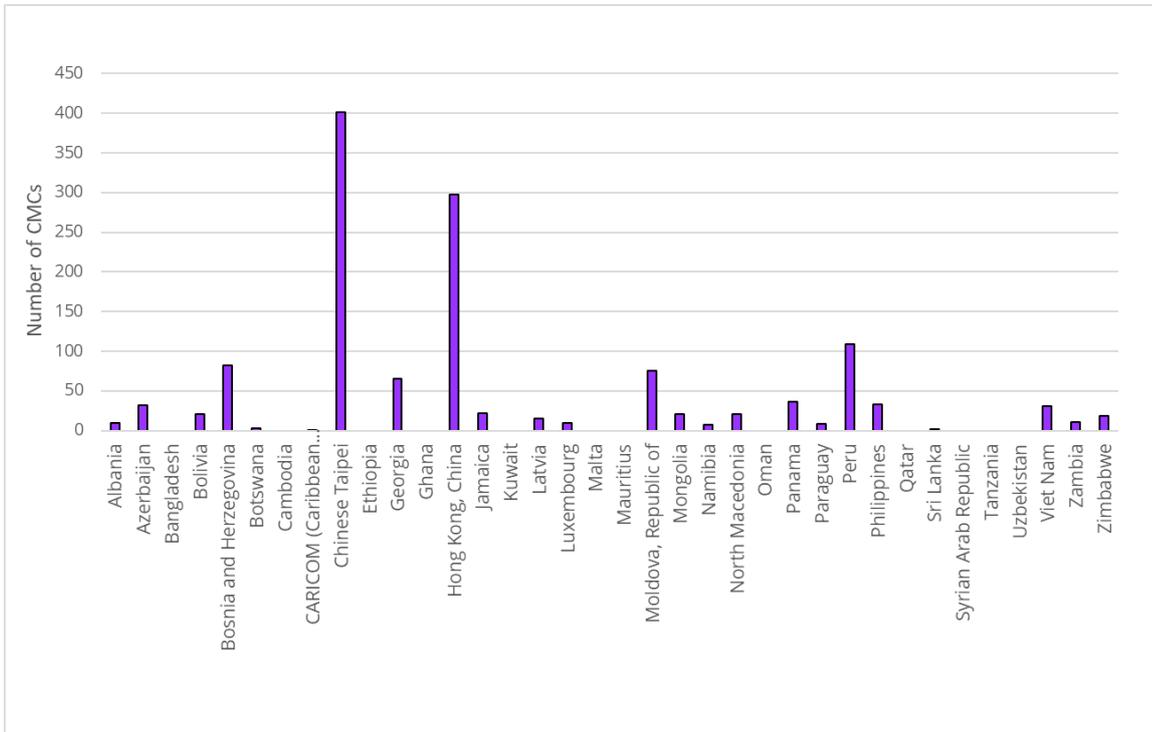


Figure 5 Graph on the number of CMCs declared by Associates of the CGPM.

