PT EPOCS – Task 4

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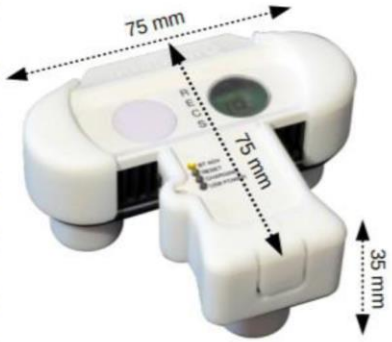
PROTEZIONE CIVILE
Presidenza del Consiglio dei Ministri
Dipartimento della Protezione Civile

CONSORTIUM FOR SMALL SCALE MODELING
COSMO

Task 4. Analysis of the mobile PWS sensors

Meteotracker is a system for agile and accurate weather data measurements on the move consisting in:



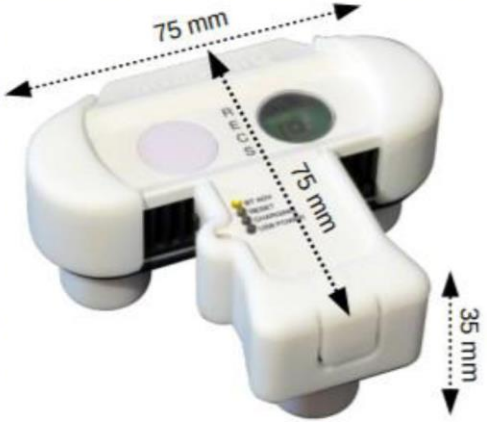
A mini-weather station

Bluetooth

A mobile app

Wifi/LTE

A web platform



- Specific design and patent for measurements on the move
- Data sampled at 1 Hz
- Battery duration. 250+ hours rechargeable
- Easy installation through magnet base and bike holder

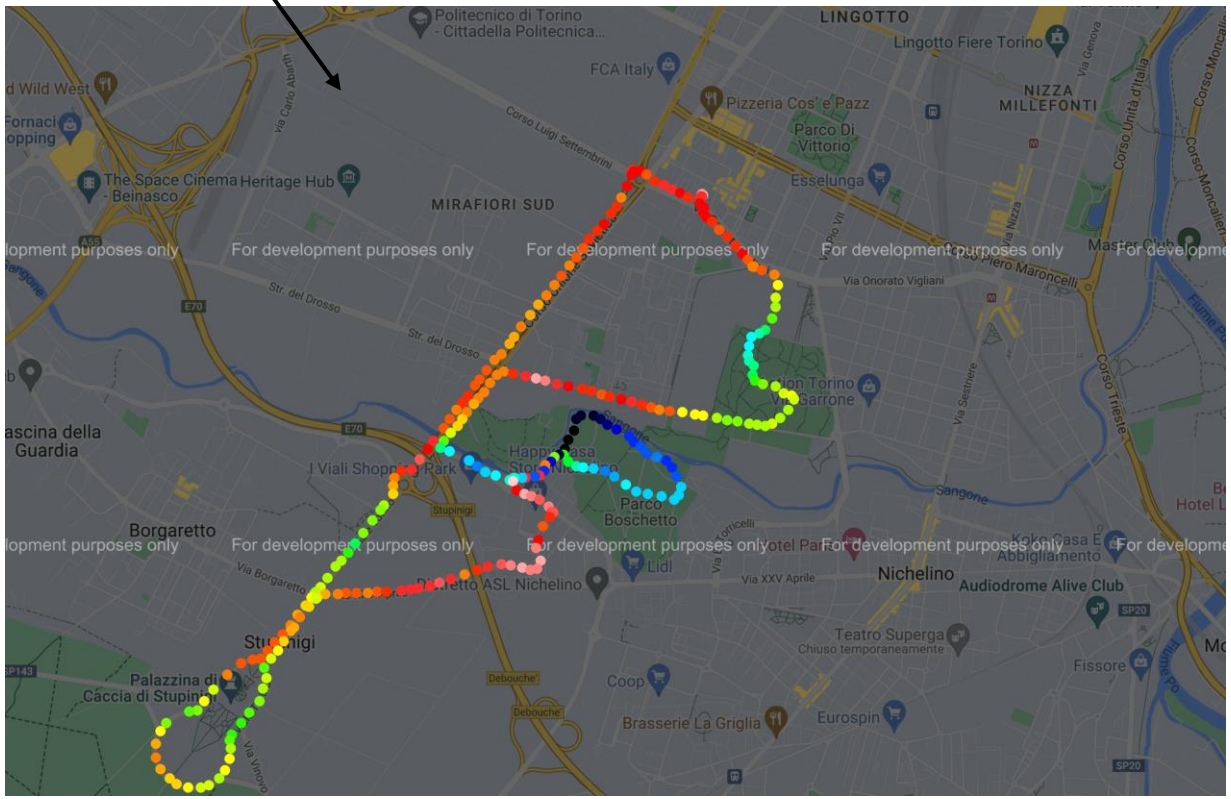
Measured quantities:

- Air temperature
  - Range: -40°C – 125°C
  - Accuracy: 0.5°C
- Relative humidity
  - Accuracy: 2%
- Pressure
  - Accuracy 100 Pa

Derived Quantities

- Dew point
- Altitude (above m.s.l.)
- Vertical temperture gradient
- Solar radiation intensity
- Thermal confo index
- Vehicle velocity

Day time: evidence of different urban texture



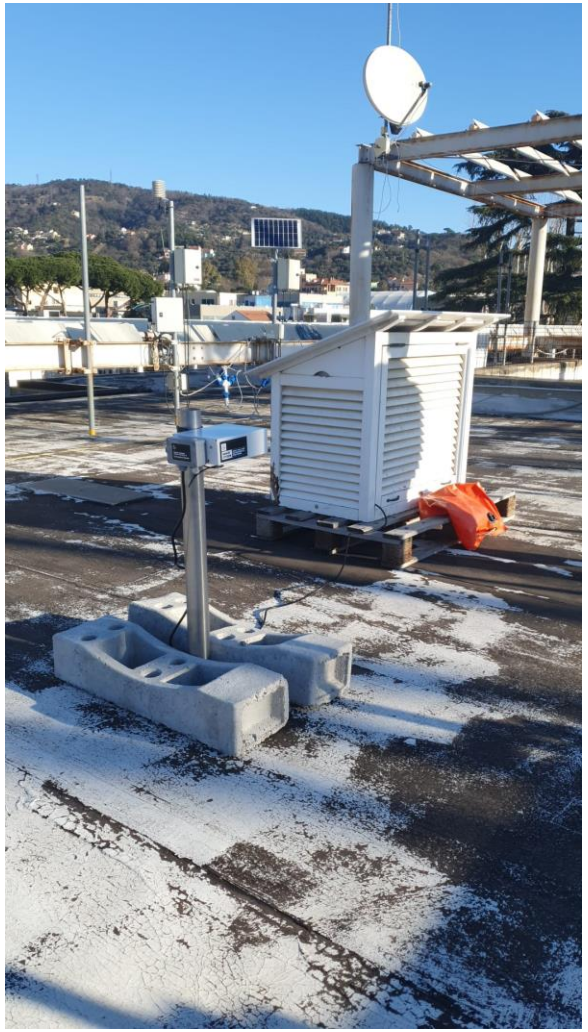
Night time: Urban Heat Island

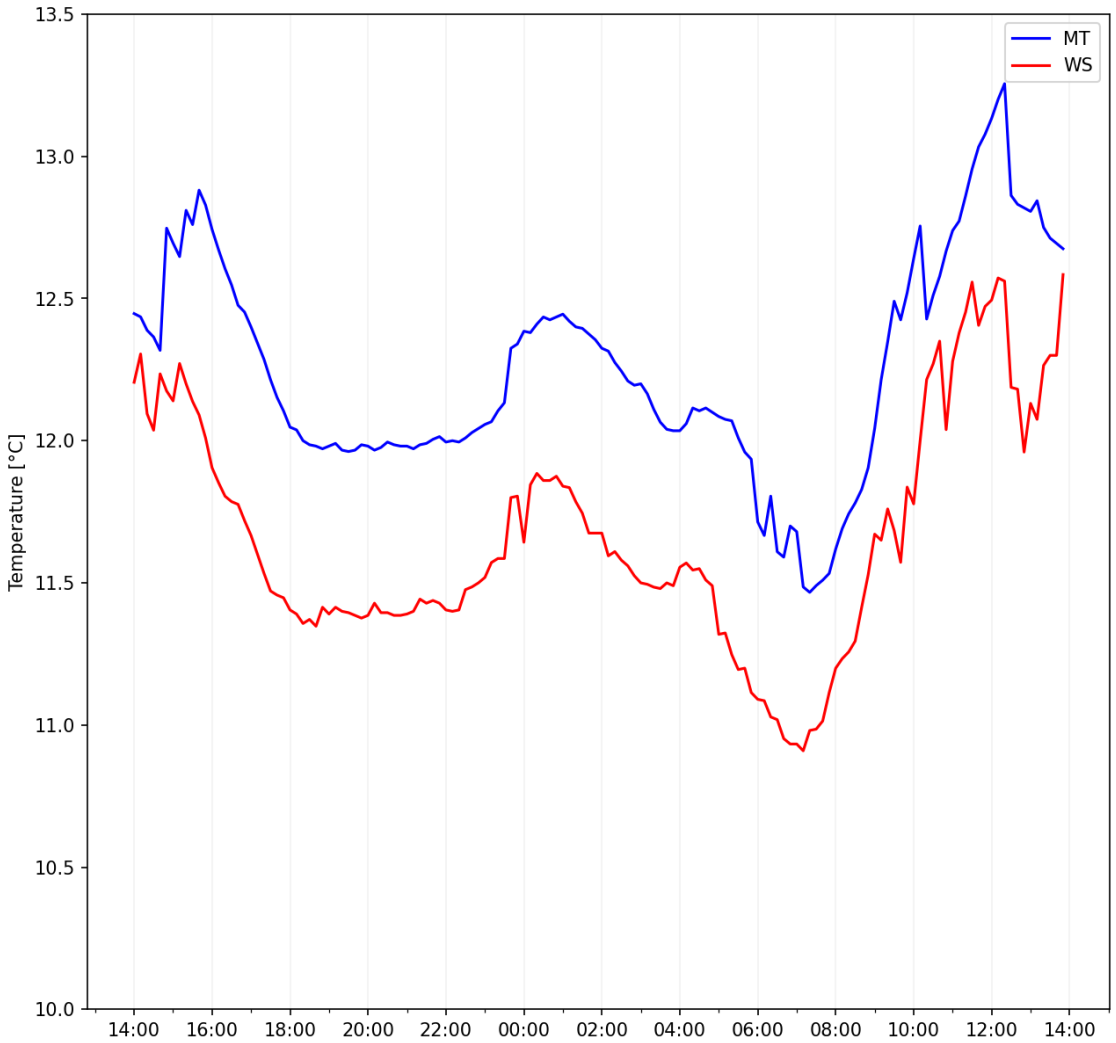
But what about the quality?

