

FINAL CONFERENCE
OPENING DOORS TO EFFICIENT BUILDINGS
July 11th, 2022

Assessment on monitored data

Contributors: Pietro Zambelli, Aaron Estrada, Kostas Tzoympas
Eurac Research



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ASSESSMENT ON MONITORED DATA **OBJECTIVES**

**Analyse collected data
from monitoring systems**

Lyon (France)
Bagnolo in Piano (Italy)

**Compare results after
refurbishment actions**

Windows, insulation panels,
etc.



LYON **OUTLINE**



AVAILABLE DATA

Indoor conditions

- Temperature
- Relative humidity
- CO₂ concentration

Energy consumption

- Global consumption



TIME FRAME

September 2019
to April 2021



ANALYSIS

Average and distribution

- Temperature
- Relative humidity
- CO₂ concentration

Predicted mean vote
(PMV) +
Predicted percentage
of dissatisfied (PPD)

Energy consumption

- Monthly consumption



LIMITATIONS

No analysis after
refurbishment
Refurbishment ongoing



www.heartproject.eu

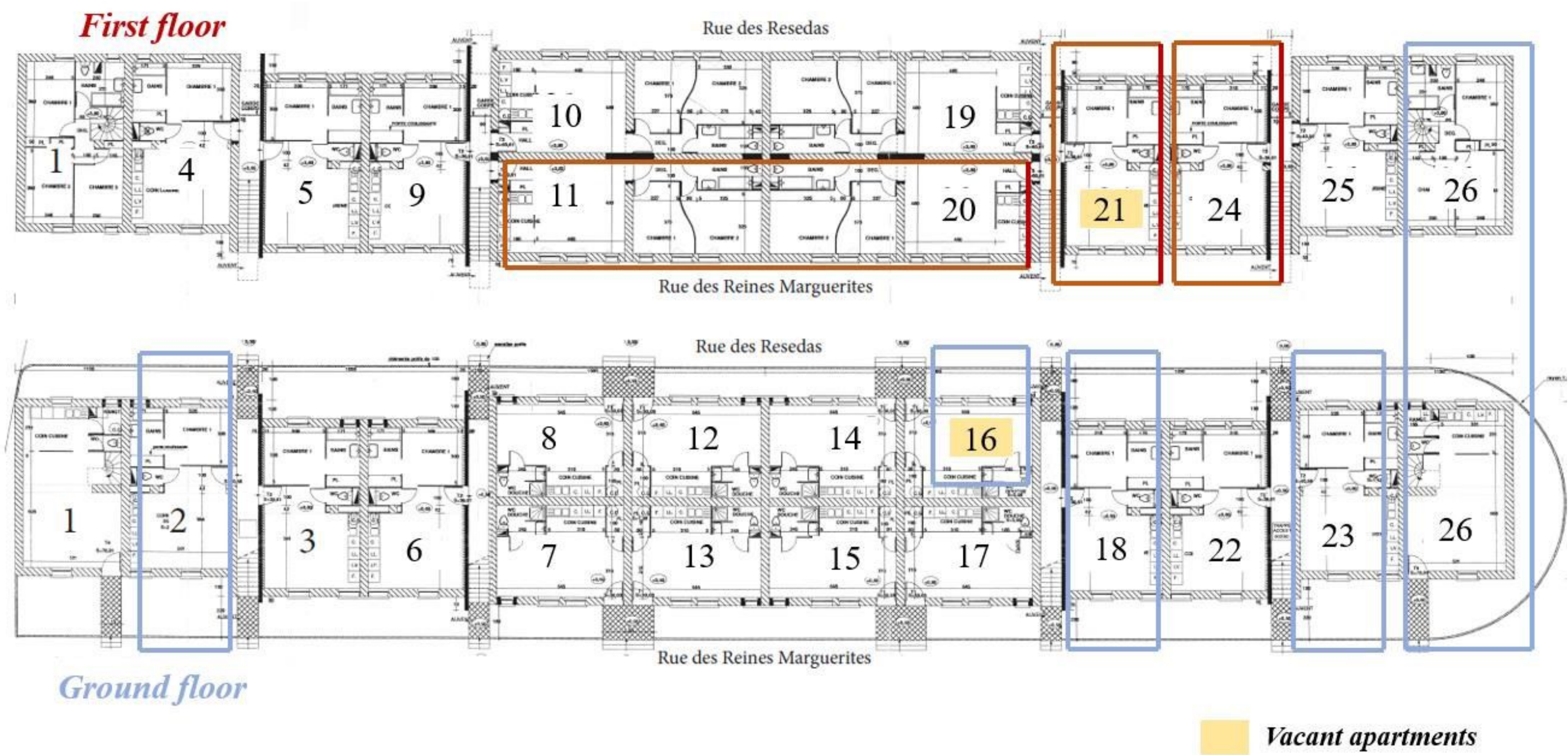


HEARTProjectEU

