

Highlights of CCT WG-KC activities (January 2022 to May 2024)

Andrea Peruzzi

May 17-18, 2024



WG-KC Terms of reference

- *“To oversee all aspects of key comparison documentation*
 - *Starting with the Technical Protocol*
 - *Ending with the Draft B Report and the KCDB entry*
- *Including provision of advice to pilots on:*
 - *Calculation of the Degrees of Equivalence*
 - *Key Comparison Reference Value*
 - *Linkage between RMO and CIPM key comparisons”.*
- *In practice:*
 - Review the initial Technical Protocols and all their subsequent iterations until approval
 - Review the Draft B Reports and all their revisions until approval
 - For all CCT KCs and RMO KCs (and, on request of the RMOs, also for RMO SCs)

Current membership

#	Member	NMI	RMO	Area of expertise
1	Megumi Akoshima	NMIJ (Japan)	APMP	Thermophysical quantities
2	Stephanie Bell	NPL (UK)	EURAMET	Humidity
3	Robert Benyon	INTA (Spain)	EURAMET	Humidity
4	Rien Bosma	Independent Researcher (NL)	EURAMET	Contact thermometry and humidity
5	Helen McEvoy	NPL (UK)	EURAMET	Non-Contact thermometry
6	Christopher Meyer	NIST (USA)	SIM	Humidity
7	Andrea Peruzzi	NRC (Canada)	SIM	Contact thermometry
8	Richard Rusby	NPL (NPL)	EURAMET	Contact thermometry
9	Gregory Strouse	NIST(USA)	SIM	Contact thermometry
10	Andrew Todd	NRC (Canada)	SIM	Non-Contact thermometry
11	Inseok Yang	KRISS (Korea)	APMP	Contact thermometry

- 11 members
- Experts in CTh, NCTh, Hum, and TQ
- Not representing the NMIs they belong to

Remembering Steffen Rudtsch

- Steffen was one of the most active and respected members of our WG
- He gave an invaluable contribution to the WG-KC in the past years
- We lost a friend, an amazing person and a formidable expert



Retirement farewell to Rod White

- Rod kindly supported the WG-KC in the past few years after his formal retirement from MSL
- He has now asked to step down from the WG
- We thank Rod and wish him to enjoy his well-deserved retirement



Proposed new member

- Dr. Sun Janping, NIM (China)
 - Responsible NIM fixed point facilities
 - Coordinator of several APMP comparisons

- The WG-KC kindly asks the president to approve Dr. Sun Janping as new member of the WG-KC

Activities January 2022 – May 2024 (since last CCT meeting)

- We have provided our services to **26 different comparisons**

Closed comparisons (13)

➤ 11 approved comparisons:

- 5 CIPM KCs
- 5 RMO KCs
- 1 RMO SC

➤ 2 abandoned comparison:

- 2 RMO SCs

Comparison ID	Type	Approval date
APMP.T-S15	RMO SC	20-03-2024
APMP.T-K4.1	RMO KC	05-12-2023
SIM.T-K9.3	RMO KC	26-10-2023
CCT-K7.2021	CIPM KC	13-04-2023
EURAMET.T-K7.4	RMO KC	01-03-2023
CCT-K10	CIPM KC	30-01-2023
CCT-K4.1	CIPM KC	16-01-2023
CCT-K9	CIPM KC	22-11-2022
APMP.T-K3.6	RMO KC	13-10-2022
SIM.T-K9.2	RMO KC	14-06-2022
EURAMET.T-S6	RMO SC	Abandoned on 12-04-2022
CCT-K9.2	CIPM KC	17-03-2022
SIM.T-S7	RMO SC	Abandoned on 21-01-2022

Active comparisons (13)

(checked in with WG-KC in the period JAN2022-MAY2024)

Acronym	Initiated	Protocol submitted	Protocol approved	Draft B submitted	Draft B reviewed
CCT-K9.2	2021	09-08-2021	17-03-2022	04-07-2023	2 nd review undergoing
CCT-K9.3	2023	20-07-2023	15-11-2023		
CCT-K9.4	2023	04-08-2023	12-10-2023		
CCT-K4.2	2023	06-11-2023	06-12-2023		
SIM.T-K9.2	2018	07-05-2018	07-12-2020	18-02-2021	
COOMET.T-S5	2021			13-04-2023	1 st review transmitted 25-05-2023
COOMET.T-S4	2020			02-06-2023	Pilot did not request a WG-KC review
EURAMET.-K8	2008	2013	13-05-2013	17-04-2023	1 st review transmitted 05-12-2023
EURAMET.T-K9	2015	2015	2015	12-08-2022	1 st review transmitted 22-02-2023
GULFMET.T-K9	2017	18-01-2017	21-06-2017	21-01-2022	1 st review transmitted 28-03-2022
GULFMET.T-S1	2017	03-05-2017	27-08-2018	22-08-2022	1 st review transmitted 25-10-2022
GULFMET.T-S2	2023	10-04-2023	03-10-2023		
GULFMET.T-S3	2019	16-09-2019	30-01-2020	08-06-2023	1 st review transmitted 10-07-2023

