

# MARCH 2024 REPORT ON THE KCDB TO THE JCRB

v. 2024-04-05  
[www.bipm.org/](http://www.bipm.org/)

## KCDB Report to the JCRB<sup>1</sup>

### September 2023 to March 2024

#### Executive Summary

The KCDB is a platform providing publicly available, peer reviewed, free and, searchable information on CMCs of NMIs and 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 for search on CMCs.

The number of CMCs is approximately stable, with increasing information offset by the adoption of wider scope CMCs. The time for CMC reviews has decreased significantly since the implementation of KCDB 2.0 in late 2019. The JCRB review duration has largely remained low at 84 median days compared to 140 days with the old system.

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over time, but the rate of increase is also approximately stable, the majority of comparisons launched being repeats of outdated comparisons plus new supplementary comparisons within the RMOs.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

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 implemented in 1999. It contains data on Calibration and Measurement Capabilities (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 reviewed by international groups of experts and approved for mutual recognition.

The KCDB website [www.bipm.org/kcdb](http://www.bipm.org/kcdb) gives access to the following services with open access:

- 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

supported by a set of guidance documents.

---

<sup>1</sup> 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>

The status of the database concerning **Calibration and Measurement Capabilities** are given in Section 1. In Section 2, recent information concerning **Comparisons** carried out within the frame 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 view on the software **status** is presented in Section 6. The **BIPM KCDB and digitalization** is brought to notice in Section 7.

This report reflects the status as of 4 March 2024.

## 1. CIPM MRA Appendix C: Calibration and Measurement Capabilities

### 1.1. CMC statistics

There were<sup>2</sup> 25 877 (25 833) CMCs published in the KCDB on 4 March 2024 of which 19 485 (19 695) are in Physics and 6392 (6138) in Chemistry and Biology, see **Error! Reference source not found..** The total number of published CMCs remains almost the same over the previous year which confirms the observed steady-state trend over the last 5 years period. An increase of 4% the CMCs published in the field of Chemistry and biology and a decrease of 1% of the CMCs published in the field of Physic are observed during 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”

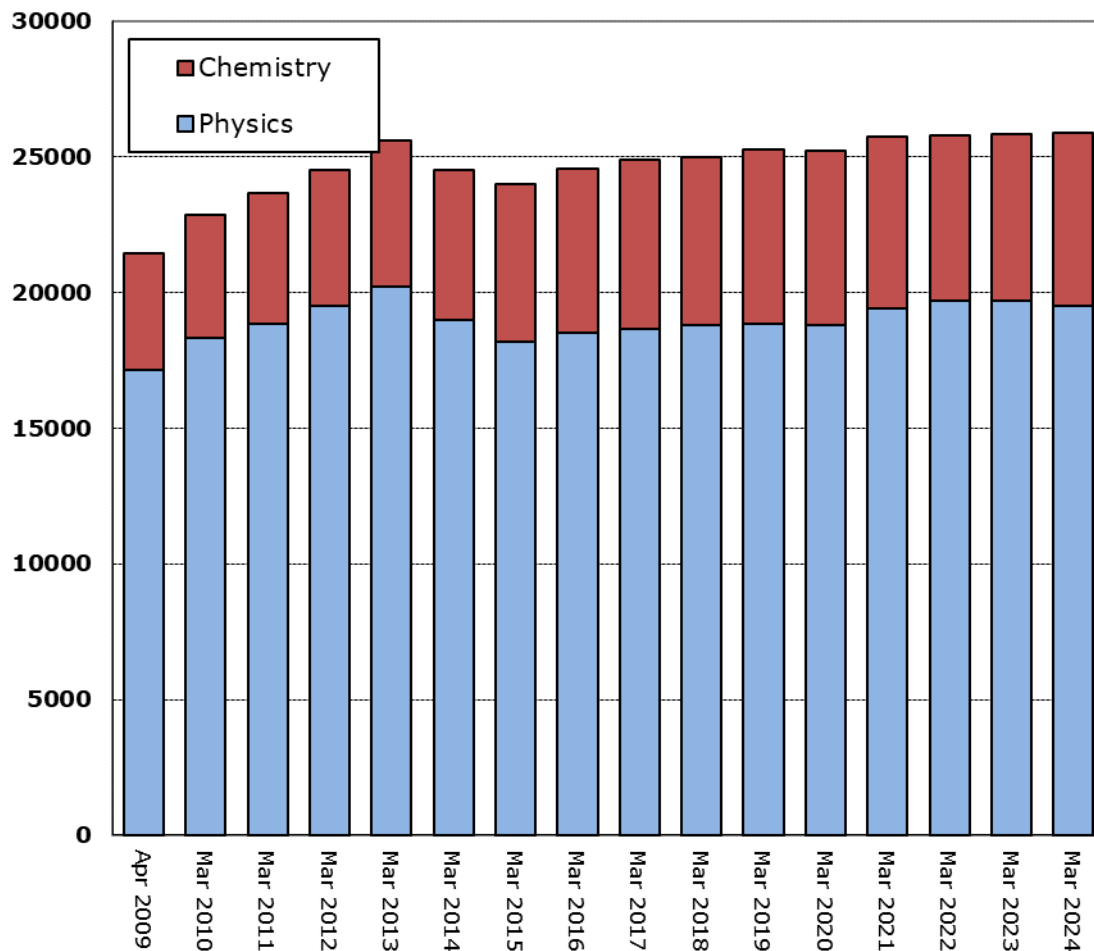
<https://www.bipm.org/kcdb/cmc/statistics/public> .

The distribution of published CMCs along the RMOs is listed in **Error! Reference source not found..** The distribution of the overall number of published CMCs within RMOs remains stable over the last six months period. We however observed a significant decrease of the CMCs from APMP which is related to the greying out of about 270 CMCs from two countries in this region.

The status of not yet published CMCs that are placed on the platform is listed in Table 2; 2765 compared to 2723 half a year earlier. This number can vary considerably, depending on the status of the review campaigns applied by some of the Consultative Committees.

---

<sup>2</sup> The numbers given within parenthesis represents the number of CMC reported one 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 4 March 2024 (follow-up of Action 17/1 of JCRB 2006).

RMO	Number of CMCs	Number of CMCs
	2024-03-04	2023-09-01
AFRIMETS	766	753
APMP	6629	6763
COOMET	2217	2197
EURAMET	11673	11564
GULFMET	77	74
SIM	4515	4458
<b>Total</b>	<b>25877</b>	<b>25809</b>

**Table 2** Status of not yet published CMCs in KCDB on 4 March 2024

Status	number of CMCs	number of CMCs
	2024-03-04	2023-09-01
Draft	384	352
RMO: Submitted	533	462
RMO: Under Review	117	118
RMO: Review Completed	101	105
RMO: Accepted	51	24
RMO: Revision Requested	175	199
RMO: Revision Completed	38	18
Submitted to the JCRB	2	6
JCRB: Under Review	359	278
JCRB: Revision Requested	303	335
JCRB: Revision Completed	22	25
JCRB: Approved	4	329
JCRB: Waiting for VOTE	0	22
Greyed out	676	450
<b>TOTAL</b>	<b>2765</b>	<b>2723</b>

The total number of CMCs published after JCRB approval during the last 6 months for each metrology area is listed in Table 3. The total number of published CMCs has increased in comparison to the previous 6-month period which confirms the observed increase in the previous 6 months. In addition, 60% of the overall published CMCs (951) were not subject to JCRB review but revised to the KCDB for editorial modification as per criteria 8.1 and 8.2 of CIPM MRA G-13.

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



Metrology area	Published CMCs	Published CMCs
	2024-03-04	2023-09-01
AUV	5	2
EM	61	63
L	1	10
M	35	143
PR	22	63
T	23	4
TF	28	27
QM	229	6
RI	2	55
<b>TOTAL</b>	<b>406</b>	<b>373</b>

**1.2. Greyed out CMCs and reinstatements**

There are presently 676 greyed out CMCs, compared to 450 CMCs 6 months earlier. 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. The increase was due to the greying out of CMCs from India and Vietnam over the last 6-months period.