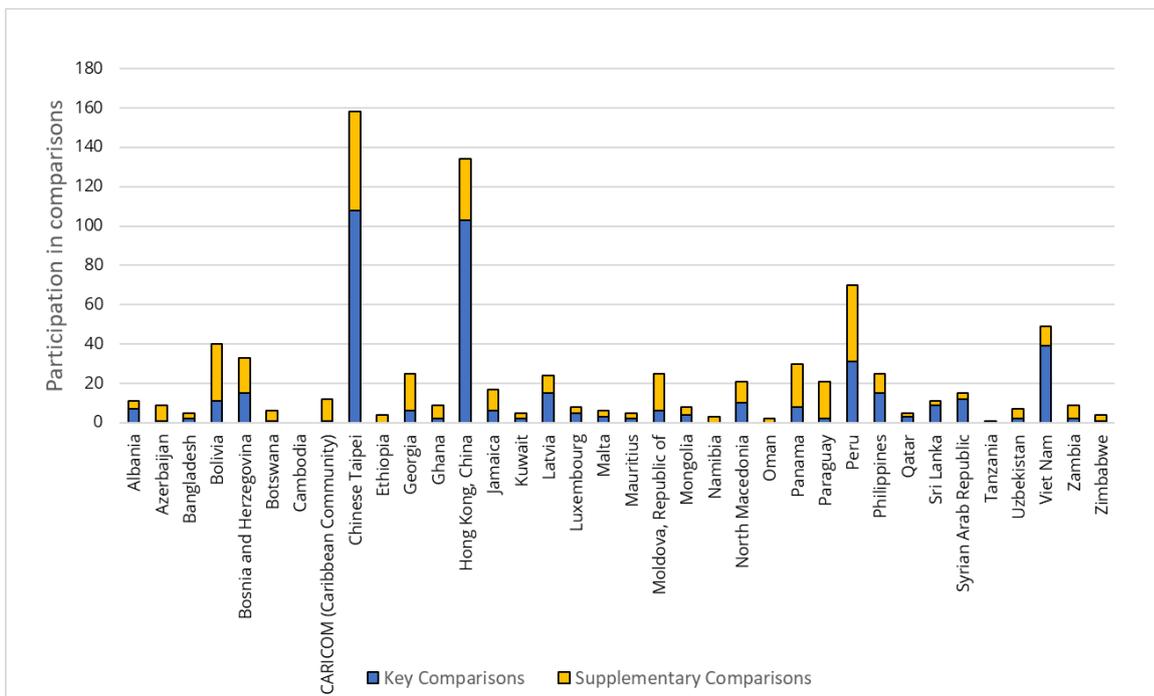


Figure 6 Graph on the participation of Associates of the CGPM in key and supplementary comparisons.

4. System’s Performance

An evaluation of the performance of the CIPM MRA activities as documented by the KCDB has been undertaken for the March 2023 Report on the KCDB to the JCRB as follows.

An analysis was started in March 2021 comparing the review duration of CMCs that had been completely processed using the KCDB 2.0 platform to the corresponding numbers regarding CMCs from 2004 to 2019 that were processed in the previous version of the KCDB. This evaluation is ongoing and an update is provided in the present report.

Statistical data on JCRB review durations for CMCs are also available from the Statistics Menu of the KCDB 2.0 platform and are illustrated in Fig 7, which shows the average, maximum, and minimum time it took for the CMCs to pass the JCRB review.

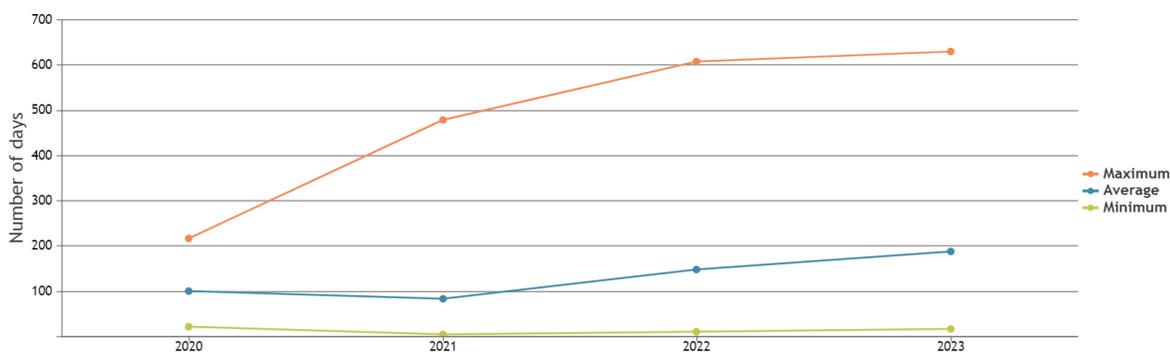


Figure 7 : A graph giving a snapshot on 1 March 2023 of the duration of the CMC approval for JCRB review as directly retrieved from the statistics on the CMCs menu of the KCDB. The KCDB 2.0 was launched in 2020.

A more detailed picture is given in Fig. 8 for the last six months (September 2022 to March 2023). Here, the CMC approval time from first submission to the KCDB, to intraregional RMO and subsequent JCRB review is depicted for CMCs submitted by the respective RMOs.