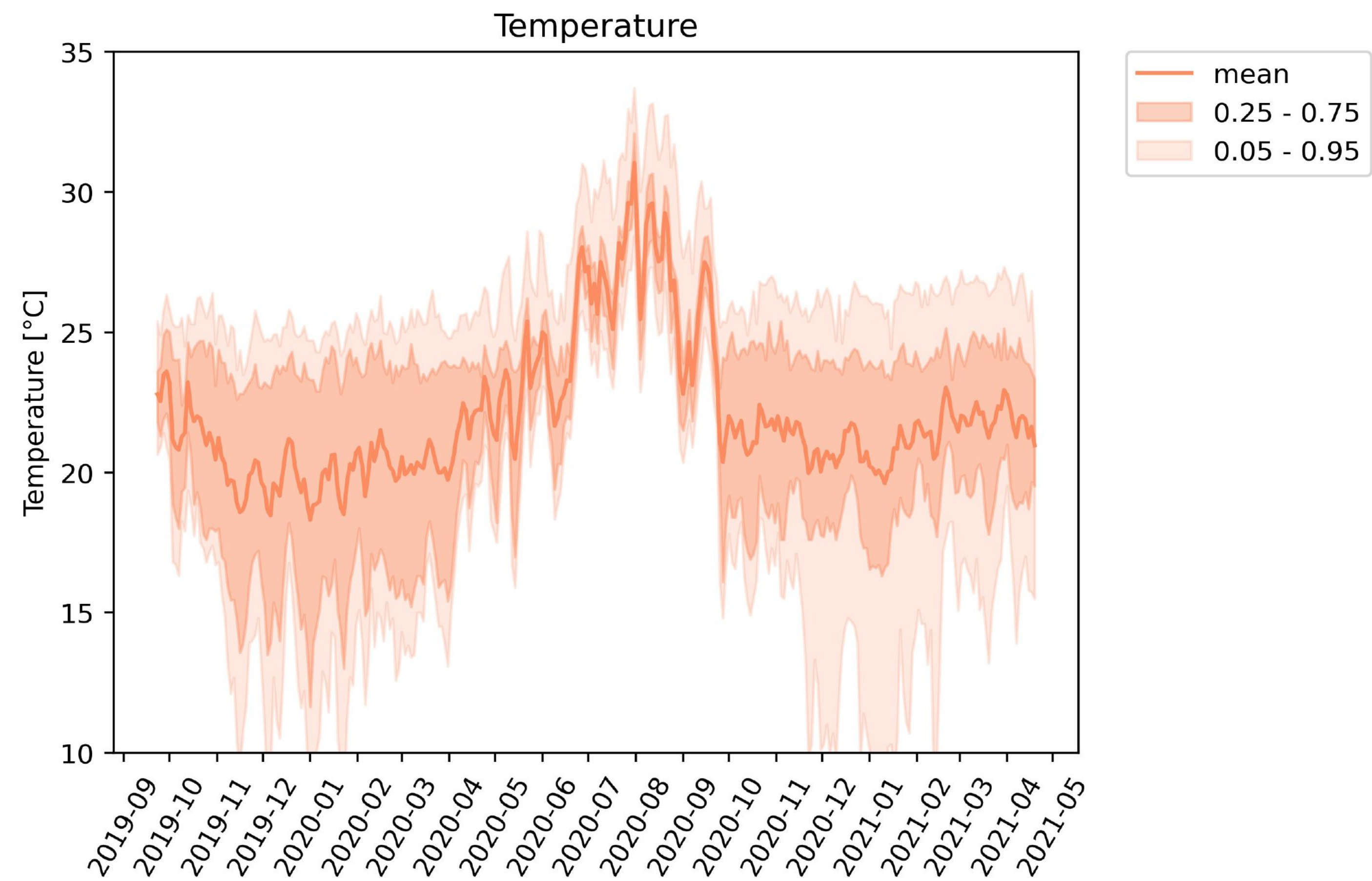


HEARTProjectEU

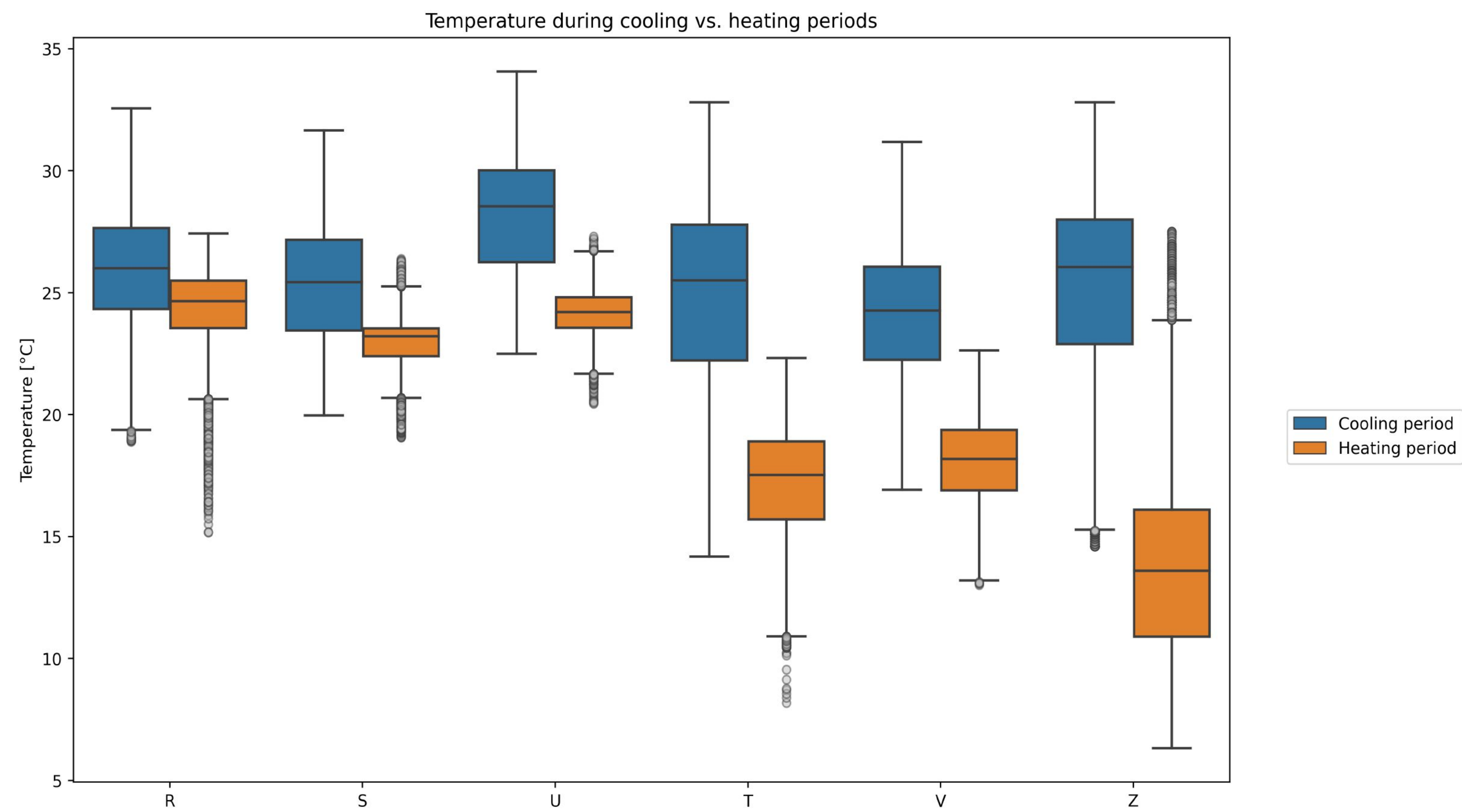
LYON APARTMENTS



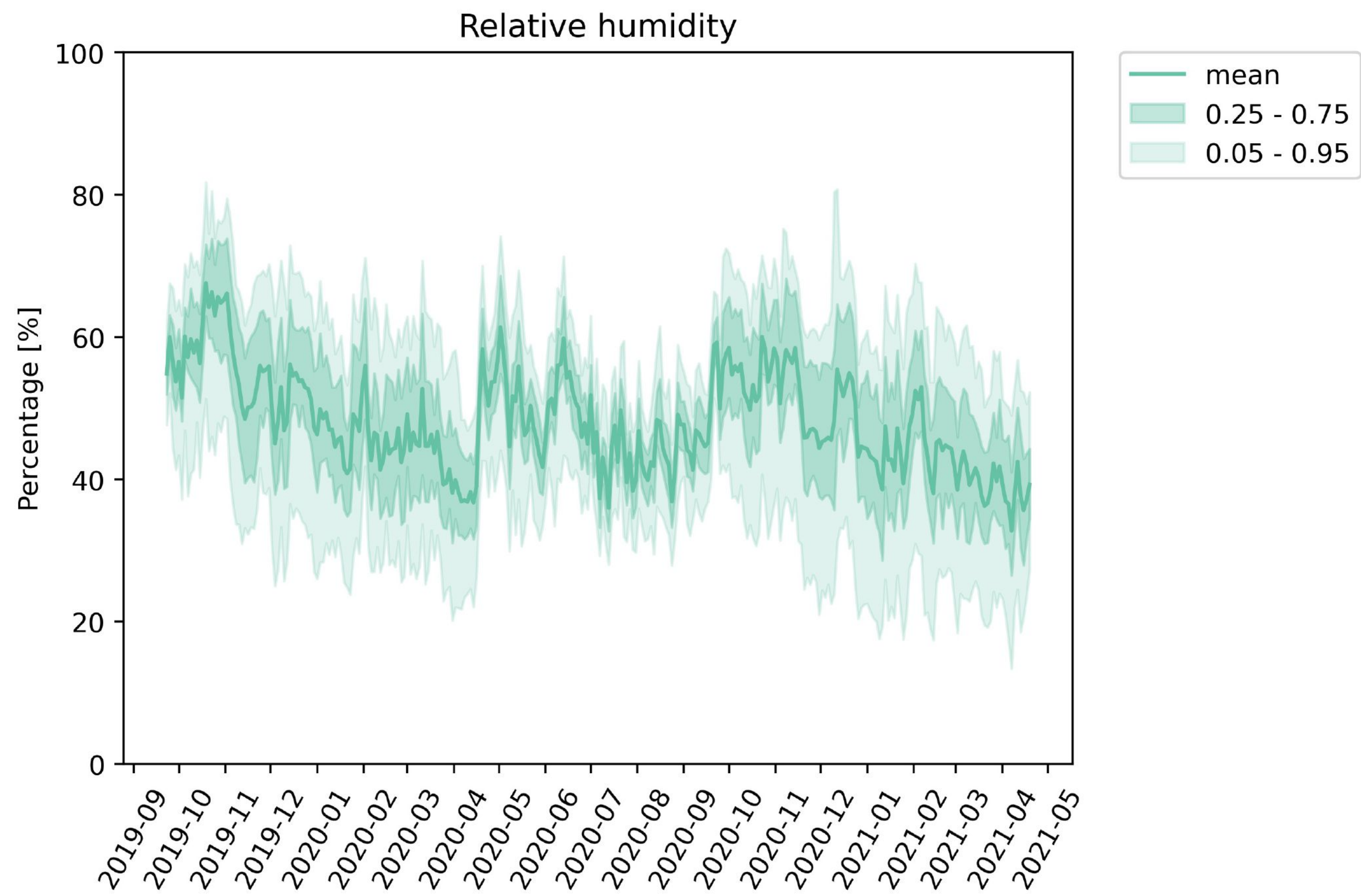
LYON INDOOR TEMPERATURE



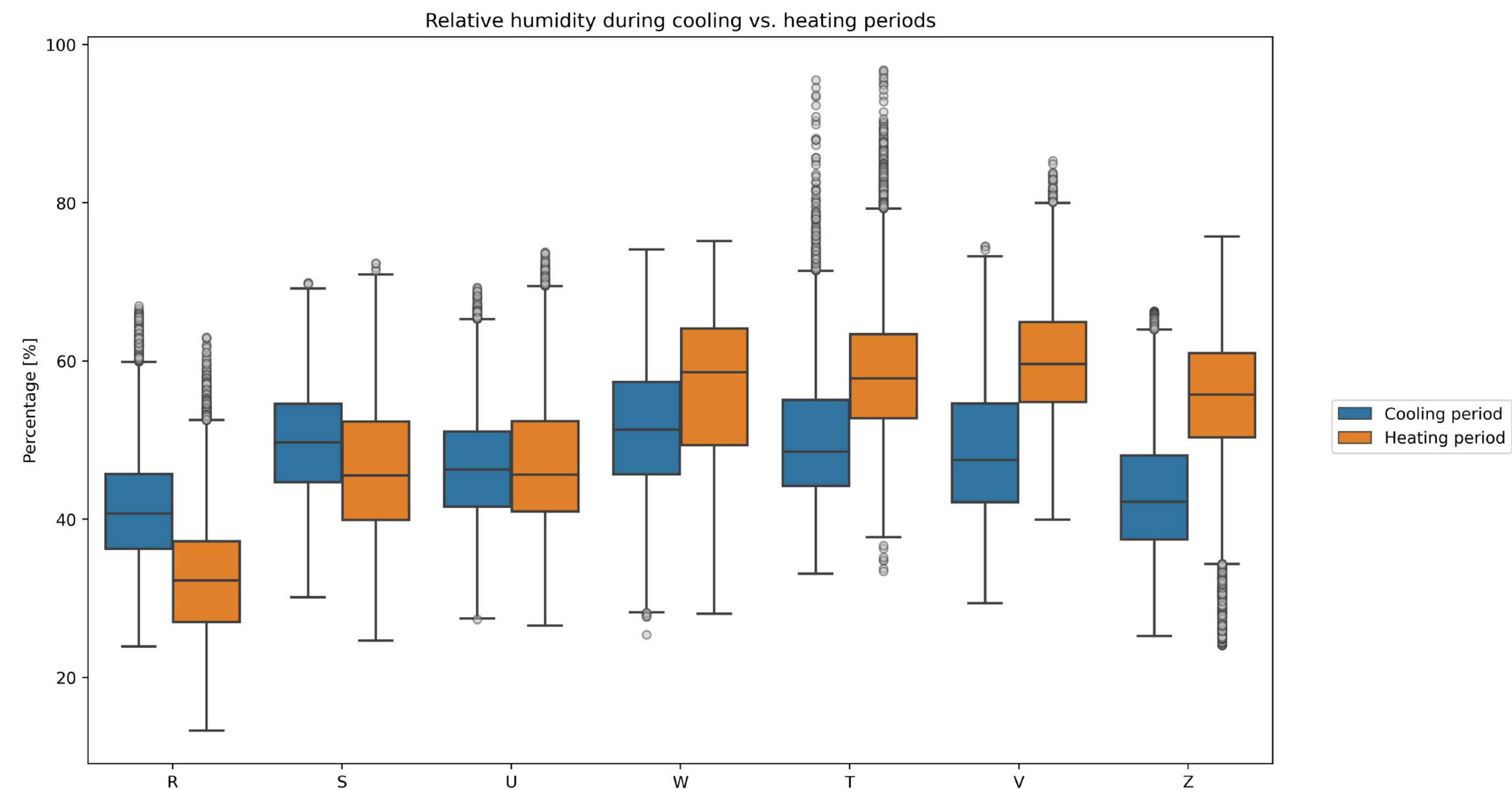
LYON INDOOR TEMPERATURE :: COOLING & HEATING PERIODS



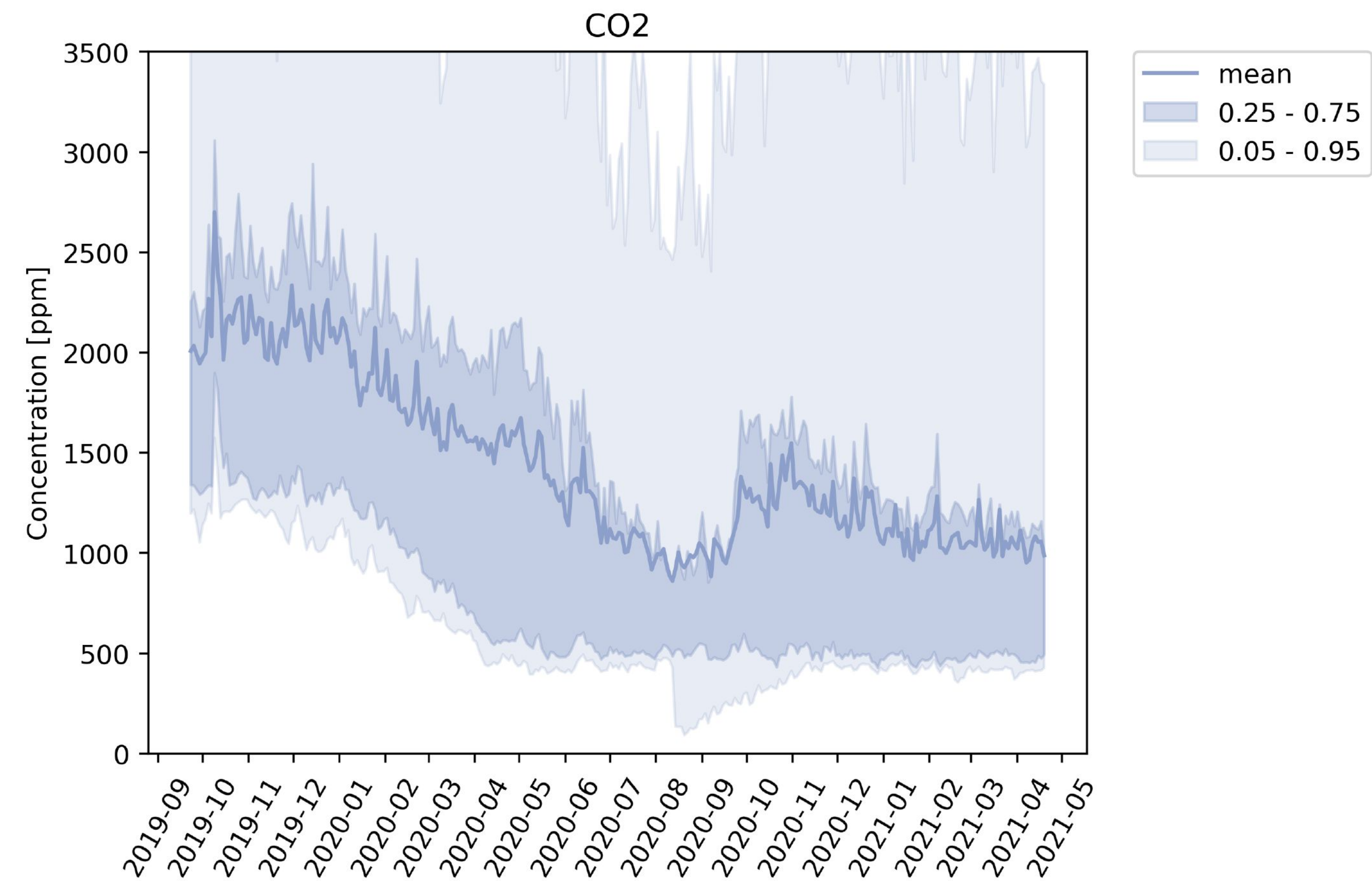