**Table 4** Status of greyed out CMCs on 4 March 2024

RMO	COUNTRY	AUV	EM	L	M	PR	QM	RI	T	TF	TOTAL
AFRIMETS	ZA							11			11
APMP	AU							14			14
APMP	CN							1			1
APMP	IN	34	74	44	54	14	1			15	236
APMP	KR		8				80				88
APMP	NZ		1			8				2	11
APMP	SG			4							4
APMP	VN			9	10					5	24
COOMET	RU				1		39				40
EURAMET	DE		0				4	0	1		5
EURAMET	ES							3			3
EURAMET	FR						7				7
EURAMET	GB		5		6						11
EURAMET	HU			6							6
EURAMET	IT		3					98			101
EURAMET	LT			9	12						21
EURAMET	LV		4								4
EURAMET	NO			1	4						5
EURAMET	PL			1							1
EURAMET	PT			1				1			2
EURAMET	SK						10				10
EURAMET	UA				6			1			7
SIM	AR			1			8				9
SIM	BO						2				2
SIM	CA		7		1						8
SIM	MX					4	17				21
SIM	US					20			6		26
<b>TOTAL:</b>		<b>34</b>	<b>102</b>	<b>76</b>	<b>94</b>	<b>46</b>	<b>168</b>	<b>129</b>	<b>7</b>	<b>22</b>	<b>678</b>

 *Increased in number*  
 *Decreased in number*

As of 4 March, Table 5 lists the number of greyed-out CMCs in the KCDB that reach its maximum possible 5 years as greyed-out within the next six months.

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

RMO	Metrology area	number	date limit greyed-out
APMP	Electricity and Magnetism	1 (NZ)	3/2024
EURAMET	Ionizing Radiation	98 (IT)	05/2024
		1 (PT)	08/2024
EURAMET	Mass & related quantities	5 (LT)	06/2024

The dynamically updated full 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>).

## 2. CIPM MRA Appendix B: Key and supplementary comparisons

### 2.1. Comparison statistics

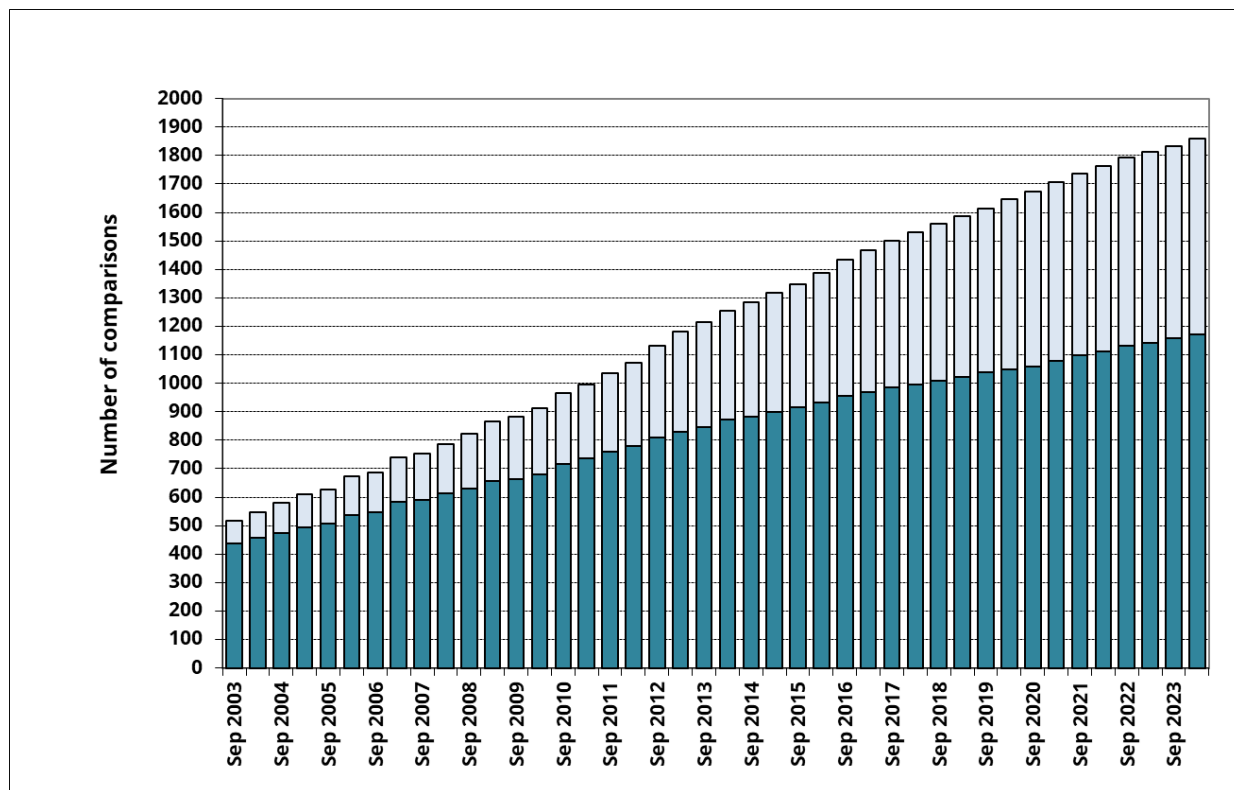
On 4 March 2024 the KCDB listed 1834 comparisons distributed as listed in Table 66; 1173 of them are key comparisons and 687 supplementary comparisons. This represents a total increase of 26 comparisons since 1 September 2023.

**Table 6** Key and Supplementary Comparisons on 4 March 2024.

Entity	KC	SC
BIPM	101	1
CC	581	36
AFRIMETS	8	32
APMP	152	125
COOMET	50	122
EURAMET	196	222
GULFMET	7	27
SIM	78	122
<b>TOTAL</b>	<b>1173</b>	<b>687</b>

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, corresponding to an increase of 3%. The ratio of

supplementary comparisons, 20 % in 2006, has continuously progressed to constitute 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.

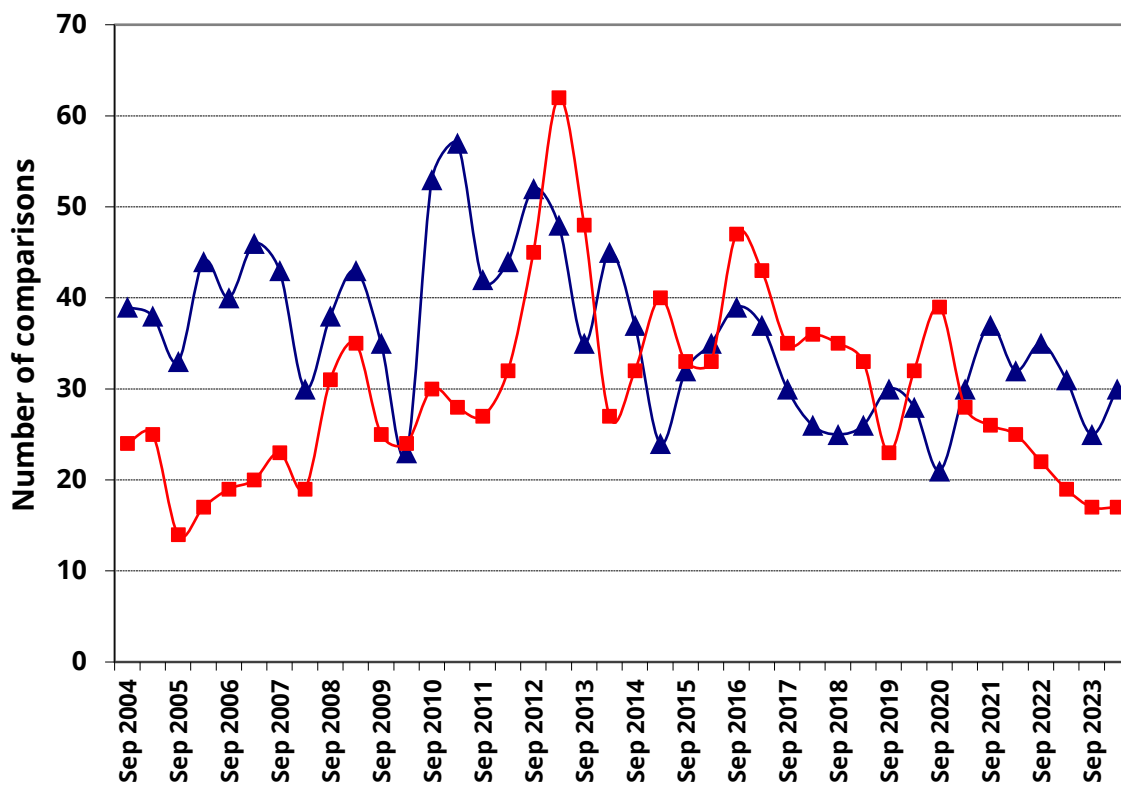
Graphs generated in real-time illustrating the participation in key and supplementary comparisons are available under the Statistics menu on the KCDB home page:

<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 26 comparisons were registered as new during the last 6 months:

- |                       |                     |
|-----------------------|---------------------|
| APMP.AUV.V-S2         | COOMET.AUV.A-S5     |
| APMP.EM.BIPM-K13      | COOMET.QM-K3.2019   |
| BIPM.RI(II)-K4.Sm-153 | EURAMET.M.FF-S20    |
| CCM.P-S1              | EURAMET.M.F-K2.a    |
| CCQM-K115.d           | EURAMET.M.G-K2.2023 |
| CCQM-K173.1           | EURAMET.QM-K170     |
| CCQM-K73.2018.3       | EURAMET.QM-K19.2018 |
| CCQM-K82.2023         | EURAMET.QM-K91.2022 |
| CCQM-K96.2023.1       | EURAMET.RI(II)-S9   |
| CCRI(II)-S16.Lu-177   | EURAMET.T-S8        |
| CCT-K4.2              | GULFMET.M.M.S3      |
| CCT-K6.2021           | SIM.M.F-S12         |
| CCT-K9.4              | SIM.M.F-S13         |

The following 58 reports were published during the last 6 months :

AFRIMETS.L-S6	BIPM.RI(II)-K1.Zn-65 (Update 2023)	EURAMET.M.FF-S12
APMP.AUV.V-K3.1	CCEM.RF-K26	EURAMET.M.FF-S17
APMP.AUV.V-S1	CCL-K11 (2022)	EURAMET.QM-K3.2019
APMP.EM-K2	CCM.T-K2.1	EURAMET.RI(I)-K1.3
APMP.QM-S19	CCQM-K154.b.1	EURAMET.RI(I)-K4.3
APMP.T-K4.1	CCQM-K154.d	EURAMET.RI(I)-S16
BIPM.QM-K1 (FMI 2023)	CCQM-K156.1	EURAMET.RI(II)-K2.Cr-51
BIPM.QM-K1 (ISCI 2023)	CCQM-K168	EURAMET.T-K7.4
BIPM.QM-K1 (NIM 2023)	CCRI(II)-S13	SIM.EM-S13
BIPM.QM-K1 (NIMT 2022)	CCRI(III)-K9.Cf-252.2016	SIM.M.D-S7
BIPM.RI(I)-K3 (BFKH 2021)	CCT-K4.1	SIM.M.FF-S13
BIPM.RI(I)-K5 (BEV 2023)	COOMET.L-K3	SIM.M.FF-S9
BIPM.RI(I)-K5 (CIEMAT 2023)	COOMET.M.FF-S4	SIM.QM-S12
BIPM.RI(I)-K7 (BFKH 2023)	COOMET.M.P-K15	SIM.QM-S17
BIPM.RI(I)-K8_PTB_2023	COOMET.M.P-S1	SIM.QM-S6
BIPM.RI(II)-K1.Cr-51 (Update 2024)	COOMET.PR-S5	SIM.QM-S9
BIPM.RI(II)-K1.Ge-68 (NIM 2021)	COOMET.RI(I)-S3	SIM.T-K9.3
BIPM.RI(II)-K1.Lu-177	EURAMET.L-S2.1.n01	SIM.T-S6
BIPM.RI(II)-K1.Na-22 (NMISA 2022)	EURAMET.M.D-K2.1	
BIPM.RI(II)-K1.Tb-161 (NPL 2022)	EURAMET.M.D-K2.2	

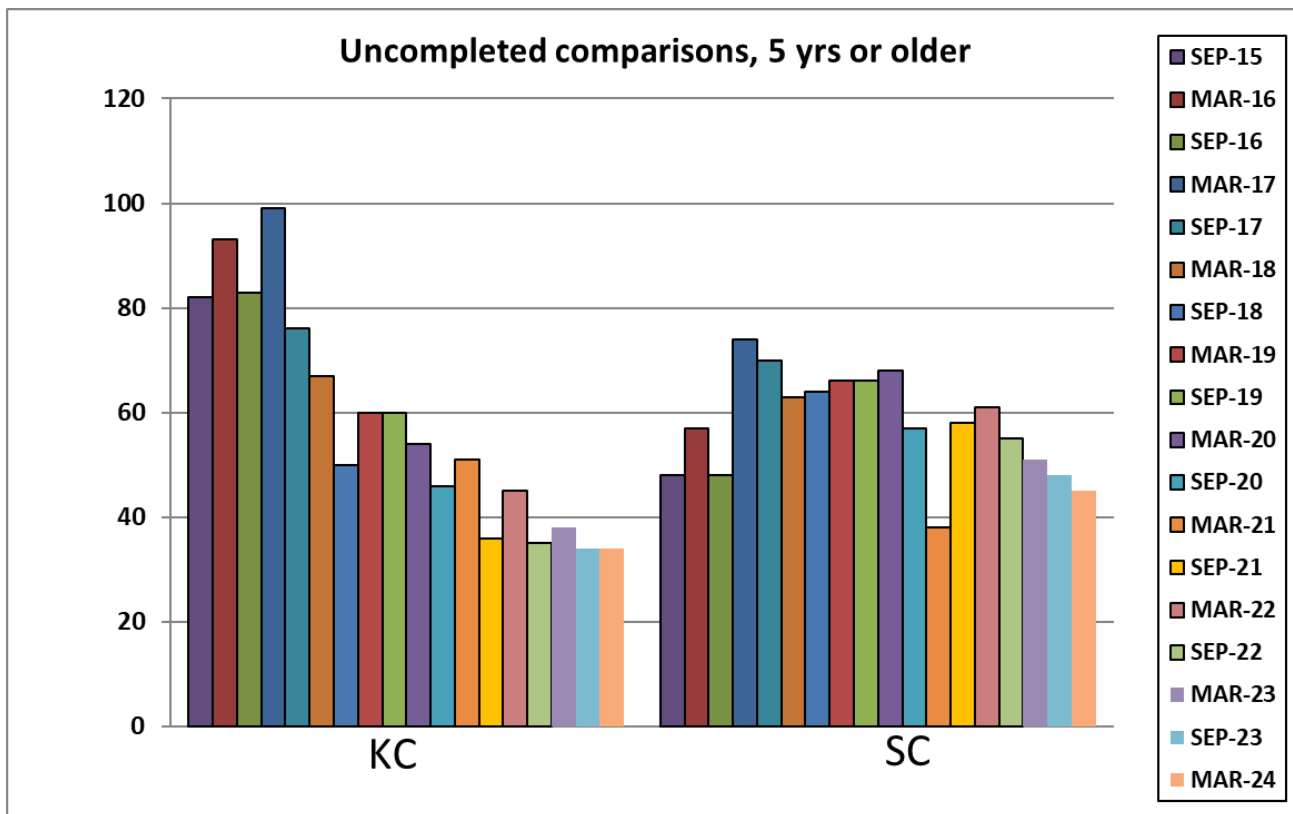
On 4 March 2024, the number of abandoned (69) or superseded key and supplementary comparisons, stored in the KCDB archives is 152, compared to 145 on 1 September 2023.

