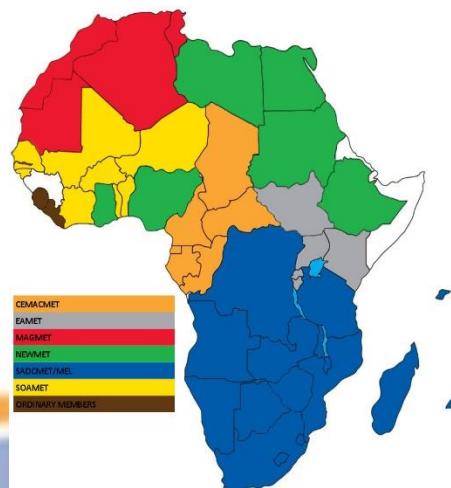




AFRIMETS
Intra-Africa Metrology System
Système Intra-Africain de Métrologie



AFRIMETS TECHNICAL COMITEE FOR THERMOMETRY (TC-T) REPORT

Efrem K Ejigu
TC-T Chair
16th AFRIMETS GA
Venue: Hilton Pyramid Golf,
Cairo
Date: 19 July 2023

CONTENTS



TC-T MEETINGS



Current & Planned AFRIMETS INTER-COMPARISONS



AFRIMETS PARTICIPATION IN CCT/APMP etc...
COMPARISONS



CMC

AFRIMETS TC-T MEETINGS

- AFRIMETS TC-T 2023 was conducted on 16 July 2023 at Hilton Pyramid Golf, Cairo
- Represented Institutes
 - Morocco (LPEE/LNM)
 - Egypt (NIS)
 - Uganda (UBS)
 - South Africa (NMISA)
 - Tanzania (TBS)
 - Zambia (ZMS)

CURRENT INTER-COMPARISON

AFRIMETS. T-S3

- Supplementary comparison of Industrial PRT calibration capability
- Range: -50 °C to 450 °C
- Started: May 2012, postponed & re-started in 2022
- Status: Initial measurement at NMISA, ZMA & SIRDC-NMI is completed, now at BOBS
- Participating NMIs:
South Africa, Zambia, Zimbabwe, Botswana, Namibia, Mozambique, Democratic Republic of the Congo

AFRIMETS. T-S7

- Supplementary comparison of noble metal thermocouple
- Range: 0 °C to 1200 °C
- Started: June 2019
- Pilot/coordinator: NMISA/NIS
- Status: measurement at BOBS. Initial measurement at NMISA and measurement at NIS, KEBS, ZMA & SIRDC-NMI is completed.
- Participating NMIs:
South Africa, Egypt, Kenya, Zimbabwe, Zambia, Botswana, Ghana, Morocco, Ethiopia.

PLANNED SUPPLIMENTARY COMPARISON

- Radiation Thermometer (-20 °C to 1100 °C)
 - Pilot: NIS/South Africa
 - Reference: South Africa
 - Participants: South Africa, Egypt, Zambia, Tanzania, Zimbabwe, Uganda, Morocco, Zambia
 - Status: Planned
- Humidity: Dew point (-20 °C to 30 °C)
 - Pilot: NIS/South Africa
 - Reference: South Africa
 - Participants: South Africa, Egypt, Morocco, Kenya
 - Status: Planned
- Humidity: Thermo-hygrometer (20%RH – 90%RH)/(20 °C - 60 °C)
 - Pilot: NIS
 - Reference: South Africa
 - Participants: South Africa, Egypt, Tanzania, Morocco, Zambia.
 - Status: Planned

PLANNED KEY COMPARISON

- AFRIMETS T-K9.x (ITS-90 key comparison)
 - Pilot: TÜBİTAK UME
 - Linking Lab: TÜBİTAK UME
 - Status: Planned
 - Participants: South Africa, Turkey, Egypt
- CCT T-K9.xx (ITS-90 key comparison)
 - Pilot: CEM
 - Linking Lab: CEM
 - Status: Protocol preparation
 - Participants: South Africa, Spain, Costa Rica, Georgia and Chile
- SPRT (Hg - Zn)(AFRIMETS T-K9.X))
 - Pilot: South Africa
 - Linking Lab: South Africa
 - Participants: South Africa, Egypt
 - Status: Planned

AFRIMETS PARTICIPATION IN CCT/APMP etc... INTER-COMPARISONS

- CCT K7 2021
 - Key comparison of water triple point cells
 - Range: water triple point
 - Started: 2021
 - Status: Completed, report published in May 2023
 - Participating AFRIMETS NMIs: **South Africa**
- APMP.T-K4.2
 - Key comparison of local realizations of aluminium (Al) freezing-point temperature
 - Range: Al fixed point
 - Started: 2018
 - Status: Measurement completed, Report writing (pilot)
 - Participating AFRIMETS NMIs: **South Africa**
- APMP.T-S11/S12
 - Local realization of radiation thermometer scale from Indium point to 2800 °C
 - Range: 156 °C to 2800 °C
 - Started: 2013
 - Status: Measurement completed, Report writing (pilot)
 - Participating AFRIMETS NMIs : **South Africa**

- APMP.T-S16
 - Supplementary comparison of noble metal thermocouple
 - Range: 1000 °C to 1560 °C
 - Started: 2017
 - Status: Measurement completed, Report writing (pilot)
 - Participating AFRIMETS NMIs: **South Africa**
- APMP.T-S13
 - Supplementary comparison of humidity (dew point)
 - Range: -60 °C, -70 °C, -80 °C, (-90 °C)
 - Started: 2014
 - Status: Measurement
 - Participating AFRIMETS NMIs : **South Africa**