LYON INDOOR RELATIVE HUMIDITY



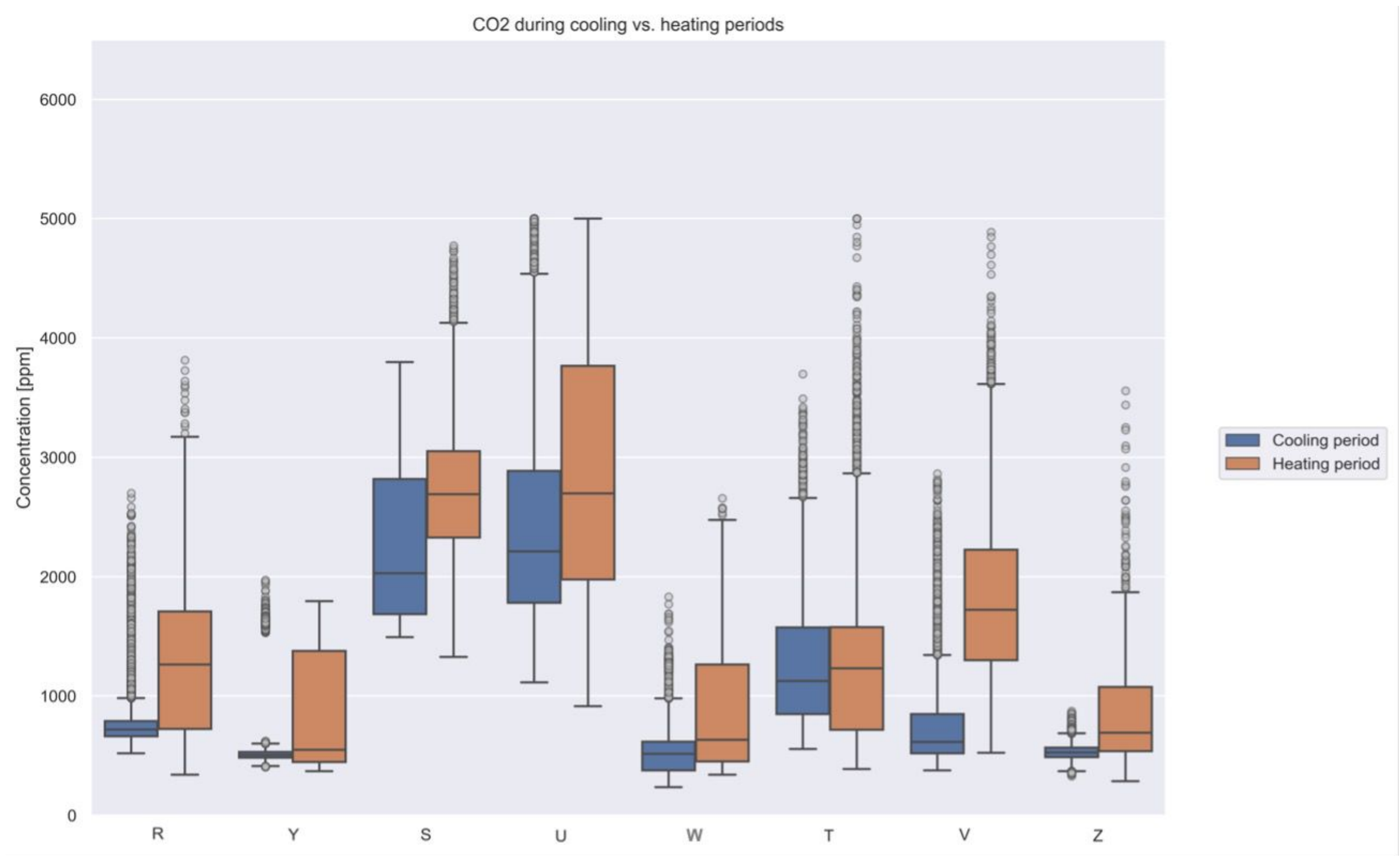
LYON INDOOR RELATIVE HUMIDITY :: COOLING & HEATING PERIODS



LYON INDOOR CO₂ CONCENTRATION

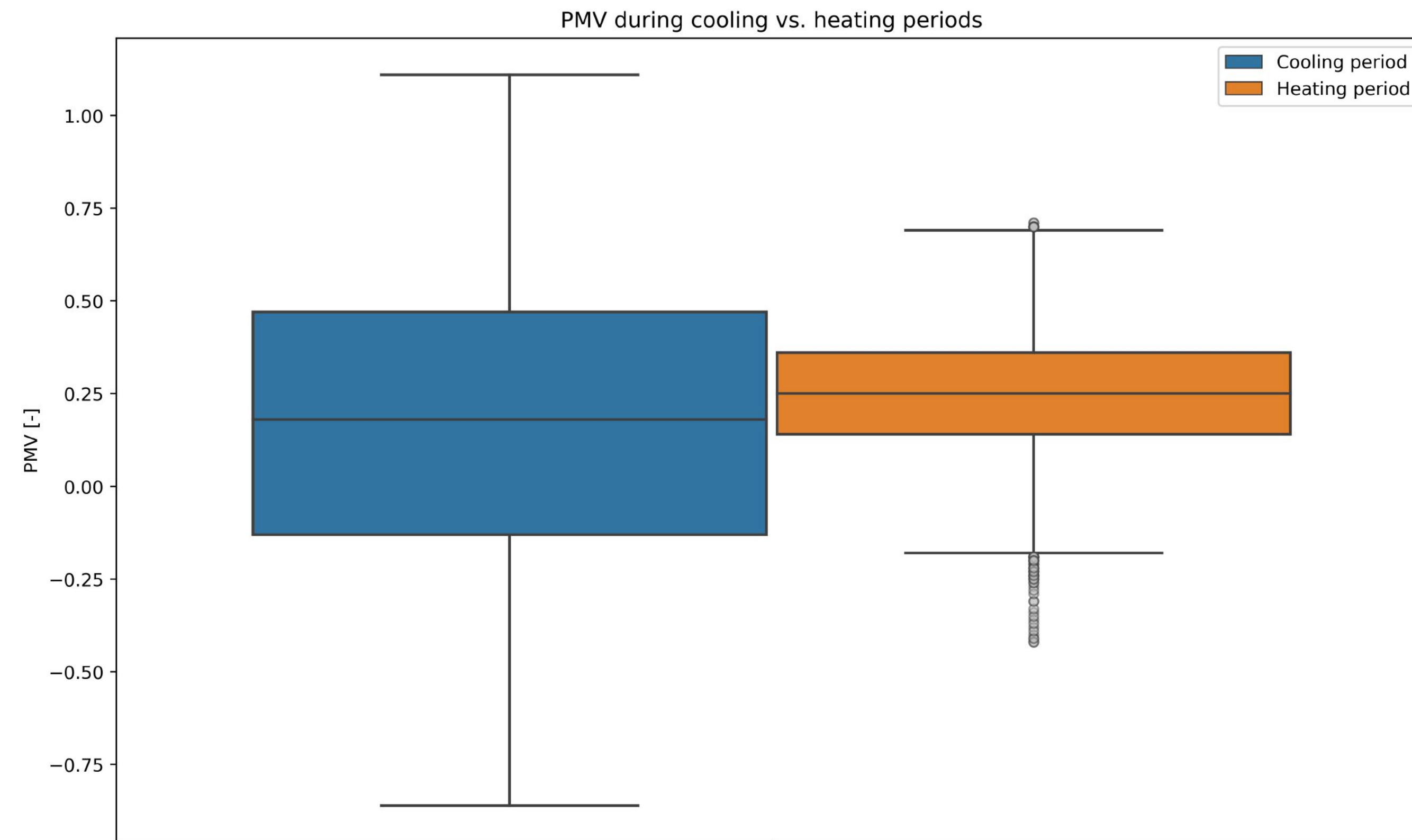


LYON INDOOR CO₂ CONCENTRATION :: COOLING & HEATING PERIODS

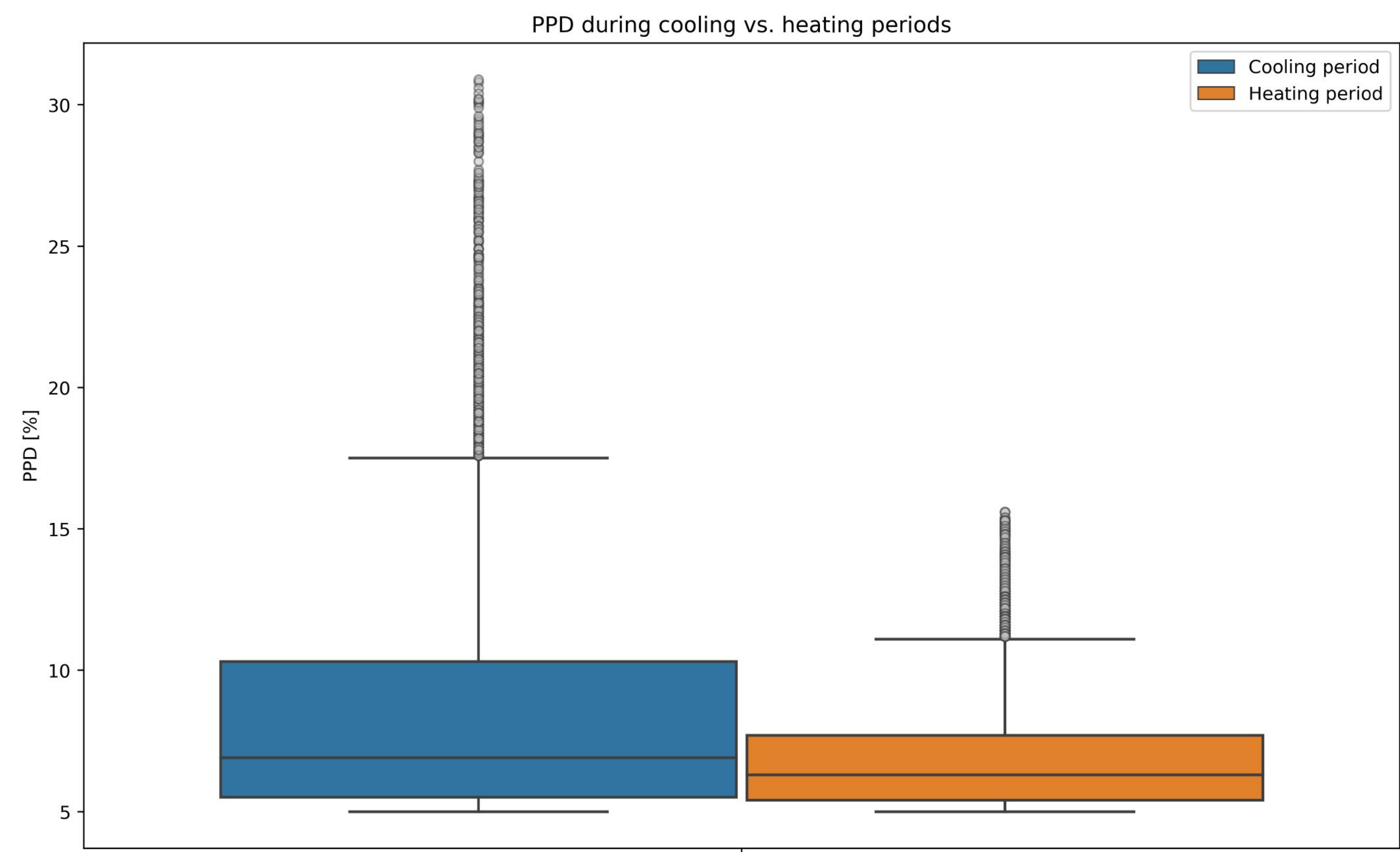


LYON PREDICTED MEAN VOTE (PMV)