## 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 uncompleted Key Comparisons, connected to the Consultative Committees, reduced by half in number since the follow-up action was triggered by the JCRB, 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 67 summarizes the participation of the [36 Associates of the CGPM](#) in CIPM MRA activities as of 4 March 2024.<sup>3</sup>

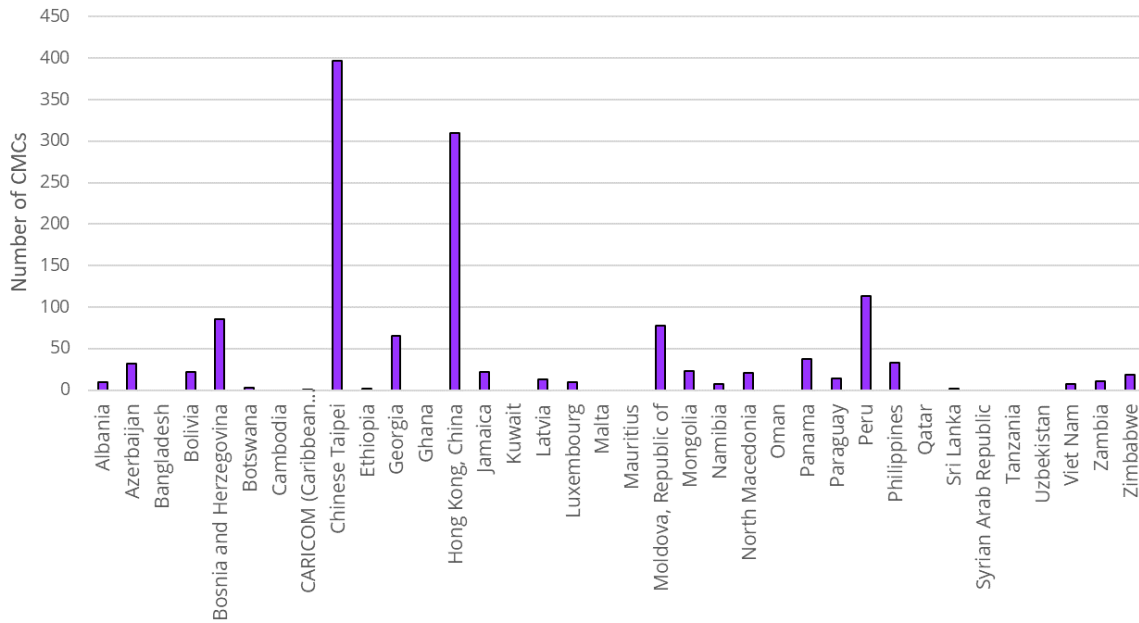
<sup>3</sup> These numbers take into account all comparisons registered in the KCDB, disregarding status, for which at least one laboratory of the Associate is listed in the participants list.

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

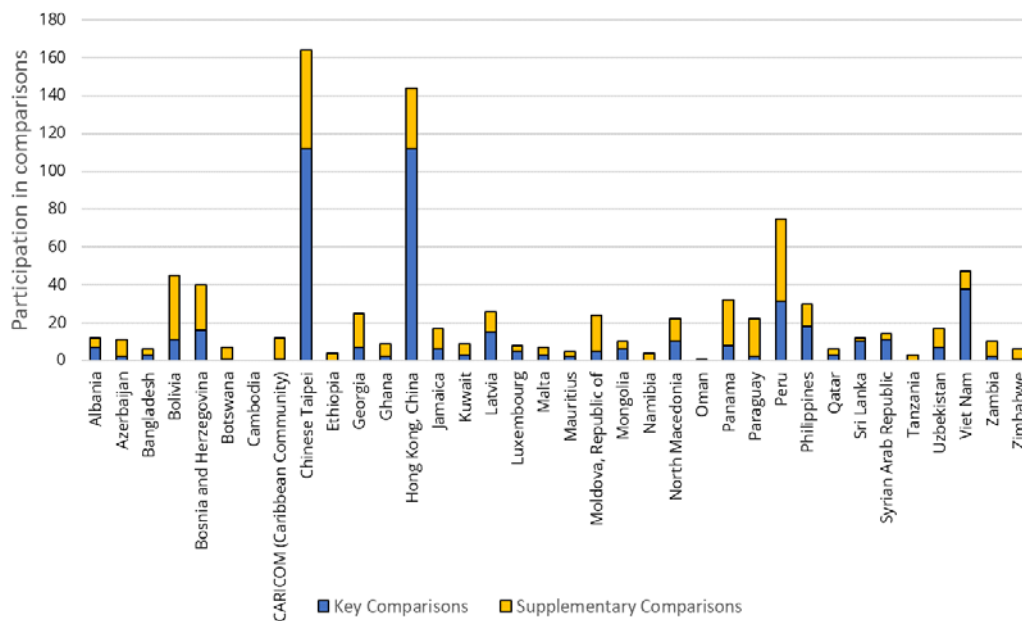
Country	Published CMCs	Greyed out CMCs	Key Comparisons	Supplementary Comparisons
Albania	10		7	5
Azerbaijan	32		2	9
Bangladesh			3	3
Bolivia	22		11	34
Bosnia and Herzegovina	85		16	24
Botswana	3		1	6
Cambodia				0
CARICOM (Caribbean Community)	1		1	11
Chinese Taipei	397		112	52
Ethiopia	2			4
Georgia	65		7	18
Ghana			2	7
Hong Kong, China	310		112	32
Jamaica	22		6	11
Kuwait			3	6
Latvia	13	4	15	11
Luxembourg	10		5	3
Malta			3	4
Mauritius			2	3
Moldova, Republic of	78		5	19
Mongolia	23		6	4
Namibia	7			4
North Macedonia	21		10	12
Oman				1
Panama	38		8	24
Paraguay	14		2	20
Peru	113		31	44
Philippines	33		18	12
Qatar			3	3
Sri Lanka	2		10	2
Syrian Arab Republic			11	3
Tanzania				3
Uzbekistan			7	10
Viet Nam	7	24	38	9
Zambia	11		2	8
Zimbabwe	19		1	5
<b>TOTAL</b>	<b>1338</b>	<b>28</b>	<b>460</b>	<b>426</b>

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.



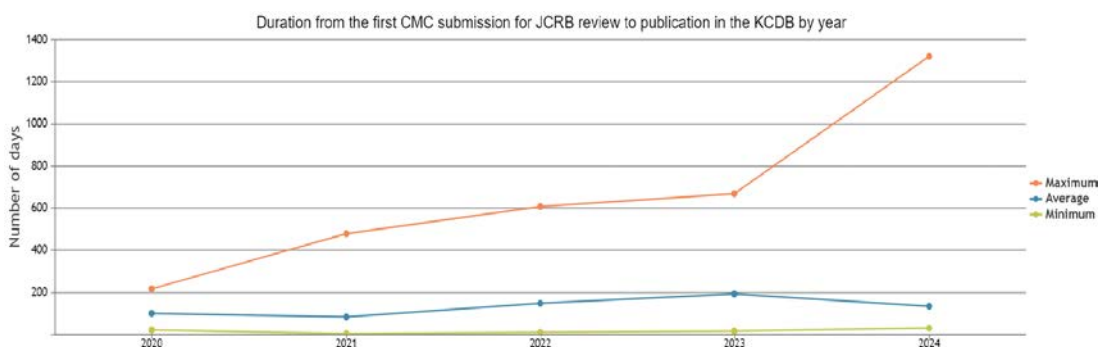
**Figure 6** Graph on the participation of Associates of the CGPM in key and supplementary comparisons.



#### 4. System’s Performance

An analysis was started in March 2021 comparing the review duration of CMCs that had been completely processed using the KCDB 2.0 platform. This evaluation is ongoing, and an update is provided in this March 2024 report on the KCDB to the JCRB.

Statistical data on JCRB review durations for CMCs is also available from the Statistics Menu of the KCDB 2.0 platform as illustrated in Fig 7, a screenshot 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 14 March 2024 of the duration of the CMC approval for JCRB review as directly retrieved from the statistics on the CMCs menu of the KCDB.