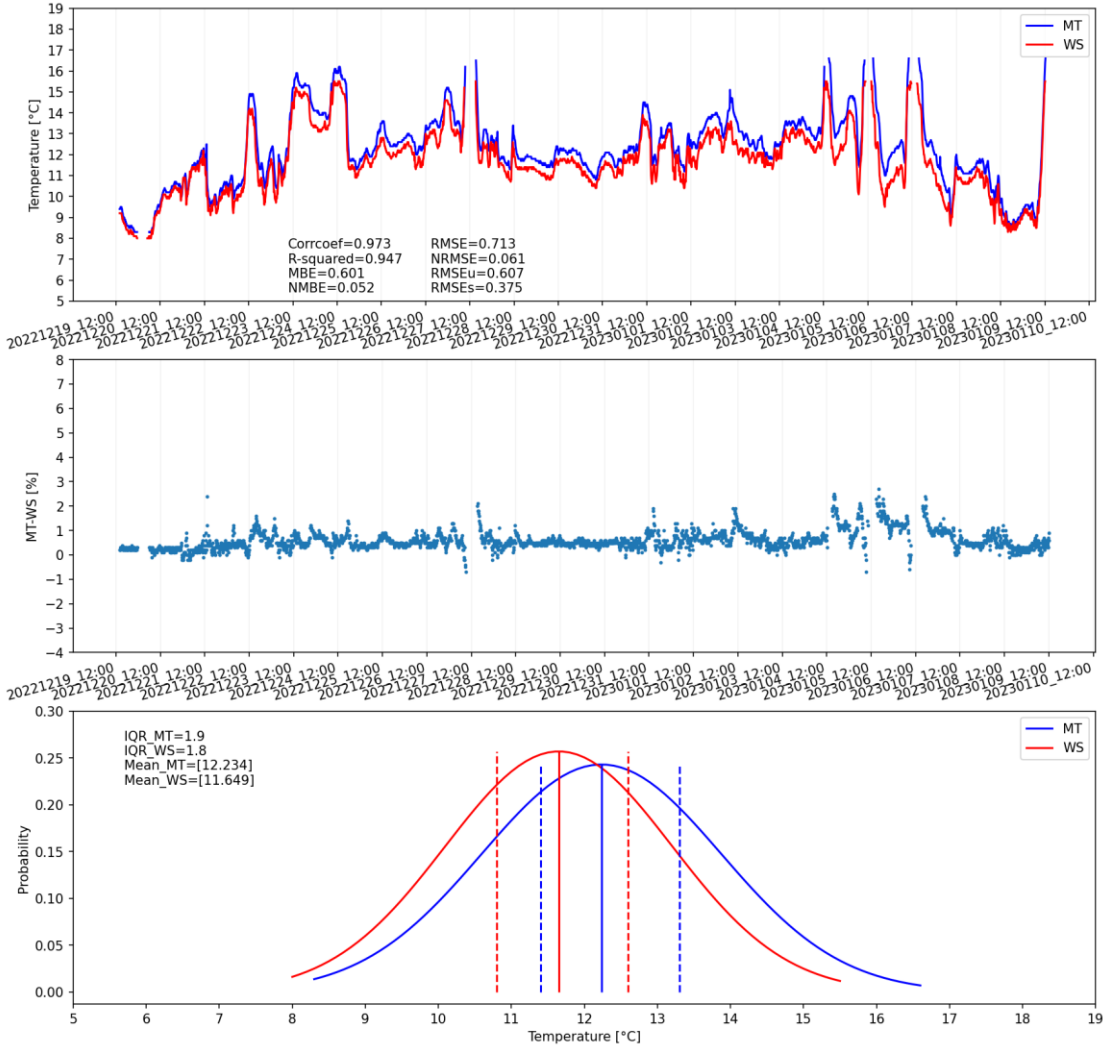
- Comparison between a MT in a Stevenson box and a WMO sensor (WS) on the roof of CIMA