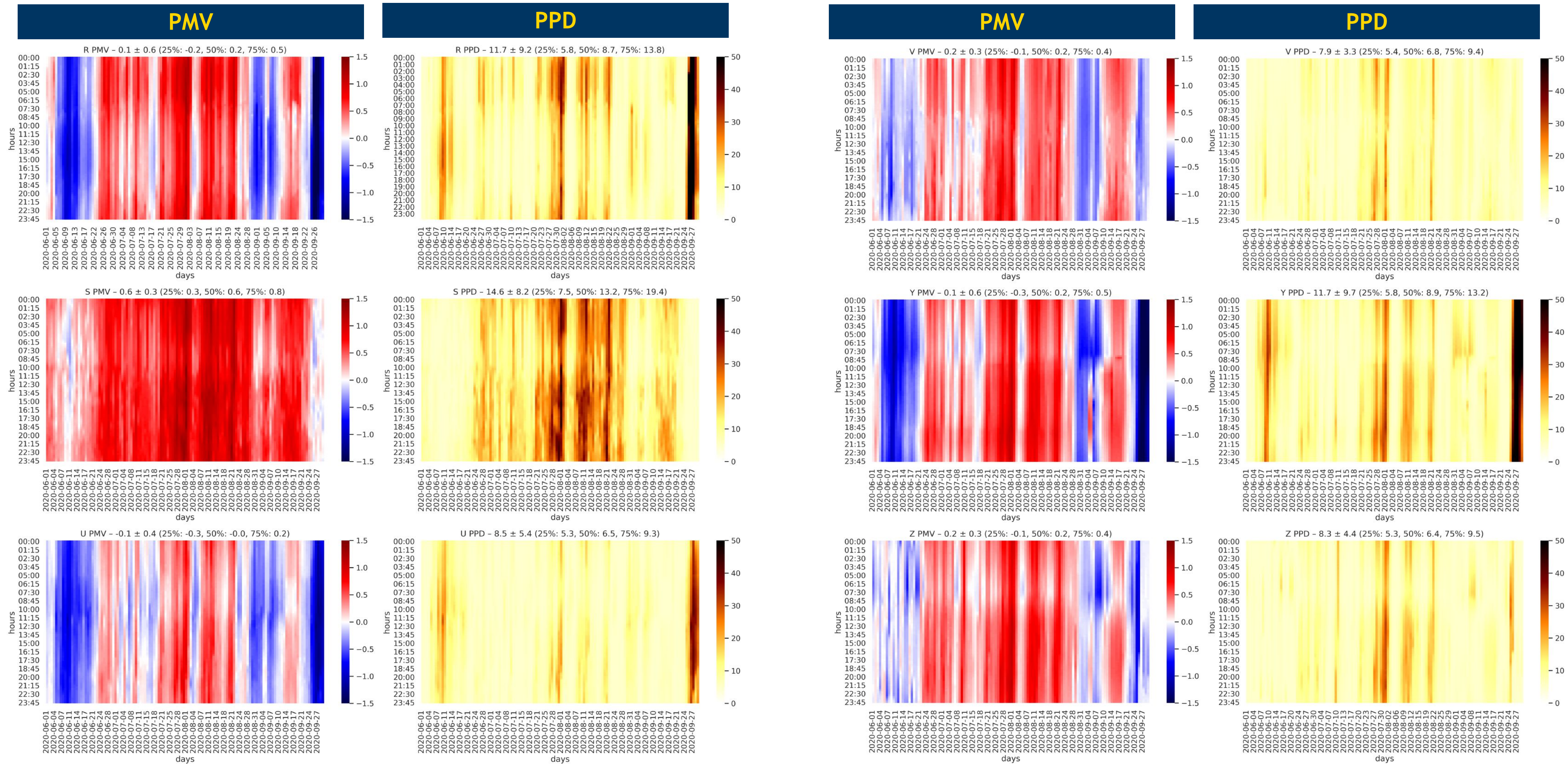
- +3 = hot
- +2 = warm
- +1 = slightly warm
- 0 = neutral
- -1 = slightly cool
- -2 = cool
- -3 = cold



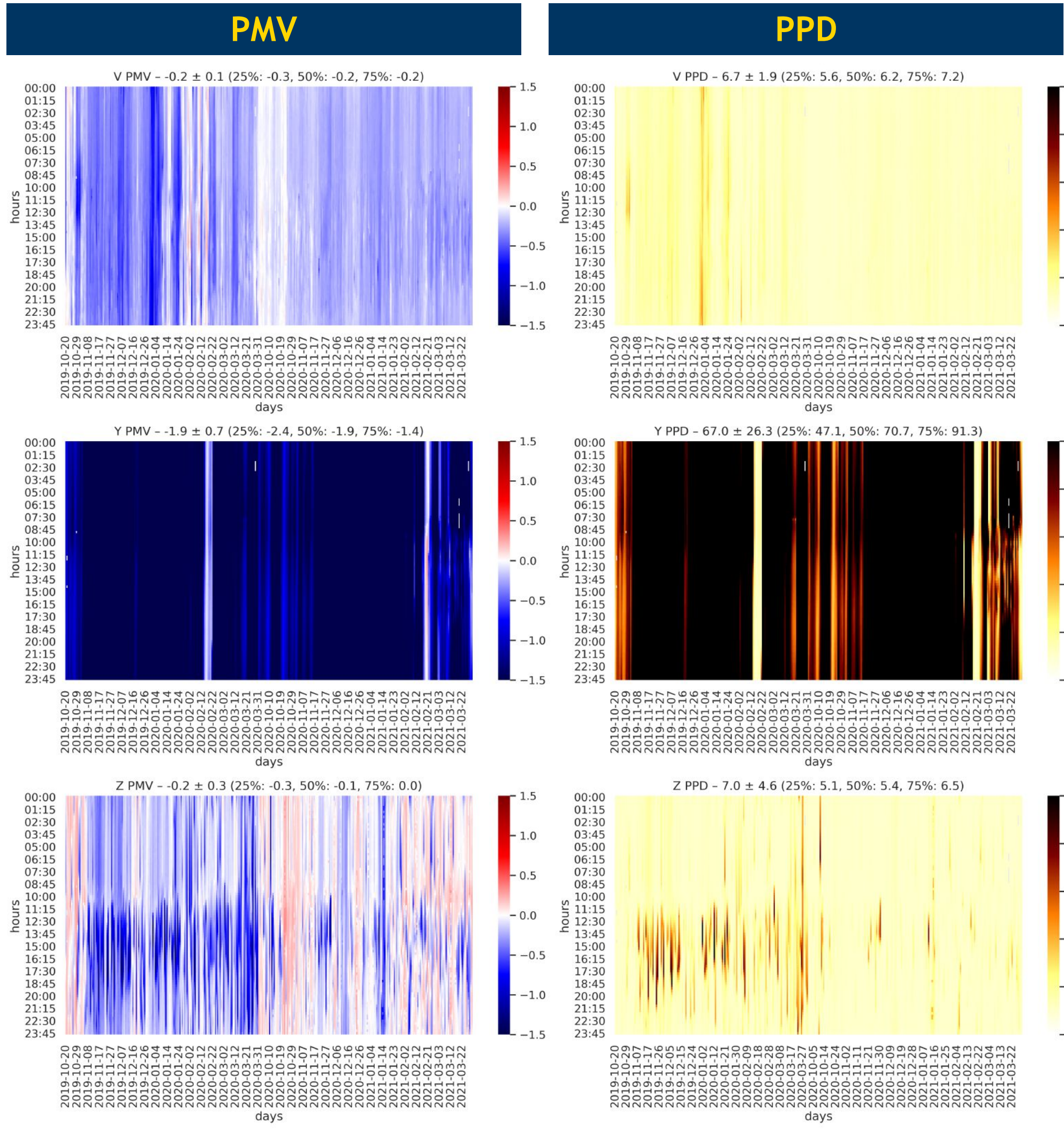
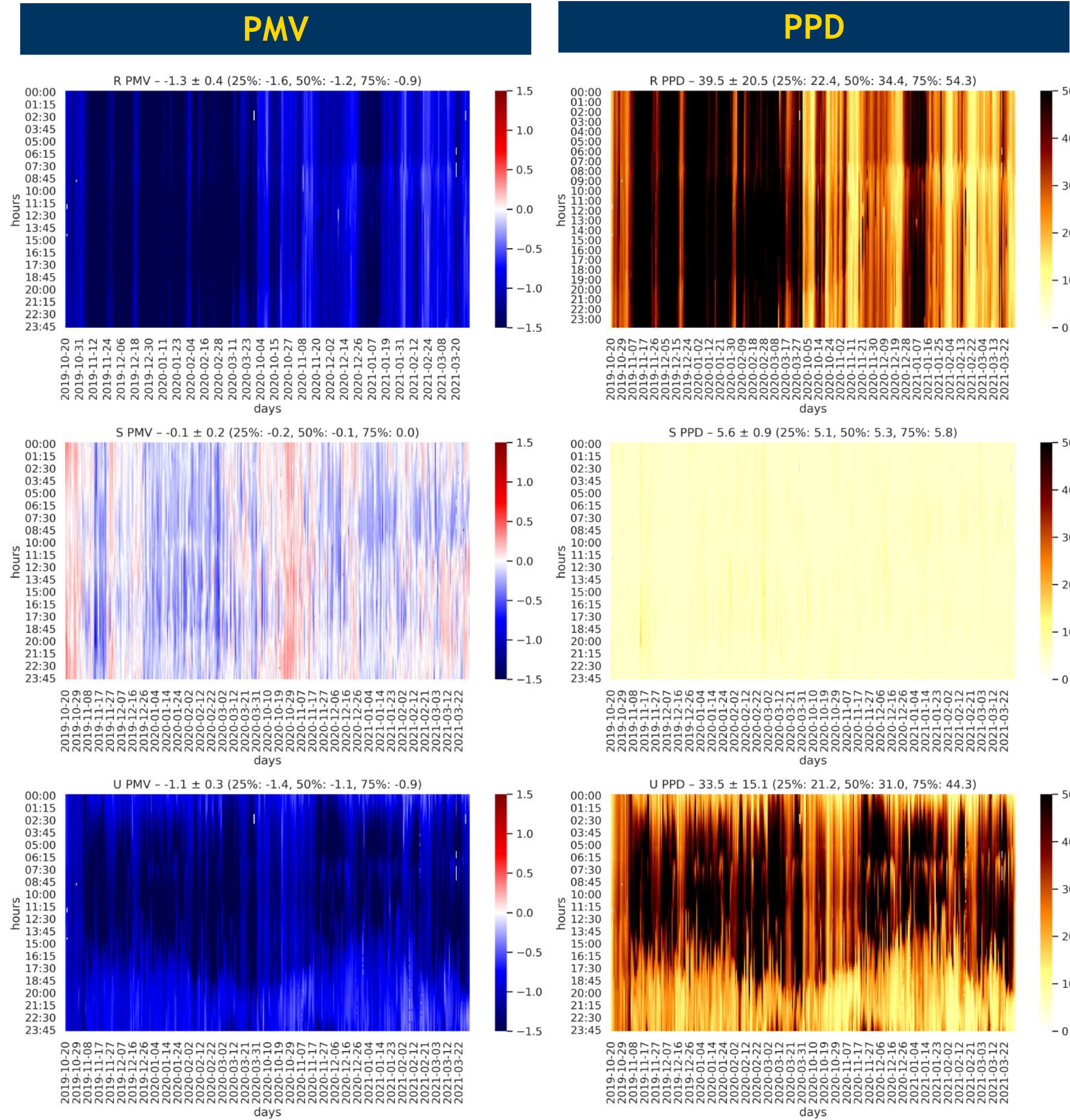
LYON PREDICTED PERCENTAGE OF DISSATISFIED (PPD)