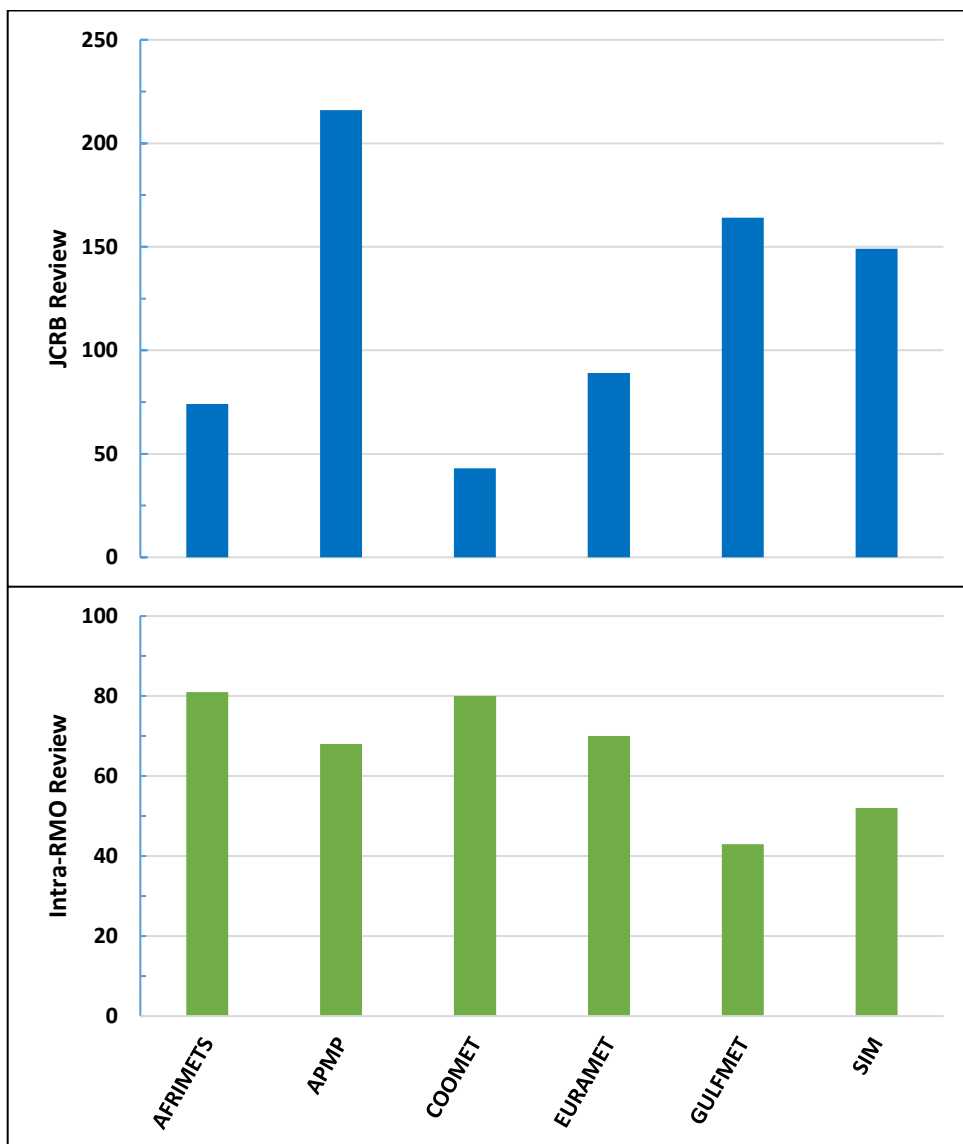
The overall picture is summarized in table 8 where JCRB review durations are compared to the more recent data of CMCs processed on the KCDB 2.0 platform. The median days for the current reporting period, column Mar. 2024, have remained fairly constant compared to the Sept. 2023 reporting period. The notable change is in the mean review duration that has reduced from 131 to 100 days and a CMC published within the last 6 months that had its JCRB review last more than 3.5 years. Looking at the median review duration for all the CMCs processed in the KCDB 2.0, it has also remained fairly constant (84 days for March 2024 reporting period versus 81 days for September 2023 reporting period), maintaining a reduced duration compared to the old KCDB system. With all current CMCs processed on the KCDB 2.0 platform, future reports will also comprise the temporal evolution of Intra-RMO review stage.

	Sep. 2022	Mar. 2023	Sep. 2023	Mar. 2024'	KCDB 2.0*
<b>Minimum</b>	6	43	22	20	31
<b>Median</b>	61	147	71	69	84
<b>Mean</b>	95	126	131	100	134
<b>Maximum</b>	412	214	665	1305	1321

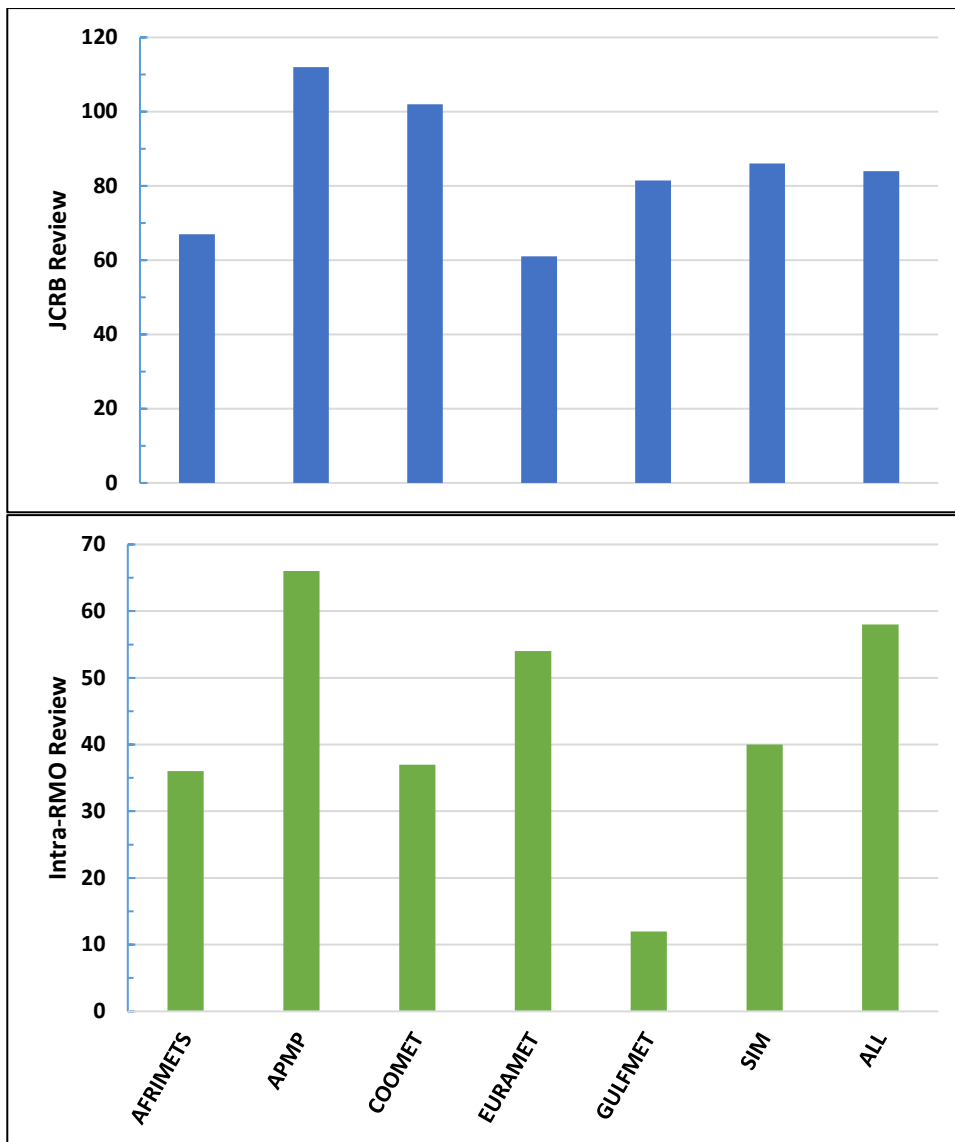
'Computed for CMCs published from 9/2023 to 3/2024  
 \*Computed from the KCDB 2.0 menu 'Statistics on review performance' for the whole period since 2020-01-01

**Table 8:** JCRB review durations in days for CMCs published within 6 months of the reporting periods and all published in the KCDB 2.0 since 2020-01-01.