- Winter period (19/12/2022 - 10/01/2023)

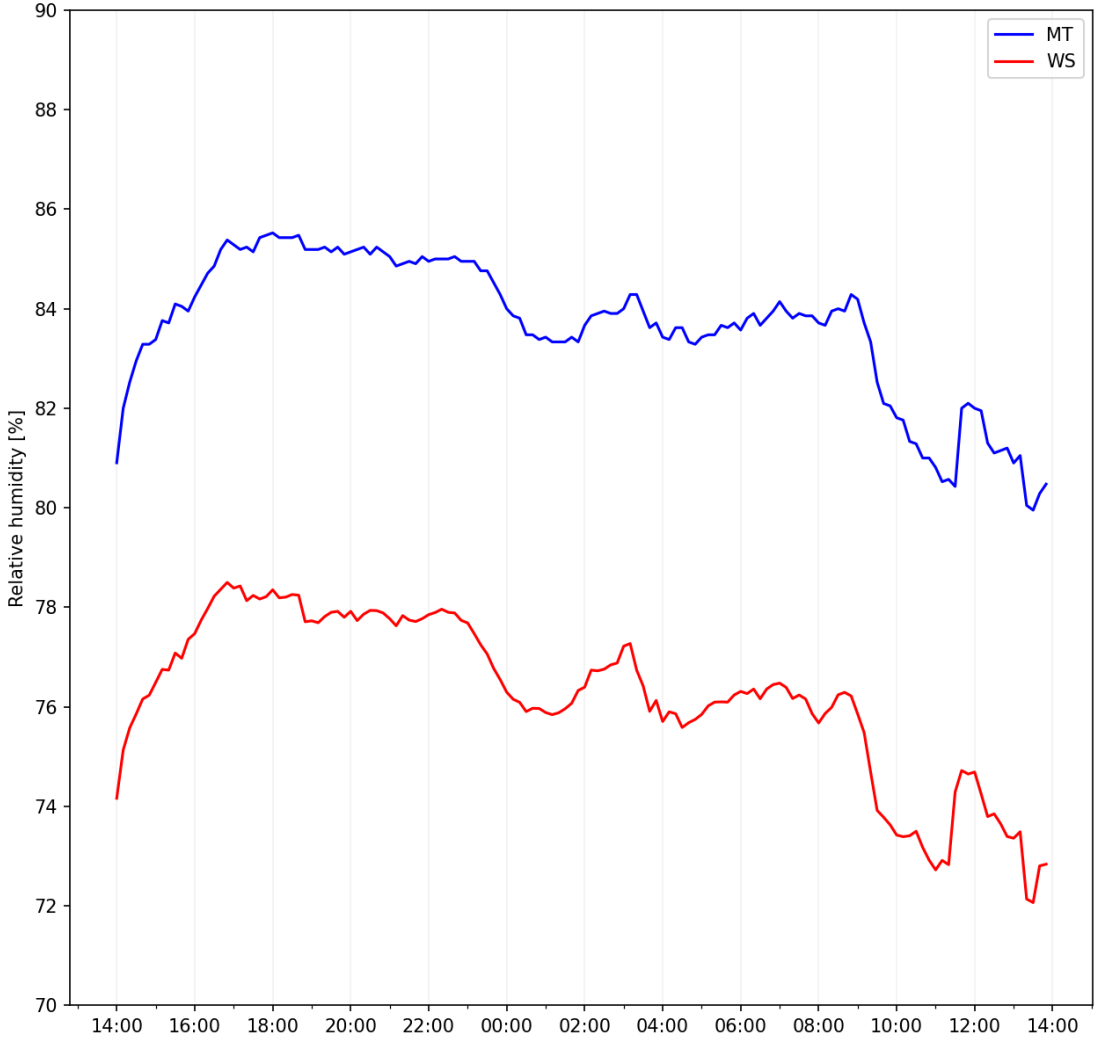
- Summer period (10/07/2023 - 03/08/2023)

