TC Chair Annual Report 2019 - 2020

TC for Thermometry (T)
TC Chair: Dolores del Campo
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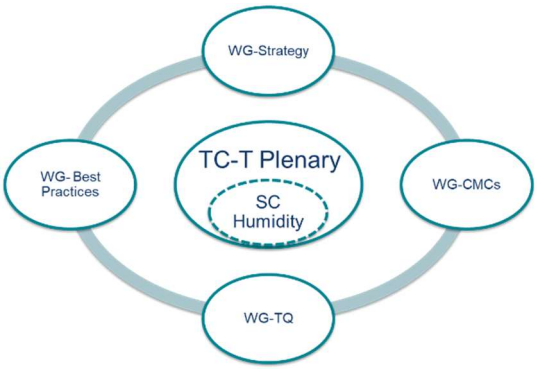
1. General Aspects

The TC-T is structured in one Sub-Committee for humidity and moisture (SC-H) and four very active working groups dealing with the TC general strategy (WG-Strategy), capacity building and knowledge transfer (WG- Best Practices), CMCs evaluation (WG-CMCs) and Thermophysical Quantities (WG-TQ). These groups develop and coordinate the most important activities of the TC between plenary meetings.



TC-T structure

Due to the Covid-19 issue the annual meeting was initially postponed and finally it was decided to hold it by videoconference the days 1st and 2nd of September, as the travel restrictions remain and make organizing a face-to-face meeting problematic.

This means that at the moment of writing this report the TC-T has not yet met, and some of the activities agreed for this year, like the workshop on best practice guides has been postponed.

2. Projects

Currently there are 20 projects in progress. In this reporting period three projects have been completed (numbers 1268, 1422 and 1491). One of them (1491) corresponds to the first hybrid comparison organized within the TC-T, with the objective to support the CMCs of NSAI NML (Ireland) at -100 ºC.

Most of the coordinators have reported in a timely manner on the activities performed during the year. However it has to be noted that project 1294 has no coordinator. If the situation is not resolved soon by VSL, the partners will be asked to appoint a new coordinator or to conclude the project. All the projects are of the comparison type except project numbers 1294, 1400 and 1459 that are classified as research projects.

Since the last GA only 1 new project started (project number 1491) which was approved by correspondence.

3. Comparisons

There are several running comparisons at CCT and regional level that involve most of the TC-T members:

- CCT.K8: Comparison of realisations of local scales of dew-point temperature of humid gas. The measurements have finished. The instruments behaved well with good reproducibilities. There was an anonymous presentation of results at the TEMPMEKO 2019 conference and the final report is in progress.
- EURAMET project 1352: Comparison of the realisations of the relative humidity (RH) in the range from 10%rh to 95%rh at temperatures from -40 °C to +1 °C. This comparison is behind schedule due to re-organisation problems of the coordinator.

- EUROMET.T-K8 (project 717): Comparison in dew-point temperature (high range). Draft A was sent to the participants in autumn 2019 for comments. Due to personnel situation at PTB and the Covid-19 issues, the comments will be collected until Autumn 2020. The comments and feedback of the participants will be evaluated and discussed. Based on the jointly made decision, a finalisation of Draft B might be expected within 2021.
- EURAMET project 1189: Comparison of the realisations of the relative humidity in the range from 10%rh to 95%rh at temperatures from -10 °C to 70 °C. Alternative estimator of the comparison reference value has been introduced to better account for transfer standards' drift. It is expected to finalise the Draft B report by the next TCT meeting in September 2020.
- CCT.K10: Realization of the ITS-90 between 960 ºC and 3000 ºC. The Draft A report has already been sent to the participants. There will be a presentation of the preliminary comparison results during the TC-T meeting in September 2020.
- EURAMET.T-K9 (project 1318): ITS-90 SPRT Calibration from the Ar TP to the Zn FP. The measurements have been finished long ago. During the 2019 TC-T meeting the coordinator was asked to prepare the comparison report regardless the completion of the CCT.K9 comparison because the linkage can be done afterwards. It is expected to have a presentation of the comparison results during the TC-T meeting in September 2020.
- EURAMET.T-S3 (project 1268): Comparison of the calibration of thermocouples in fixed points and/or by comparison from 419,527 ºC (freezing point of zinc) up to 1492 ºC (Pd-C eutectic fixed point). The comparison is complete and published in the KCDB.