A graphical representation of the CMCs published in the last the last six months (September 2023 to March 2024) is depicted in Fig. 8. The lower graph with green bars shows the Intra-RMO review durations per submitting RMOs. All of them have median durations of less than 81 days from initial submission to submission for JCRB review. The top graph shows the median JCRB review durations. Only one RMO has an extreme duration of over 200 days while three have durations of <100 days. The same analysis is displayed in Fig. 9 for all CMCs processed fully on the KCDB 2.0 platform since 2020. A column on the right-hand side of the graph shows the median value across all RMOs.



**Figure 8 :** Review durations for CMCs published in the KCDB 2.0 between September 2023 to March 2024. The bars reflect median intra-regional review in the bottom panel and median JCRB review durations in the upper panel for CMCs submitted by the RMOs indicated on 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 submitting the CMCs. Top, JCRB review on the same CMCs. Median data on both review stages averaged across all RMO submissions in the right column.

Lastly, a graphical representation of the review durations for metrology areas is depicted Fig. 10. The only extreme for the JCRB review phase in this reporting period (light blue bars), is in QM. This is due to the special approval process of the CCQM KCWG in the JCRB review. However, the long-term trend from 2020 to March 2024 still reflects a great improvement in JCRB review durations for all areas, as indicated by the dark blue bars compared to the old system.

The review duration for the QM area in the longer-term perspective is displayed in Table 9. For CMCs published in the last 6 months, the median JCRB review duration in QM has reduced from 384 to 189 days. Finally, there has been a marginal increase from the last reporting period from a median duration of 119 days compared to 128 days for CMCs processed since April 2021.



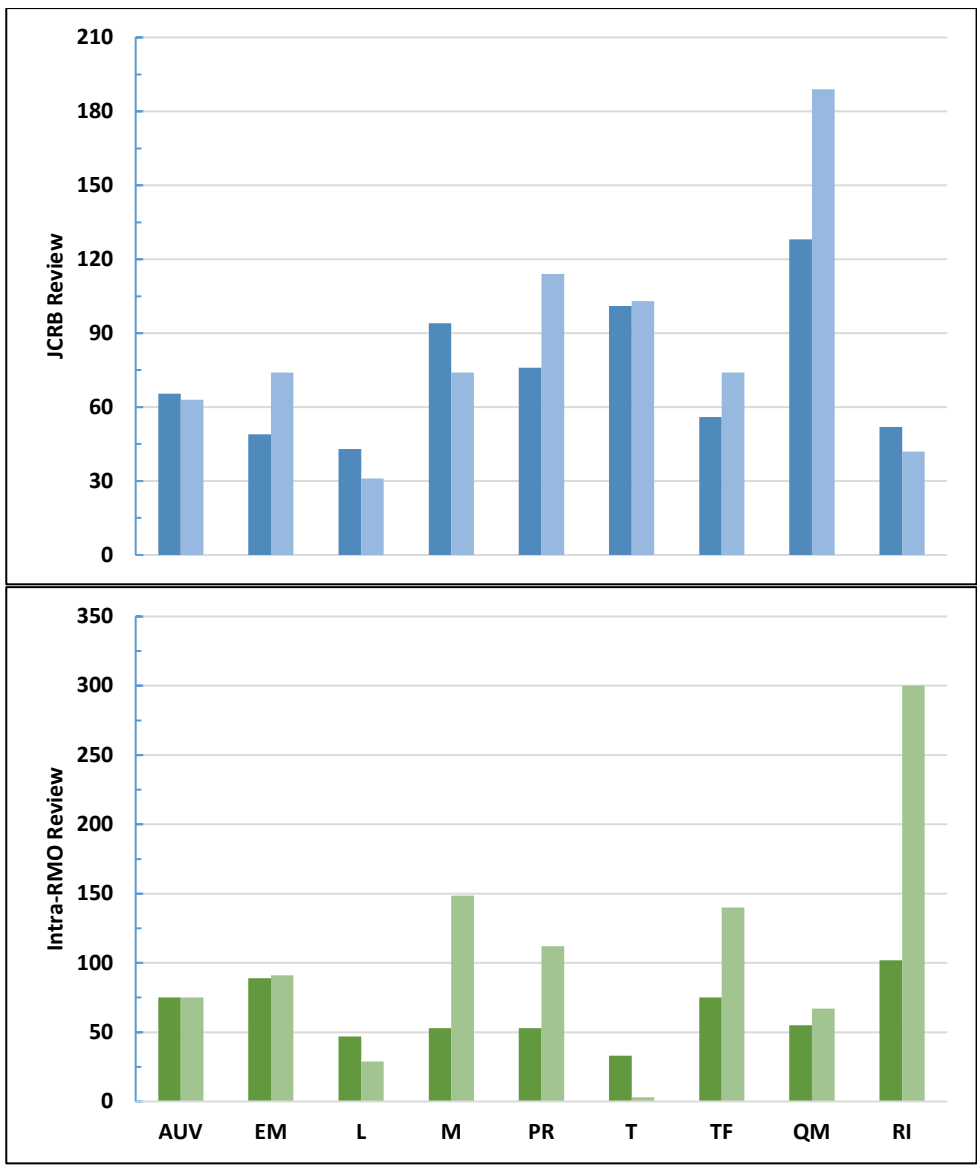


Figure 10 : Median review durations of CMCs published during the last six months (light green and blue bars) and since 2020 (dark blue and green bars) per metrology areas.

Table 9 : JCRB review durations for CMCs published in the QM area.

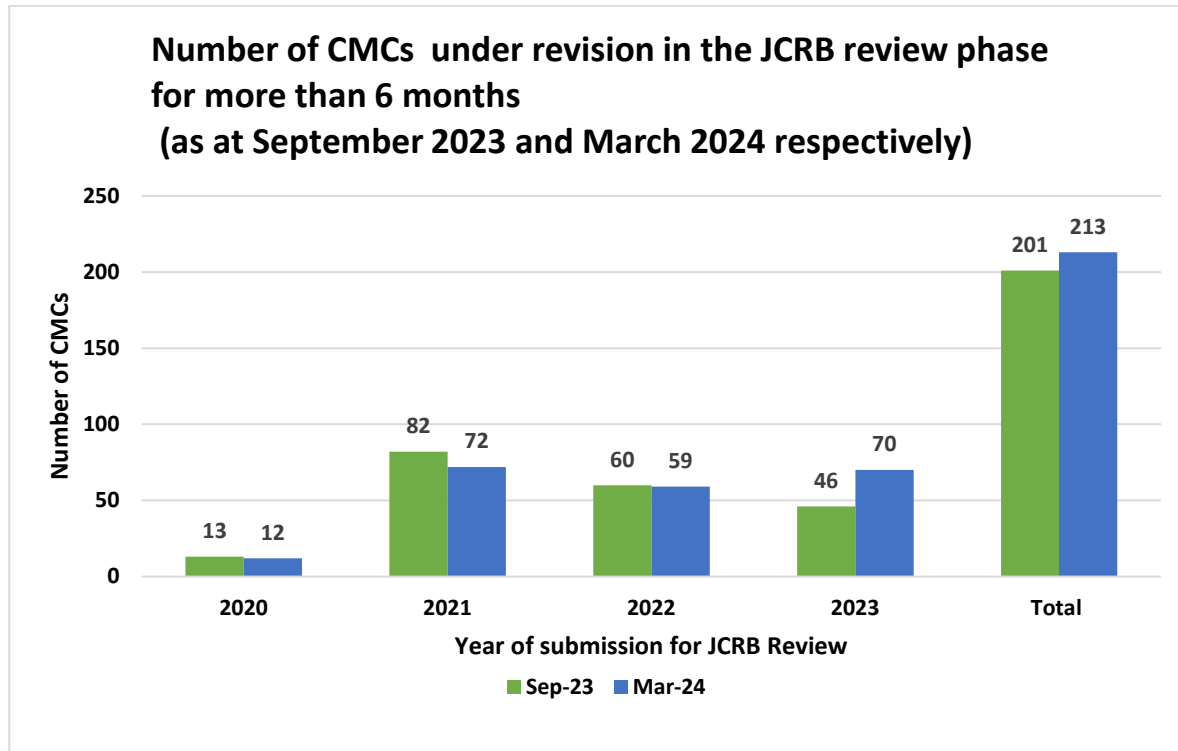
Year	March 2023 – September 2023	September 2023 – March 2024	April 2021 – March 2024
JCRB duration / days	384	189	128