Excessively sleeping comparisons: CCT (6)

(have not checked in with WG-KC in the period JAN2022-MAY2024)

Comparison	Initiated	Status KCDB	Last KCDB progress report	Last contact with WG-KC	Pilot	This week
CCT-K1.1	2006	Report in Progress, Draft A	05-05-2015	CCT Meeting 2020	NIST (USA)	
CCT-K2.2	2012	Measurements in progress	30-01-2014	16-10-2020 "Draft B by end 2020"	INRIM (Italy)	
CCT-K6.1	2008	Report in Progress, Draft A	none	20-09-2021 WG-KC sent comments on Draft B	MSL (New Zealand)	
CCT-K8	2012	Measurements completed	20-11-2017	22-02-2017 WG-KC approved revised protocol	INTA (Spain)	Draft A (v4) ready to send
CCT-S3	2007	Report in Progress, Draft A	02-07-2014	28-07-2021 WG-KC sent comments on Draft B	NMIJ/AIST (Japan)	Revised Draft B by end of 2024

Excessively sleeping comparisons: AFRIMETS (1)

(have not checked in with WG-KC in the period JAN2022-MAY2024)

Comparison	Initiated	Status KCDB	Last KCDB progress report	Last contact with WG-KC	Pilot	This week
AFRIMETS.T-S6	2017	Planned	29-03-2018	25-10-2018 WG-KC sent comments on revised protocol	NMISA (South Africa)	Still planned, waiting for NMIA to complete K9.3

Excessively sleeping comparisons: APMPM (12)

(have not checked in with WG-KC in the period JAN2022-MAY2024)

Comparison	Initiated	Status KCDB	Last KCDB progress report	Last contact with WG-KC	Pilot	This week
APMP.T-K4.2	2017	Report in Progress, Draft A	29-09-2017	07-02-2018 WG-KC approved revised protocol	KRISS	
APMP.T-K6.2013	2015	Measurements in progress	none	13-11-2020 Report in Progress, Draft A	NMC, A*STAR	Draft A in preparation
APMP.T-K9	2016	Measurements in progress	01-12-2017	06-12-2016 WG-KC approved revised protocol	NIM	Some participants to send results
APMP.T-S8	2006	Measurements in progress	04-02-2014	02-07-2013 WG-KC sent comments on protocol	NMLPHIL	Some participants to send results
APMP.T-S9	2013	Measurements in progress	none	13-02-2020 WG-KC approved revised report	NMIJ-AIST	
APMP.T-S10	2013	Planned	none	31-08-2020 WG-KC approved revised report	KRISS	
APMP.T-S11	2013	Report in progress, Draft A	26-08-2014	07-11-2013 WG-KC approved protocol	NMIJ-AIST	
APMP.T-S12	2013	Report in progress, Draft A	26-08-2014	07-11-2013 WG-KC approved protocol	NMIJ-AIST	Draft B expected in May 2024
APMP.T-S13	2014	Measurements in progress	17-04-2014	13-11-2020 WG-KC approved protocol	NMC, A*STAR	
APMP.T-S14	2016	Measurements in progress	10-05-2016	20-02-2020 WG-KC sent comments on protocol	NMIM	
APMP.T-S16	2017	Report in progress, Draft A	27-06-2017	20-06-2017 WG-KC approved protocol	NMIA	Draft B submitted this week
APMP.T-S17	2018	Measurements in progress	09-04-2018	06-09-2019 WG-KC approved revised protocol	KRISS	

Excessively sleeping comparisons: COOMET (1)

(have not checked in with WG-KC in the period JAN2022-MAY2024)

Comparison	Initiated	Status KCDB	Last KCDB progress report	Last contact with WG-KC	Pilot	This week
COOMET.T-K9.1	2017	Measurements in progress	16-08-2017	01-01-2021 WG-KC decline review of protocol because measurements nearly completed	VNIIFTRI	Problems with cell transportation

Excessively sleeping comparisons: EURAMET (3)

(have not checked in with WG-KC in the period JAN2022-MAY2024)