As the situation indicated by Fig. 8 shows only the last six months it is interesting to look at the long-term data. Intra-RMO and JCRB review durations for those CMCs processed fully on the KCDB 2.0 platform since 2020 are displayed in Fig. 9. Additionally, a column is provided, which shows the median value across all RMOs to the right-hand side of the graph.

Based on this, the overall picture is summarized in Table 8 where JCRB review durations computed in the ‘old’ system of the previous KCDB are compared to the more recent data of CMCs processed on the KCDB 2.0 platform. Here the picture is that review times have decreased from 140 days (median) in the old system to 67 days (status 23 February 2023) in the KCDB 2.0. The numbers for the current reporting period, column Mar. 2023 in Table 8, are larger than in previous reporting periods. This gives rise to an increase in the KCRB 2.0 figure, from 59 days in September 2022 to a current level of 67 days. However, the overall picture as compared to the old system is still quite positive. The increase of JCRB review durations in the current reporting period depends on the metrology area and specific situation in the RMOs. For example, we have seen unreasonably long JCRB review deadlines (≈365 days) set by RMOs recently, which contributed to the increase of JCRB review durations in the current reporting period.

Since intra-RMO review data was not recorded in the previous KCDB, Table 8 does not contain data for the intra-RMO review. With increasing time working on the new KCDB 2.0 platform, future reports will also comprise the temporal evolution for this review stage.

Table 8 JCRB review durations in days for CMCs at different times.

	2004 – 2019	45 th JCRB'	Sep. 2022''	Mar. 2023	KCDB 2.0*
minimum	<i>not computed</i>	24	6	43	0
median	140	75	61	147	67
mean	188	85	95	126	98
maximum	>365	327	412	214	628

'Computed for CMCs published from 9/2021 to 3/2022
 '' Computed for CMCs published from 3/2022 to 9/2022
 *Computed from the KCDB 2.0 menu 'Statistics on review performance' for the whole period since 2020-01-01