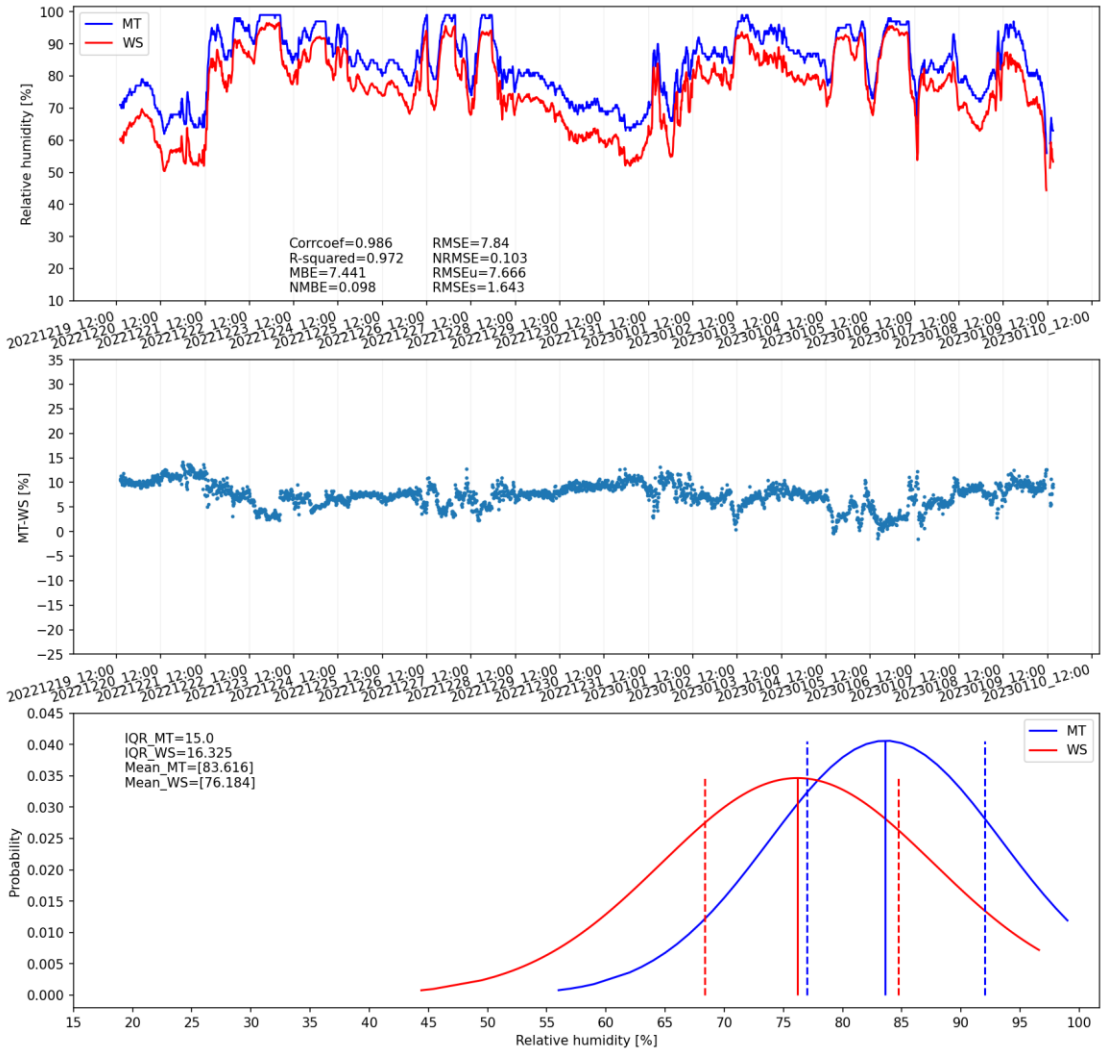




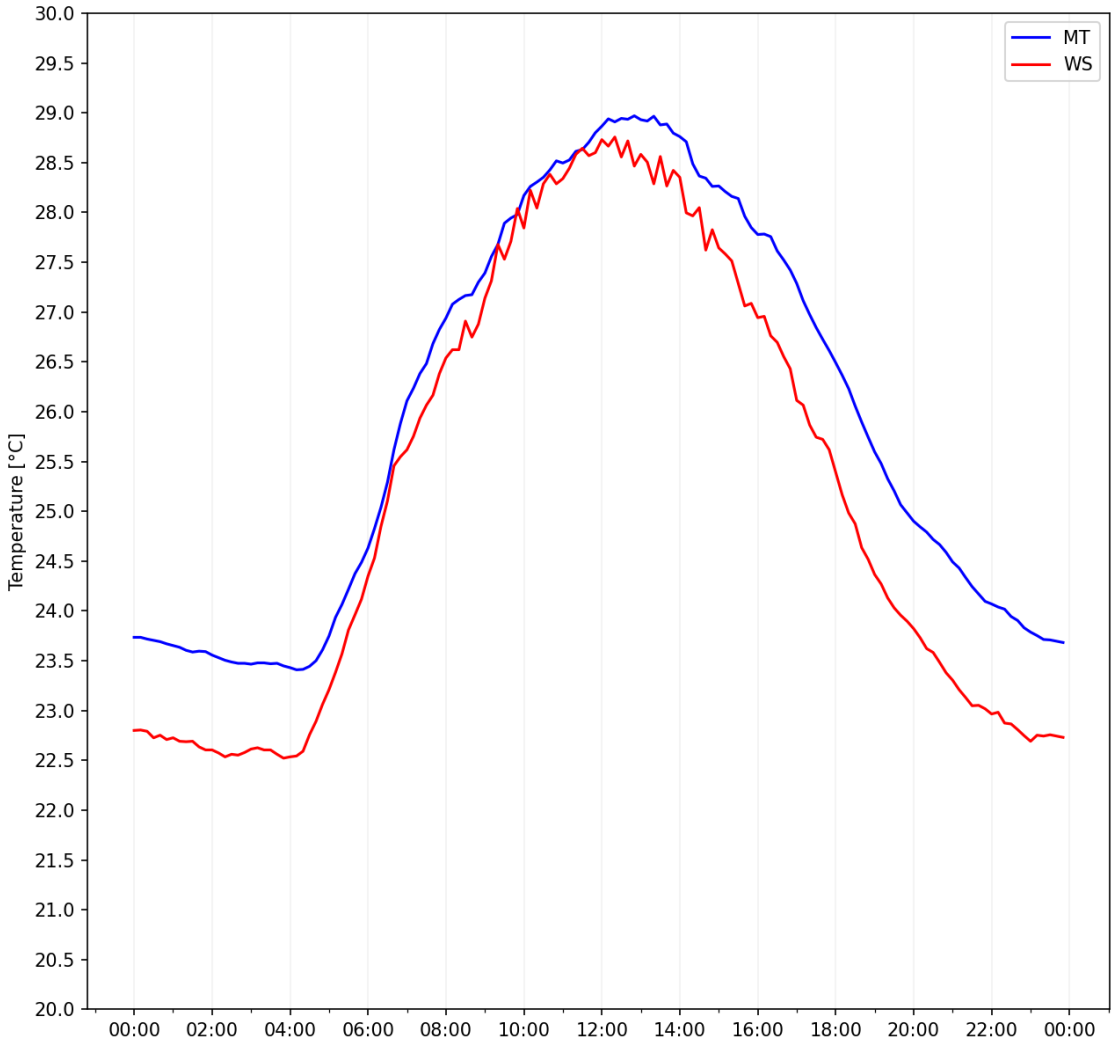


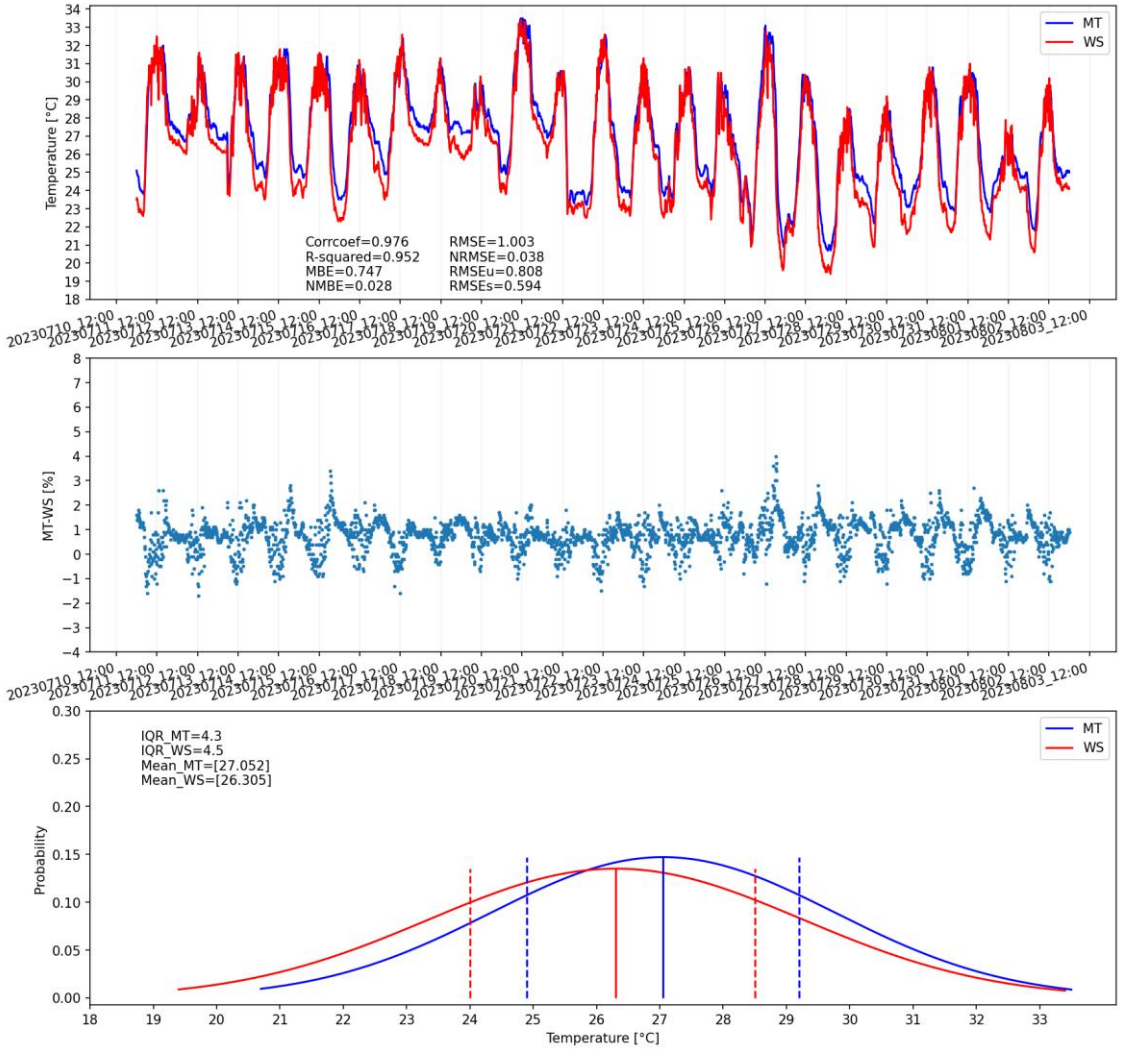
Mean daily cycle



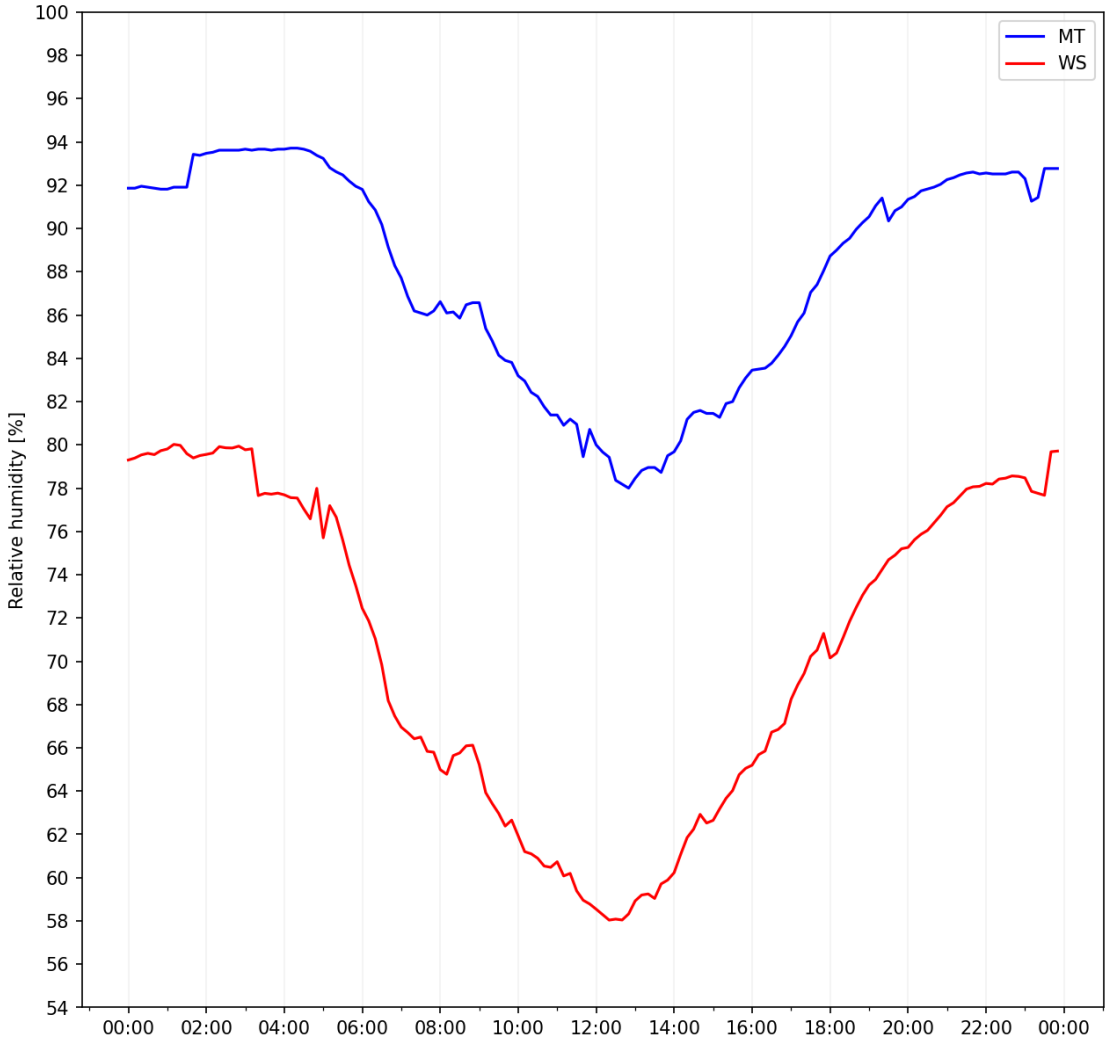