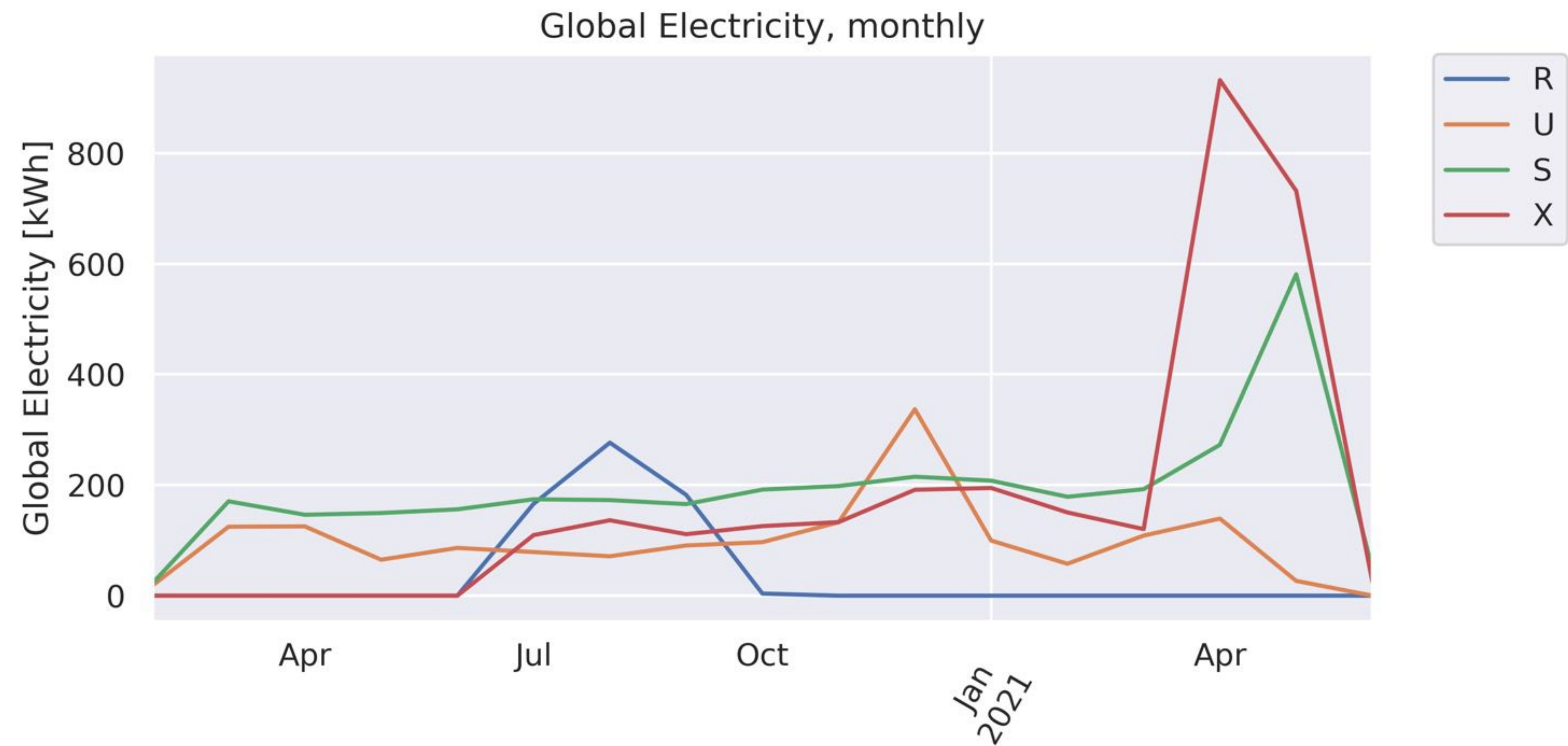


LYON PMV & PPD :: COOLING PERIOD

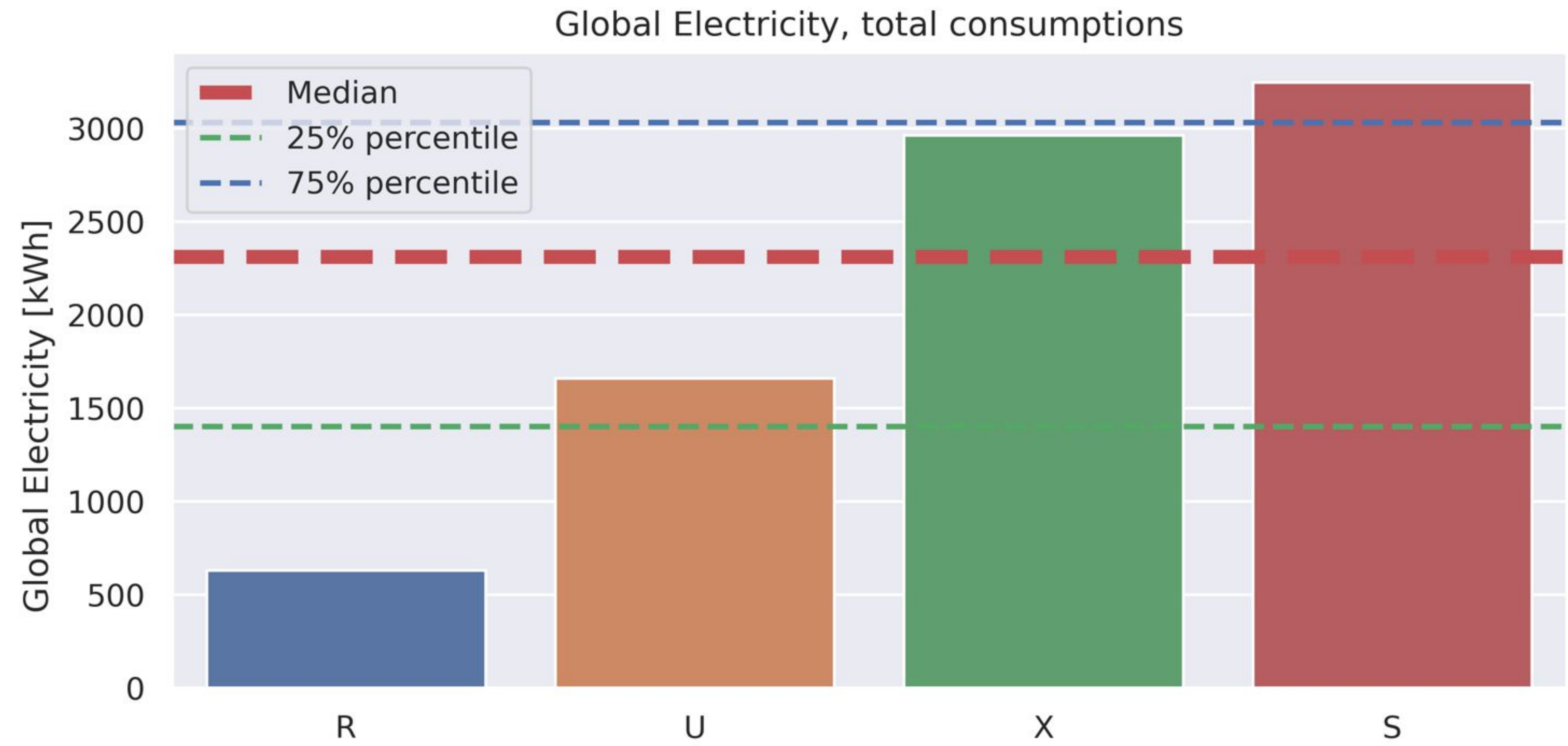


LYON PMV & PPD :: HEATING PERIOD





LYON ENERGY CONSUMPTION :: GLOBAL - PERCENTILES



BAGNOLO IN PIANO OUTLINE



AVAILABLE DATA

Indoor conditions

- Temperature
- Relative humidity

Energy consumption

- Air conditioning
- Boiler



TIME FRAME

September 2018 to April 2021