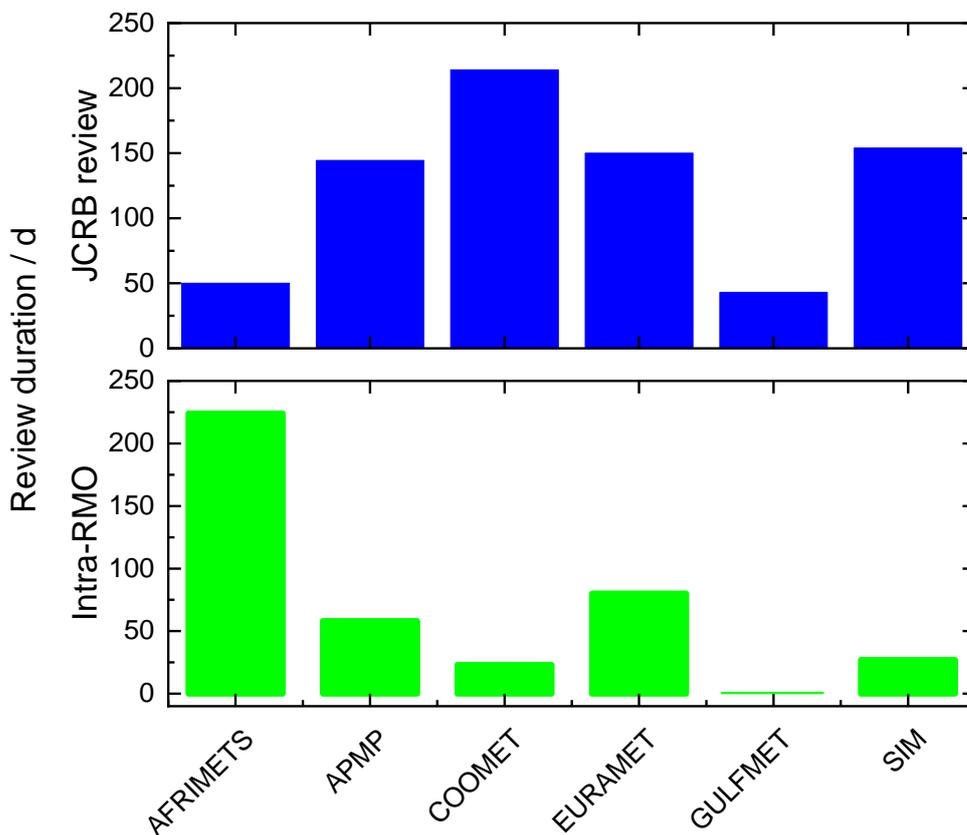


Figure 8 : Review durations for CMCs published in the KCDB 2.0 from September 2022 to March 2023. The bars reflect median intraregional review in the bottom panel and median JCRB review durations in the upper panel for CMCs submitted by the RMOs indicated in the x axis.

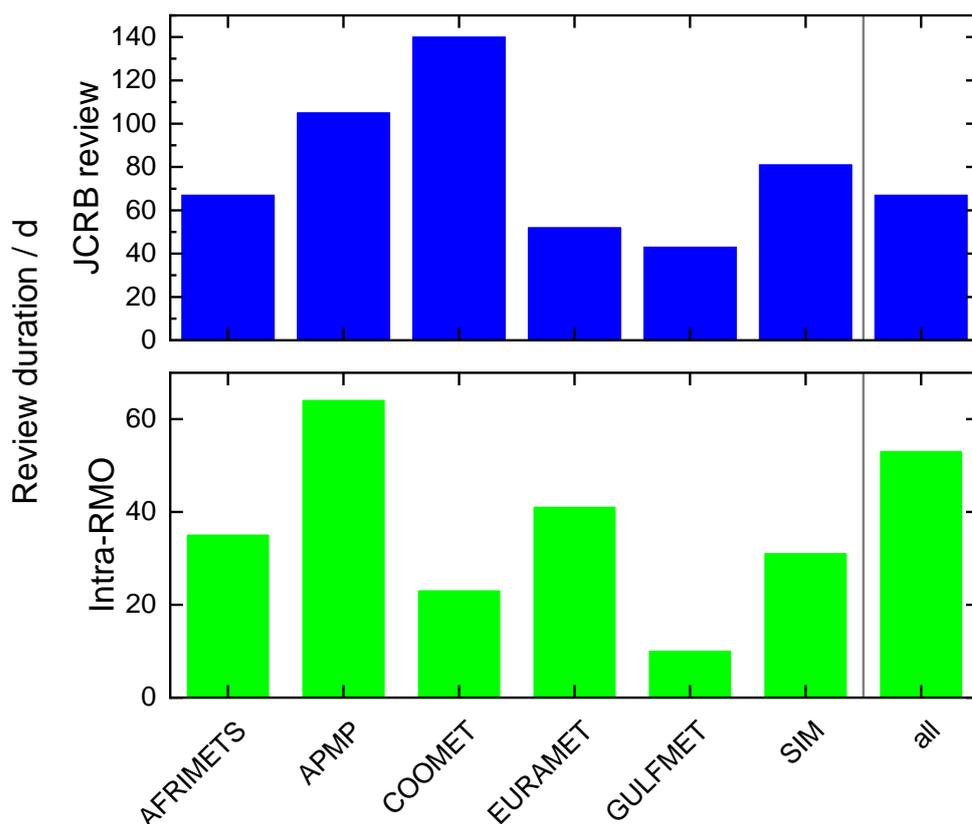


Figure 9 : Median review durations computed on CMCs fully processed in the KCDB 2.0 platform since 2020. Bottom, the intra-RMO review for all RMOs that submitted CMCs. Top, JCRB review on the same CMCs. Median data on both review stages averaged across all RMO submissions in the right column.

Review durations are different for different metrology areas as can be seen from Fig. 10. Extremes, in this reporting period (blue squared dots), are seen in the JCRB review durations in the areas EM (not visible on the scale of the graph), T, and QM. Such outliers are typically related to some changes in responsibilities within TCs/WGs where, in some cases, a smooth transition has been disturbed. For EM this long JCRB duration was mainly caused by a JCRB review deadline set by one RMO to 365 days. However, the long-term trend from 2020 to March 2023 does reveal a great improvement in JCRB review durations for all areas, as indicated by the blue bars in Fig. 10, as compared to the old system.