There are other comparisons that involve a lower number of participants (there are mostly bilateral): EURAMET projects number 1145, 1149, 1167, 1193, 1357, 1358, 1401, 1403, 1422, 1434, 1442, 1446, 1447, 1457 and 1491, most of the coordinators have sent a progress report that can be consulted in the EURAMET web page.

Since the previous report the comparisons corresponding to project numbers 1268 (EURAMET.T-S3), 1422 (EURAMET.T-K9.1) and 1491 (hybrid comparison) have been completed.

4. CMCs

The CMCs are reviewed by the members of the WG-CMCs that is currently chaired by D. del Campo. The members are appointed by the TC-T plenary based on their different expertise. There have been some changes on the membership in this period, currently there are 2 members (MIRS/UL-FE/LMK and NPL) to review the CMCs for SPRTs and fixed points, 2 (PTB and RISE) to review the CMCs for industrial thermometers, 1 (CEM) to review the CMCs for thermocouples, 2 (PTB and LNE-CNAM) to review the CMCs in radiation thermometry and 2 (INRiM and MIRS/UL-FE/LMK) to review the CMCs in humidity.

On May 2020 a new EURAMET submission consisting of 22 CMCs from 6 countries were published in the KCDB.

In April 2020 a new submission was sent for Inter-RMO review, the first one through the new KCDB 2.0:

- 3 new on humidity from 1 country
- 1 new on RIRT from 1 country
- 53 new/modified on thermocouples from 5 countries
- 1 withdrawal for thermocouples from 1 country
- 3 new for air temperature sensors from 1 country
- 5 new/modified in radiation thermometry form 2 countries

- 3 new for industrial thermometers from 1 country.

Only 1 country has sent new CMCs for EURAMET approval in 2020 (deadline end February 2020), probably because of the reluctance to use the new KCDB 2.0. Anyway the WG-chair has sent a one-page document with brief instructions on the registration and use of the KCDB to encourage its use.

During this period 3 submissions from other RMOs have been reviewed (1 from APMP, 1 from SIM and 1 from COOMET) with a total number of 134 CMCs reviewed.

The problems encountered performing inter-RMO reviews continue and several misinterpretations of the agreed CCT review protocols and/or misunderstandings arose during the process which hampered the publication of some EURAMET CMCs. During the TEMPMEKO 2019 conference the CCT-WG-CMCs met, however not all the members were able to travel to China so there were no opportunity to discuss these problems. An on-line meeting has been scheduled on the 1st October 2020 where there will be a new opportunity to discuss the problems and reach a common understanding.

5. Activities of the Subcommittees

The TC-T has only one sub-committee regarding Humidity and Moisture. The Sub-Committee Humidity (SC-H) is concerned with all issues of measurement of humidity and moisture, as well as with standards and references necessary for developing the metrology in the field.

The SC-H is coordinated by Vito Fernicola (INRIM) with Domen Hudoklin (MIRS/UL-FE/LMK) as co-chair. The SC-H will meet on-line the 2nd September 2020. The time for Vito Fernicola as convenor finishes in 2021 so a new convenor will be appointed next year.

6. Participation in EMRP/ EMPIR

The EMPIR project “Implementing the new kelvin2” (InK2) formally finished in May 2019. A keynote address and a themed session concerning the outcomes of the InK2 project were held at the TEMPMEKO 2019 conference in Chengdu June 2019. The results will be presented to the appropriate working group during the CCT on-line meetings in the 2020 last trimester.

The RPT project HUMEA also finished in 2019 which has developed new measurement methods and shared best practice with emerging NMIs by providing an infrastructure for reliable, traceable humidity measurements across Europe.

The thermal community was deeply involved in the Energy and Environment 2019 call, collaborating in the preparation of the call scopes through the Task Groups and participating in the preparative workshops. There was a unanimous concern from the thermometry community regarding the non-selection of SRTs related to thermal quantities, topics supported for important stakeholders like presidents of WMO committees. It seems that the EMPIR Committee considered that the objectives established in the SRT proposals were not clear enough to allow its selection. It is expected that the EMN Climate and Ocean Observation will contribute to the development of new proposals acceptable for being funding in the future metrology research program. Anyway there were 2 SIP projects linked to METEOMET that have been approved for funding in the 2019 call: 19SIP03 CRS (Climate Reference Station) and 19SIP06 (Increasing the comparability of extreme air temperature measurements for meteorology and climate studies), which ensure the continuation of the work in collaboration with the meteorology and climate community.