- APMP.T-S17
 - Supplementary comparison of Air Thermometers
 - Range: -70 °C to 90 °C
 - Status: Measurement
 - Participating AFRIMETS NMIs: **South Africa**
- CCT K11
 - Key comparison of blackbodies for infrared ear and forehead thermometers
 - Range: 34 °C to 43 °C
 - Status: Protocol approved, Rescheduled due to Ukraine Russia incidence
 - Participating AFRIMETS NMIs: **South Africa**

Comparison Challenges

- Participating labs are not committed enough to conduct their part of measurement in the agreed time

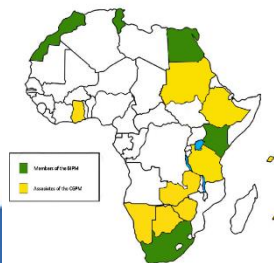
CMC submission

- ❑ National Institute of Standards (NIS)
(Thermometry Service classification 2.2.2 & 2.3.3)
 - Platinum resistance thermometer (-50 °C – 550 °C)
 - Pure-metal thermocouple at fixed points Zn, Al, Ag, Co-C, Pd-C
- Status: Under **Inter-RMO** review process and Pure-metal thermocouple CMCs at Zn, Al and Ag fixed point are published



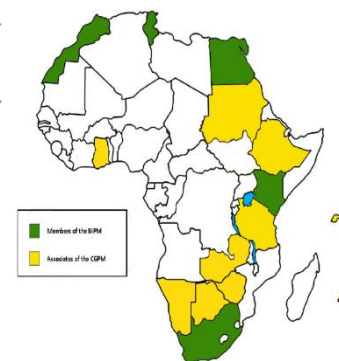
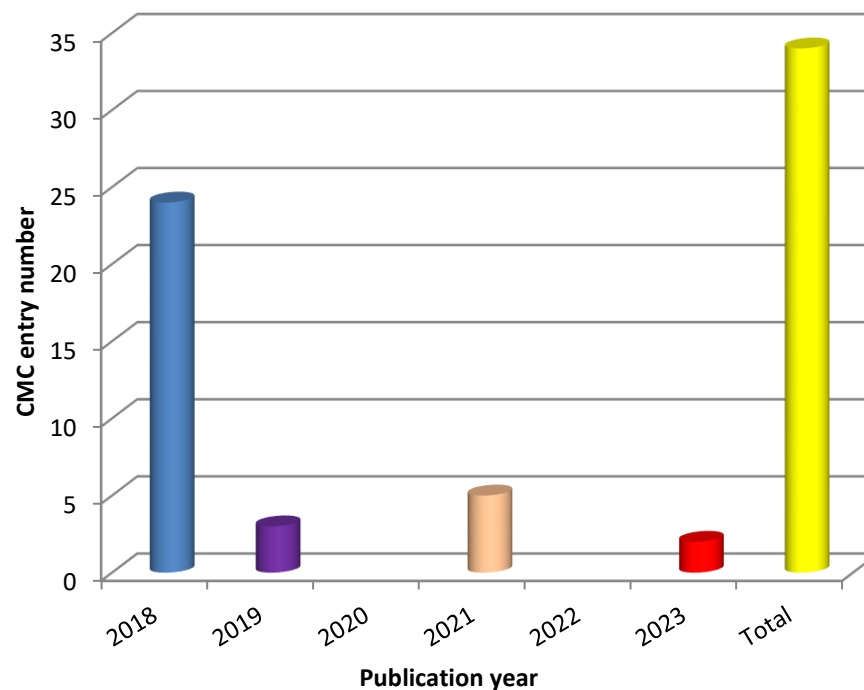
CMC submission


- ❑ Kenya Bureau of Standards (KEBS) (Thermometry Service classification 2.2.2)
 - Platinum resistance thermometer ($-10^{\circ}\text{C} - 200^{\circ}\text{C}$)
- Status: under **Inter-RMO** Review process
- ❑ Ethiopian Metrology Institute (EMI) (Thermometry Service classification 2.2.2, 2.3.1, and 2.3.2)
 - Platinum resistance thermometer ($-50^{\circ}\text{C} - 450^{\circ}\text{C}$)
 - Noble metal Thermocouple ($0^{\circ}\text{C} - 1200^{\circ}\text{C}$)
 - Base metal Thermocouple ($0^{\circ}\text{C} - 1200^{\circ}\text{C}$)
- Status: under **Inter-RMO** Review process
- ❑ Tanzania Bureau of Standards (TBS)
 - Status: Quality system peer-review completed in July 2023.
- ❑ Ghana Standards Authority (GSA)
 - Status: Quality system peer-review (Date unknown)



Approved and published CMC in the past five years

Member country	No. of CMC
Zimbabwe (SIRDC-NMI)	13
Zambia (ZMA)	11
Botswana (BOBS)	3
Morocco (LPEE/LNM)	4
Egypt (NIS)	3
Total	34



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Inter-RMO CMC review

- AFRIMETS TC-T is actively participating in inter-RMO CMC reviewing process.



Training

- NMISA provided training to Ethiopian Metrology Institute (EMI) temperature & Humidity metrologists at EMI premises
- NMISA provides consultancy service to EMI on the Establishment of ITS90 realization facility.
- NMISA provided training to Tanzania Bureau of Standards (TBS) humidity metrologist.
- NMISA is currently hosting a temperature metrologist from Ghana Standards Authority (GSA) for a six attachment
- TBS provided training to Malawi Bureau of Standards (MBS) on calibration of temperature devices

Chair election

No Chair and vice-chair election was conducted as election was conducted last year.

Chairman: Dr. Efrem Kebede Ejigu (NMISA)

Vice-Chair: Mr. Richard Odak (KEBS)

Prof. Dr. Mohamed Gamal Ahmed (NIS)



Thank you