Faster publication of chemistry and biology CMCs (QM area) with the KCDB 2.0 platform is possible now, as reported in the previous KCDB Report. Due to the special approval process of the CCQM KCWG in the JCRB review, the average duration depends on when the 6-month time window is applied for statistics, and therefore, when the 6-month window is studied. The review duration for the QM area in the longer-term has been computed and displayed in Table 9. September 2021 showed lower JCRB review durations followed by a comparably large median JCRB duration in March 2022. The median JCRB review duration in QM has now increased again to 173 days within this reporting period and with this to a median duration of 122 days computed for CMCs since April 2021.

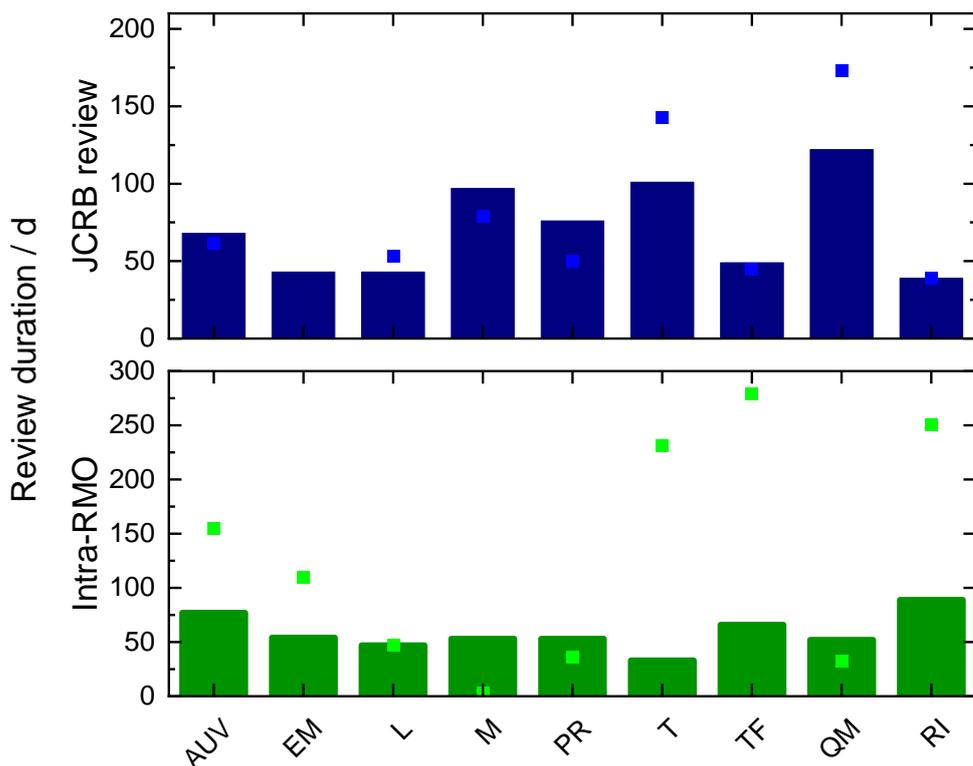


Figure 10 : Median review durations of CMCs published during the last six months (green and blue squares) and since 2020 (dark blue and green bars) related to metrology areas.

Table 9 Duration of CMCs published in the QM area for JCRB review.

Year	March 2022 – September 2022	September 2022 – March 2023	April 2021 – March 2023
JCRB duration / days	61	172	122

Preparatory work, which commenced in the previous reporting periods, was supported CIPM MRA activities, the interaction of key actors, and the adoption of the KCDB 2.0 platform by the metrology areas. This preparatory work included the organization of BIPM Capacity Building and Knowledge Transfer Programme (CBKT) training sessions for potential CMC writers, reviewers and regional metrology organization (RMO) technical TC/WG Chairs, as well as mock review exercises. In parallel, guidance documents were prepared for JCRB review using the KCDB 2.0 platform and the CMC review guidelines developed by many of the CC KCWG/WGRMO were reviewed, often supported by the KCDB Office. A suite of CIPM MRA Brochures on all aspects of the CIPM MRA was published in 2022 (<https://www.bipm.org/en/committees/cb/cbkt/cipm-mra-brochures>).