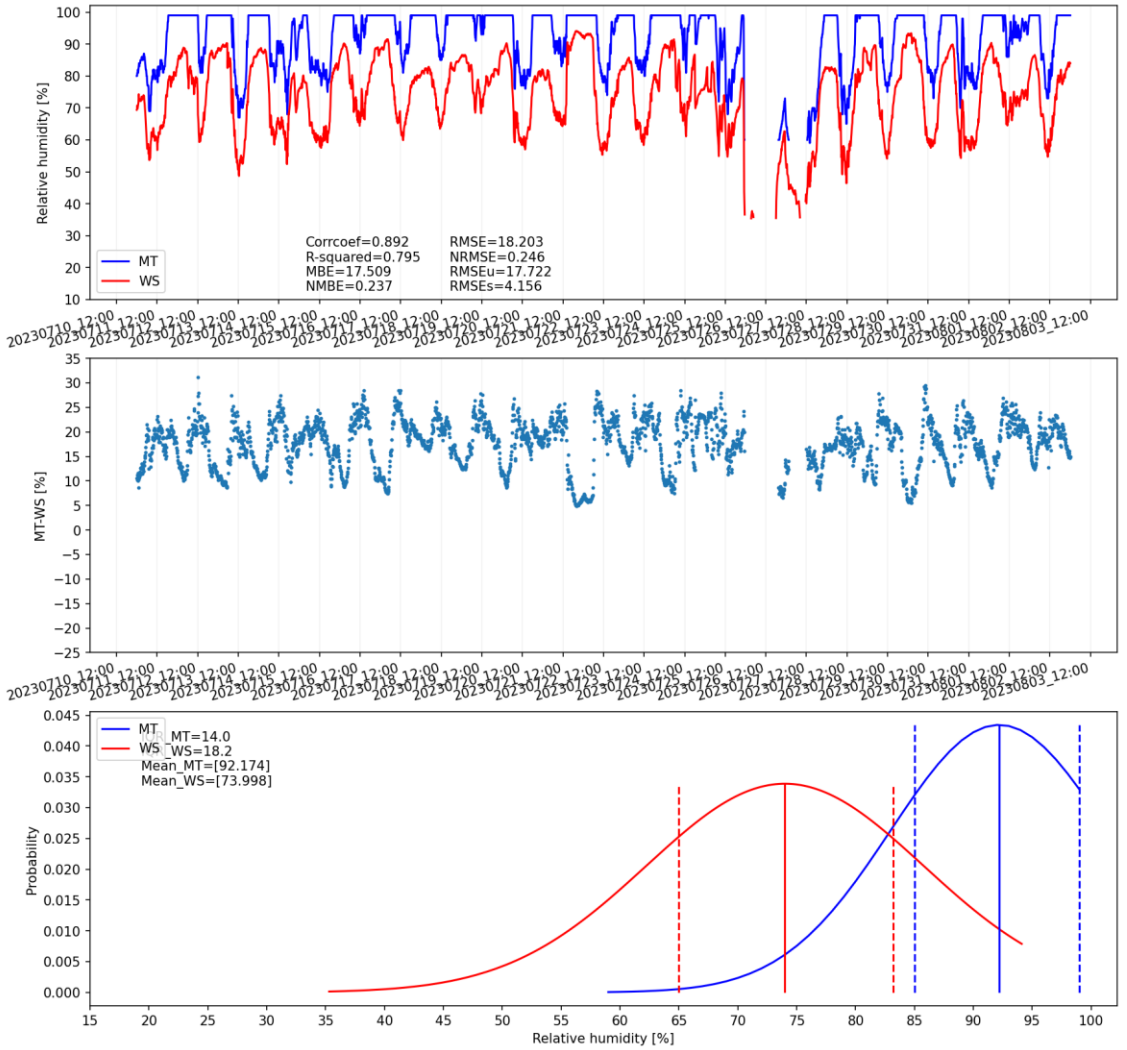
Mean daily cycle





Mean daily cycle





Mean daily cycle

Conclusions

- Temperature accuracy of MT is comparable to WS (~0.5°C difference in winter and in summer)
- RH accuracy is poorer and MT tends to overestimate RH (~10% difference in winter and ~20% difference in summer)
- Winter and summer behaviours are coherent (overestimation of MT)
- Nice application for qualitative purposes (citizen science), to be improved for more “scientific” purposes

Thank you and let's have a fruitful meeting!

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