In 2020 there are several proposals lead by the thermometry community in both Fundamental and Industry call. There are three (two in industry and one in fundamental) that are follow-up projects of EMPRESS, DynPT and PhotOQuant. The other two are proposals which did not succeed in previous calls or that were not finally submitted, but whose objectives are very relevant and which have a high potential impact in industry and in the future of primary thermometry.

The TC-T is eager to know the evolution of the new metrology research program and how the future calls will be developed. Duncan Jarvis will give a talk during the next on-line TC-T meeting in September, we hope this will clarify the future and will solve most of the doubts of the representatives.

7. Capacity Building: Activities of the last year and future needs

The TC-T is really engaged with all the capacity building activities organized by EURAMET and in fact it is one of the main objectives of the WG-BP, discussed within the Strategy Group and there is always a slot on the TC-T agenda for the Euramet CB Officer to give a presentation.

A workshop on the preparation of Best Practice Guides was envisaged to be held during the 2020 TC-T meeting, however it has been postponed because of the Covid-2019 situation.

During the 2019 meeting a course was proposed on the organization and data treatment of comparisons. The reason was that most of the delays in the completion of inter-laboratory comparisons was the complexity of the data treatment, so if there were more people able to do it maybe the issues with the delays could be partially solved. This course was discussed and agreed with the CB officer and the WG-Strategy. It will include not only inter-laboratory comparisons but also topics related to the preparation and evaluation of CMCs in the frame of the KCDB 2.0. The course will take place jointly with the 2021 EURAMET TC-T meeting and will be open to COOMET participants. It will be a good opportunity to homogenize CMC criteria.

8. Meetings

The TC-T 2019 on-line meeting will take place the 1st and 2nd September. On the first day the different WGs will meet and on the second day the SC-H and the TC-T plenary will meet.

For the 2021 meeting it has been agreed to have, for the very first time, a joint TC-T EURAMET+COOMET meeting, hosted by SMU the days 26th to 30th April 2021. The meeting will have joint and separate sessions, besides the training course on comparisons and CMCs mentioned and a workshop on “The New kelvin Challenges and Opportunities” oriented to small size NMIs on how to address the SI changes in the field of thermometry.

9. Issues

In the 2018-2019 report it was pointed out the concern of the TC-T members by the uptake of the EURAMET calibration guides by the accredited laboratories in some countries. During the 2019 GA the TC-T chair asked to encourage the uptake of these guides. As there were no clear actions on that from EURAMET, the TC-T chair has contacted directly with the EA chair to ask him to link the EA web page to the EURAMET calibration guides. He was open to do it and he intended to present this suggestion to the EA Executive Committee for approval, however the Covid-19 issue has slow down their response.

TC-T is aware of the recent publication of the revised ILAC P10 document about its policy in metrological traceability of measurement results and is concerned about how the different European Accreditation Bodies will establish their own policies."

The TC-T is also concerned on how to interact effectively with the recently created EMNs. A plan for maintaining interactions is coordinated by the WG-Strategy and a set of presentations of the EMNs of interest for the TC-T are scheduled during the 2020 meeting. The TC-T has also been invited to send representatives to EMNs meeting such as ENERGY GASES, in whose general meeting a presentation on the TC-T activities and interests in the fields was done.

10. Strategic Planning

The TC-T Strategic Planning falls within the responsibility of the WG-S currently chaired by Steffen Rudtsch (PTB).

With the new metrology research program in mind, the WG-S considers now a priority the update of the roadmaps. This is one of the topics to be considered during the next WG-S meeting and likely different actions will be scheduled over 2021.

11. Outlook for 2020/2021

In 2020-2021 TC-T activities will include, apart from the routine activities like CMC review:

- Organisation of the first joint EURAMET/COOMET meeting, which due to the complexity of the meeting will require additional logistic efforts.
- Organization of the Training Course on Inter-laboratory Comparisons and CMCs.
- Organisation of the workshop "The New kelvin Challenges and Opportunities".
- Update of TCT roadmaps in preparation for the new metrology research program