5. Present Status of the BIPM KCDB 2.0

The KCDB facility is accompanied by a variety of guidance materials, cf. <https://www.bipm.org/en/about-us/kcdb-help.html>. Several online demonstrations to users within the frame of the CBKT <https://www.bipm.org/en/cbkt/> have been organized during the last 6 months, focused on different user profiles or requested needs.

The KCDB 2.0 software is supported by an Application Management contract, which at present gives the opportunity to make smaller adjustments of the software. Anomalies and suggestions for improvements may be communicated by the users by completing the form https://www.bipm.org/utis/common/pdf/KCDB_2.0/Form_for_declaring_an_anomaly_or_request.docx.

The Quality System underpinning the previous version of the KCDB has been updated. The most recent internal audit was held in June 2021.

6. BIPM KCDB and digitalization

The metrology community is progressively noting the importance of FAIR⁴ machine-readable data for calibration issues but also for future emerging applications. Industrial sectors are requesting possibilities to use Digital Calibration Certificates, which will contribute to versatile technical advantages, increased cost effectiveness and improvements from a quality perspective.

The BIPM implemented an Application and Programming Interface for the KCDB (API KCDB) in 2021 as a first step in this direction. This interface allows external users to make CMC queries from systems other than the KCDB web and to collect machine readable data: <https://www.bipm.org/en/cipm-mra/kcdb-api>.

Within the framework of an Expert Group, and under the auspices of the CIPM Task Group on the Digital SI, the KCDB has recently been the subject of a case study in relation to a supporting interoperable unit and quantity system and this work will continue as part of the BIPM Digitalization programme.

Acknowledgement

Many thanks to the BIPM IT team (Laurent Le Mée and Thierry N'Guyen) for their continued support.

⁴ Findable Accessible Interoperable Reusable

APPENDIX I List of uncompleted comparisons older than 5 years**a) Key Comparisons**

KC identifier	Indicated measurement date		Status March-2023
	Start year	End year	
APMP.EM.BIPM-K11.2	2004	2004	Report in progress, draft B
APMP.EM.RF-K8.CL	2012	2013	Measurements completed
APMP.EM-K12	2014	2015	Waiting for approval
APMP.EM-K2	2010	2011	Waiting for approval
APMP.EM-K5.1	2010	2013	Waiting for approval
APMP.M.D-K4	2007	2008	Report in progress, draft A
APMP.M.F-K3.a	2013	2017	Measurements in progress
APMP.M.P-K15	2013	2014	Measurements completed
APMP.M.P-K4	2015	2016	Measurements completed
APMP.M.P-K7.2	2015	2016	Report in progress, draft B
APMP.M.T-K1	2015	2016	Planned
APMP.PR-K3.a	2012	2014	Report in progress, draft A
APMP.PR-K3.a.1	2006	2006	Measurements completed
APMP.T-K3.6	2013	2014	Waiting for approval
APMP.T-K4.1	2013	2014	Report in progress, draft B
CCEM.RF-K5.c.CL	2012	2015	Measurements in progress
CCL-K4.2015	2015	2017	Report in progress, draft B
CCM.FF-K2.2011	2013	2015	Report in progress, draft B
CCPR-K2.b.2016	2016	2017	Measurements completed
CCQM-K110	2012	2012	Postponed
CCQM-K133	2017	2017	Planned
CCQM-K150	2017	2017	Report in progress, draft A
CCRI(II)-K2.Pa-231	2017	2017	Report in progress, draft B
CCRI(II)-K2.Tc-99	2012	2013	Measurements in progress
CCT-K1.1	2006	2014	Report in progress, draft A
CCT-K10	2014	2016	Report in progress, draft B
CCT-K6.1	2008	2010	Report in progress, draft A
CCT-K8	2016	2017	Measurements completed
COOMET.AUV.V-K1	2007	2008	Report in progress, draft B
COOMET.L-K3	2011	2012	Report in progress, draft A
EURAMET.T-K6.2	2017	2017	Planned
EURAMET.T-K7.4	2015	2017	Measurements in progress
EURAMET.T-K8	2008	2012	Report in progress, draft A

(continued...)