### 5. CMCs with status JCRB: Revision Requested and older than 6 months of KCDB reporting period

During JCRB review phase, there have been cases where CMCs are sent back to Writers to address issues raised by Reviewers, but no action is taken by the Writers. The revision process as guided by the CIPM MRA-G-13 has no formal deadline, some Writers take longer to act or do not do so altogether. This creates a scenario where the CMCs seem to “hang” at the JCRB review stage. This matter has been raised by TC Chairs and discussed in CC meetings and was escalated to the JCRB.

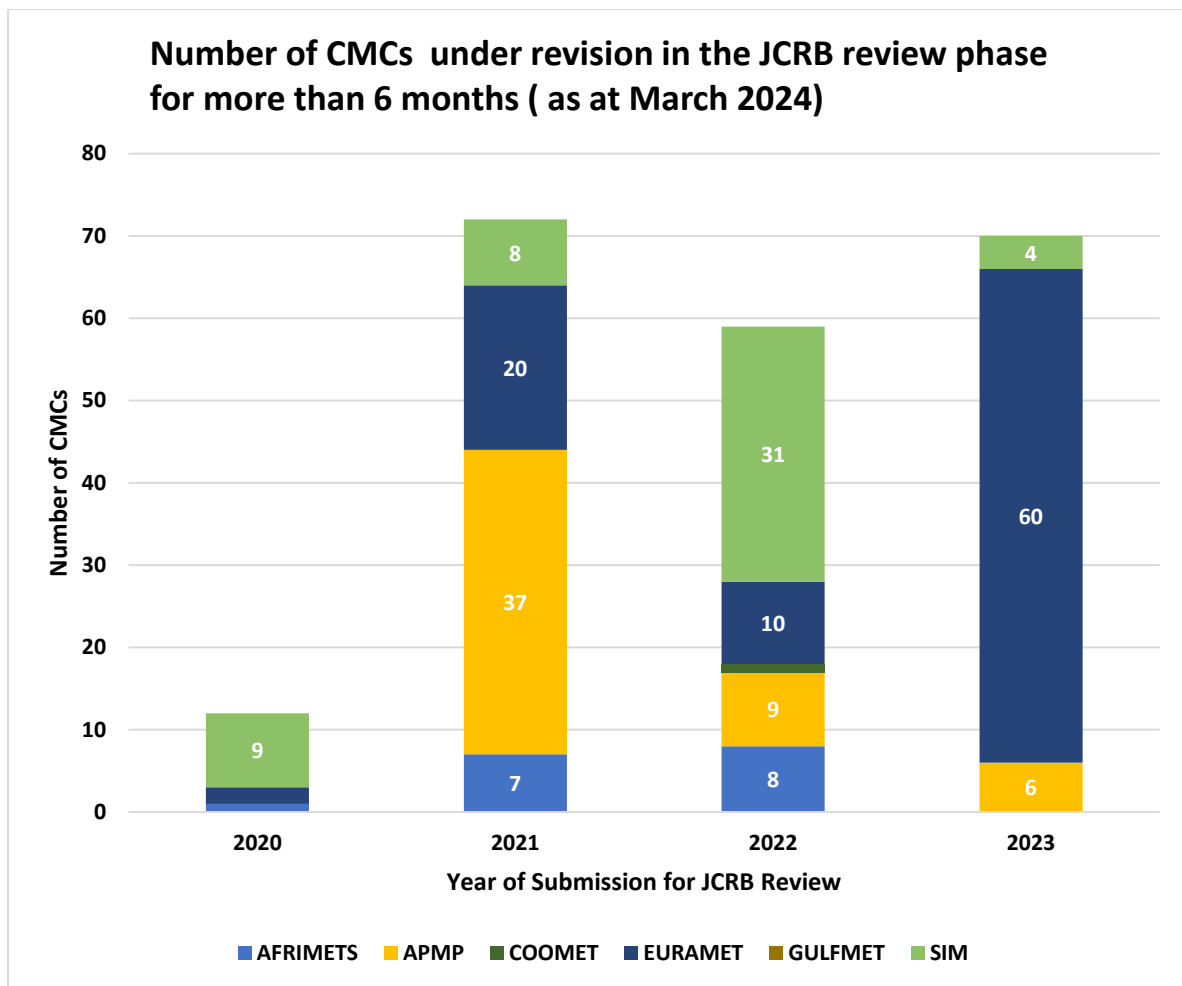
Consequently, since the September 2023 reporting period and now the March 2024 reporting period, analyses have been conducted on CMCs with status “JCRB: Revision Requested”. This was done to establish if there was any significant effect by the inaction of the Writers on the review duration at the JCRB review phase thereby lengthening the duration of publishing of their CMCs. Since the KCDB is a dynamic database and CMCs are regularly returned to Writers for revision, the analyses were based on the 6-month cycle of the KCDB report. It is believed that 6 months is sufficient time for a Writer to address concerns raised by a Reviewer and any time beyond that renders a CMC to be considered hanging in the KCDB unrevised.

As of September 2023, there were a total of 290 CMCs with the status “JCRB: Revision requested”. Of the total, 201(69%) were considered hanging between 2020 and March 2023 with CMCs submitted for JCRB review in 2021 and 2022 having the most significant contribution (71%). As of March 2024, there were a total of 313 CMCs with the same status. Of the total, 213(68%) were hanging between 2020 and September 2023 with CMCs submitted for JCRB review in 2021, 2022 and 2023 having the most significant contribution (94%). Fig. 11 shows the comparative numbers.



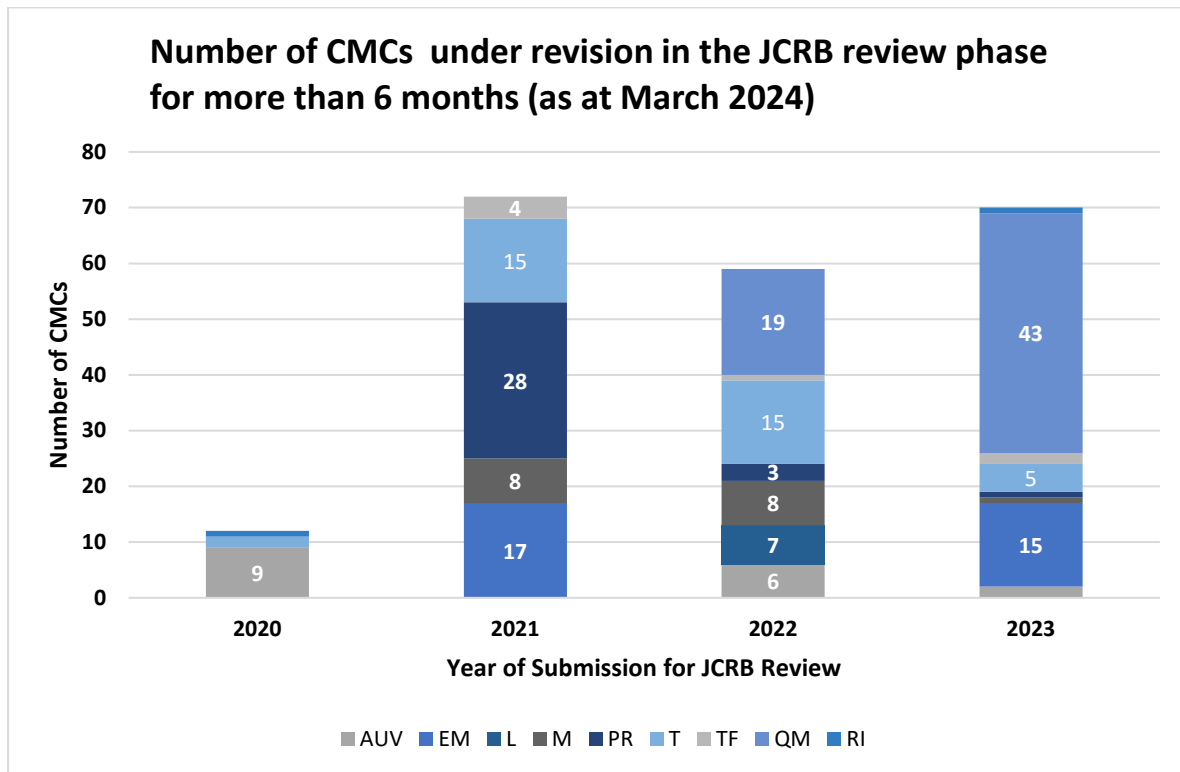
**Figure 11:** Number of CMCs with status JCRB Review Requested by year of submission and older than 6 months of reporting periods.