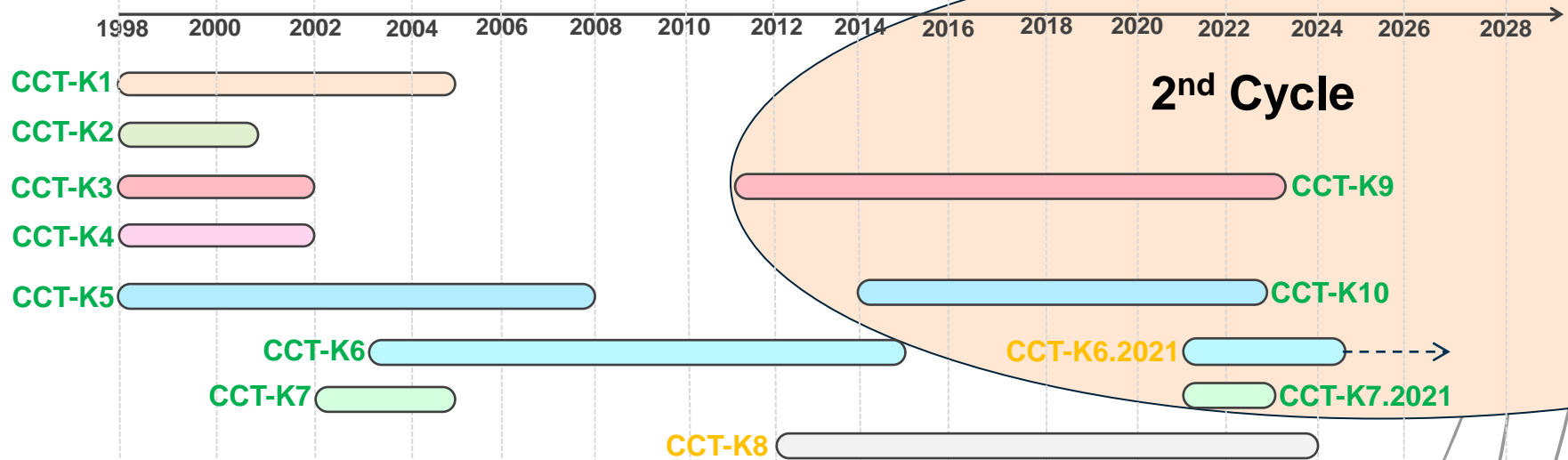
Comparison	Initiated	Status KCDB	Last KCDB progress report	Last contact with WG-KC	Pilot	This week
EURAMET.T-K9	2014	Report in Progress, Draft A	none	23-10-2023 WG-KC sent comments on Draft B	LNE-Cnam (France)	Revised Draft B expected in May 2024
EURAMET.T-S7	2018	Planned	17-07-2018	13-02-2020 WG-KC approved protocol	INRiM (Italy)	unclear

Excessively sleeping comparisons: SIM(5)

(have not checked in with WG-KC in the period JAN2022-MAY2024)

Comparison	Initiated	Status KCDB	Last KCDB progress report	Last contact with WG-KC	Pilot	This week
SIM.T-K6.8	2021	Measurements in progress	none	10-01-2022 WG-KC approved revised protocol	NIST (USA)	Report in Progress, Draft A
SIM.T-S8	2014	Report in Progress, Draft A	15-11-2014	none	CESMEC (Chile)	Abandoned
SIM.T-S9	2016	Planned	09-11-2016	16-12-2016 WG-KC sent comments on protocol	NIST (USA)	Planned, no news
SIM.T-S11	2020	Measurements in progress	none	27-01-2021 WG-KC approved revised protocol	PTB (Germany)	Measurements in progress
SIM.T-S12	2021	Measurements in progress	none	?	INM (Colombia)	Report in Progress, Draft A

Overview CCT KCs



1st Cycle:

CCT-K1: 0.65 K to 24.6 K
CCT-K2: 13.8 to 273.16 K
CCT-K3: -189.3442 °C to 660.323 °C
CCT-K4: 660.323 °C and 961.78 °C
CCT-K5: 961 °C to 1700 °C

CCT-K6: -50 °C to 20 °C (frost/dew point)
CCT-K7: 273.16 K
CCT-K8: 30 °C to 90 °C (dewpoint)

2nd Cycle:

CCT-K9: 2nd cycle of CCT-K3
CCT-K10: 2nd cycle of CCT-K5 (up to 3000 °C)
CCT-K7.2021: 2nd cycle of CCT-K7
CCT-K6.2021: 2nd cycle of CCT-K6

Need for new KCs

➤ **KC on fixed point cells:**

- K9 is already obsolete (and its results are not satisfactory for many participants)
- SPRT not ideal as transfer artifact (particularly true for newly manufactured SPRTs)

➤ **New K4 (AI and Ag)**

THANK YOU

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