KC identifier	Indicated measurement date		Status as of 23 Feb-2023
	Start year	End year	
EURAMET.T-K8.1	2017	2017	Planned
GULFMET.T-K9	2017	2017	Measurements in progress
SIM.L-K7.2016	2016	2017	Report in progress, draft A
SIM.M.M-K6	2015	2017	Report in progress, draft B
SIM.QM-K1	2009	2009	Report in progress, draft B

b) Supplementary Comparisons

SC identifier	Indicated measurement date		Status Mar-2023
	Start year	End year	
APMP.EM.RF-S5.CL	2013	2015	Protocol complete
APMP.EM-S8	2011	2013	Protocol complete
APMP.M.FF-S2.2016	2016	2017	Report in progress, draft B
APMP.M.G-S1	2012	2012	Report in progress, draft A
APMP.M.H-S4	2011	2011	Report in progress, draft A
APMP.M.MM-S1	2012	2013	Measurements in progress
APMP.M.P-S1	2003	2005	Measurements completed
APMP.M.P-S7	2015	2015	Report in progress, draft B
APMP.PR-S5	2008	2009	Measurements in progress
APMP.PR-S8	2015	2017	Measurements in progress
APMP.T-S10	2013	2013	Planned
APMP.T-S11	2013	2016	Report in progress, draft A
APMP.T-S13	2014	2016	Measurements in progress
APMP.T-S14	2017	2017	Measurements in progress
APMP.T-S8	2011	2015	Measurements in progress
APMP.T-S9	2013	2013	Measurements in progress
CCRI(II)-S9	2011	2011	Report in progress, draft A
CCT-S3	2007	2008	Report in progress, draft B
COOMET.EM-S10	2010	2012	Report in progress, draft B
COOMET.EM-S18	2013	2016	Report in progress, draft A
COOMET.EM-S19	2015	2017	Report in progress, draft A
COOMET.EM-S21	2016	2017	Report in progress, draft B
COOMET.EM-S6	2007	2010	Report in progress, draft B
COOMET.EM-S7	2009	2011	Report in progress, draft B
COOMET.L-S20	2016	2016	Report in progress, draft A
COOMET.M.FF-S4	2009	2010	Report in progress, draft B
COOMET.M.F-S1	2008	2010	Report in progress, draft B
COOMET.M.H-S2	2014	2016	Report in progress, draft A
COOMET.M.M-S2	2015	2017	Report in progress, draft A
COOMET.M.M-S3	2016	2017	Measurements in progress
COOMET.M.P-S1	2014	2015	Report in progress, draft B
COOMET.PR-S10	2016	2017	Protocol complete
COOMET.PR-S5	2008	2011	Measurements completed
COOMET.RI(I)-S3	2016	2017	Waiting for approval
EURAMET.M.F-S2	2012	2013	Measurements in progress
EURAMET.M.P-S16	2016	2016	Protocol complete
EURAMET.M.T-S4	2015	2015	Measurements completed
EURAMET.PR-S4	2012	2013	Measurements completed

(continued...)

SC identifier	Indicated measurement date		Status Mar-2023
	Start year	End year	
SIM.M.FF-S4	2006	2006	Report in progress, draft B
SIM.M.FF-S9	2016	2016	Report in progress, draft A
SIM.M.F-S2	2012	2012	Report in progress, draft A
SIM.M.F-S6	2017	2017	Report in progress, draft A
SIM.M.M-S17	2017	2017	Measurements completed
SIM.QM-S3	2012	2012	Report in progress, draft A
SIM.QM-S4	2012	2012	Report in progress, draft A
SIM.QM-S5	2015	2015	Report in progress, draft B
SIM.QM-S6	2016	2016	Protocol complete
SIM.T-S4	2008	2008	Report in progress, draft B
SIM.T-S6	2012	2014	Report in progress, draft A
SIM.T-S8	2014	2014	Report in progress, draft A
SIM.T-S9	2017	2017	Planned