A further analysis of the 213 CMCs that are hanging as of March 2024 per submitting RMO and the spread per year of submission for JCRB review is indicated in Fig. 12. SIM dominated in 2020 and 2022 while APMP dominated in 2021. Lastly, EURAMET dominated in 2023 but still featured highly in 2021.



**Figure 12:** Number of CMCs with status JCRB Review Requested by year of submission, from each submitting RMO and older than 6 months of reporting period March 2024

When the CMCs were analyzed per metrology areas, there was general diversity in the numbers. Five metrology areas dominated in diverse years. 2020 was dominated by AUV, 2021 by EM, PR and T, 2022 by QM and T and finally 2023 by QM. Figure 13 gives the snapshot.



**Figure 13:** Number of CMCs with status JCRB Review Requested by year of submission, per metrology area and older than 6 months of reporting period March 2024.

A few CMCs were sampled to establish the reason behind the inaction by the Writers, and it was established that most were caused by unresolved technical comments, with a few having editorial and evidence issues. The quality of intra-RMO reviews may be a contributing factor since it influences the number and nature of queries raised at the JCRB review phase. The high number of technical comments may also be an indicator of the complexity of the metrology areas which has many CMCs hanging.

To address the problem, some mitigating actions were recommended by the JCRB. The first was for the JCRB Executive Secretary to continue monitoring the status of the CMCs and provide biannual analyses and report to the JCRB on a regular basis. It was also recommended the CBKT technical exchanges be continued to sensitize CMC Writers on requirements of CMCs for successful publishing. To complement the technical exchanges, a three-point checklist has been developed to guide the Writers and has been uploaded in the KCDB. It was also recommended that RMOs conduct a thorough intra-RMO review to so that most of the issues are resolved before CMCs are submitted for JCRB review.

## 6. Present Status of the BIPM KCDB

The KCDB facility is accompanied by providing a variety of guidance material, 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, presently giving 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](https://www.bipm.org/utis/common/pdf/KCDB_2.0/Form_for_declaring_an_anomaly_or_request.docx).

Mr Anderson Maina joined the International Liaison and Communication Department of the BIPM, in February 2024 as a new Liaison Officer for the CBKT and KCDB.

## 7. BIPM KCDB and digitalization

The metrology community is progressively noting the importance of FAIR<sup>4</sup> machine-actionable for calibration issues but also for future emerging applications. Industrial sectors request urgently possibilities to use Digital Calibration Certificates which will contribute to versatile technical advantages, cost effectiveness and improvements from a quality perspective.

Within the framework of the Digital SI reference system, work is presently progressing towards interoperability of the CMC data.

A new project on the integration of the Digital SI Reference point<sup>5</sup> into the KCDB as a first step to meet the FAIR principles is currently being organized in collaboration with the BIPM Digital Team. The aim of this work is to integrate the digital SI references or persistent identifiers for the units, kind of quantities and services of the CMCs.

In addition, development is progressing for updating the Application and Programming Interface for the KCDB ([API KCDB](#)) for allowing external users to make CMC queries for any statuses and to collect machine readable data.

## Acknowledgement

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

---

<sup>4</sup> FAIR: Findable, Accessible, Interoperable and Reusable

<sup>5</sup> The SI Reference Point is a set of tools designed to provide an authoritative digital reference for the International System of Units (SI), traditionally published by the BIPM in the form of the SI Brochure. The SI Reference Point is designed to be fully FAIR\* and machine-actionable. The digital resource is currently based on five pillars - units, prefixes, decisions, constants and quantities, and a beta version is accessible at: <https://si-digital-framework.org/>

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

KC identifier	Indicated measurement date		Status as of 4 March 2024
	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-K5.1	2010	2013	Waiting for approval
APMP.M.F-K3.a	2013	2017	Measurements in progress
APMP.M.P-K15	2013	2014	Report in progress, draft A
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-K9	2017	2018	Measurements in progress
CCEM.RF-K5.c.CL	2012	2015	Measurements in progress
CCL-K4.n01	2015	2017	Report in progress, draft B
CCM.FF-K2.2011	2013	2015	Report in progress, draft B
CCM.F-K3.1	2017	2018	Measurements completed
CCM.V-K4.A	2018	2018	Report in progress, draft B
CCM.V-K4.B	2018	2018	Report in progress, draft B
CCPR-K2.b.2016	2016	2017	Measurements completed
CCPR-K4.2017	2017	2018	Report in progress, draft A
CCQM-K110	2012	2012	Postponed
CCQM-K133	2017	2017	Planned
CCQM-K144	2018	2018	Planned
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
EURAMET.PR-K6.2015	2016	2018	Measurements in progress
EURAMET.T-K8	2008	2012	Waiting for approval
GULFMET.T-K9	2017	2017	Measurements in progress
SIM.M.FF-K6.2017	2017	2018	Report in progress, draft A
SIM.M.M-K6	2015	2017	Report in progress, draft B

**b) Supplementary Comparisons**

SC identifier	Indicated measurement date		Status as of 4 March 2024
	Start year	End year	
APMP.EM.RF-S5.CL	2013	2015	Protocol complete
APMP.M.FF-S2.2016	2016	2017	Report in progress, draft B
APMP.M.F-S2.1	2018	2018	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	Report in progress, draft B
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-S15	2016	2018	Report in progress, draft B
APMP.T-S16	2017	2018	Report in progress, draft B
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	Waiting for approval
COOMET.EM-S18	2013	2016	Waiting for approval
COOMET.EM-S19	2015	2017	Report in progress, draft A
COOMET.EM-S21	2016	2017	Waiting for approval
COOMET.L-S20	2016	2016	Report in progress, draft A
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-S3	2016	2017	Measurements in progress
COOMET.M.P-S3	2017	2018	Measurements in progress
COOMET.PR-S10	2016	2017	Protocol complete
EURAMET.M.F-S2	2012	2013	Measurements in progress
EURAMET.M.P-S16	2016	2016	Protocol complete

(continued...)

SC identifier	Indicated measurement date		Status as of 4 March 2024
	Start year	End year	
EURAMET.M.T-S4	2015	2015	Report in progress, draft A
EURAMET.PR-S4	2012	2013	Measurements completed
GULFMET.T-S1	2017	2018	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.F-S8	2018	2018	Measurements completed
SIM.M.M-S17	2017	2017	Measurements completed
SIM.M.M-S18	2018	2018	Measurements completed
SIM.QM-S3	2012	2012	Report in progress, draft A
SIM.QM-S4	2012	2012	Report in progress, draft A
SIM.T-S4	2008	2008	Report in progress, draft B
SIM.T-S8	2014	2014	Report in progress, draft A
SIM.T-S9	2017	2017	Planned