September 2019
Windows installed

December 2020
Insulation panels installed



ANALYSIS

Average and distribution before & after window installation

- Temperature
- Relative humidity

Predicted mean vote (PMV)
+ Predicted percentage of dissatisfied (PPD)
before & after window installation

Energy consumption

- Air conditioning + boiler
- Monthly consumption



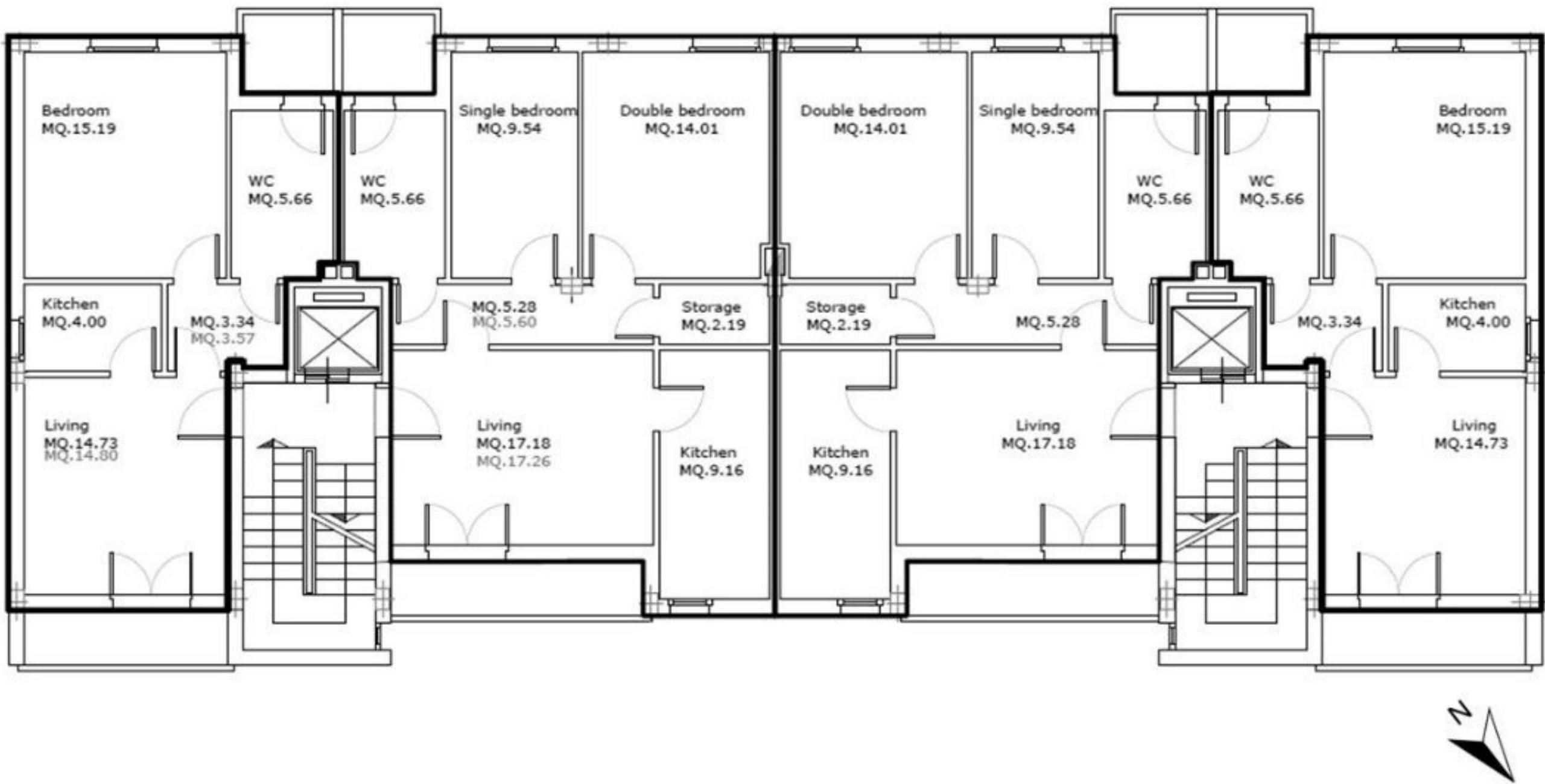
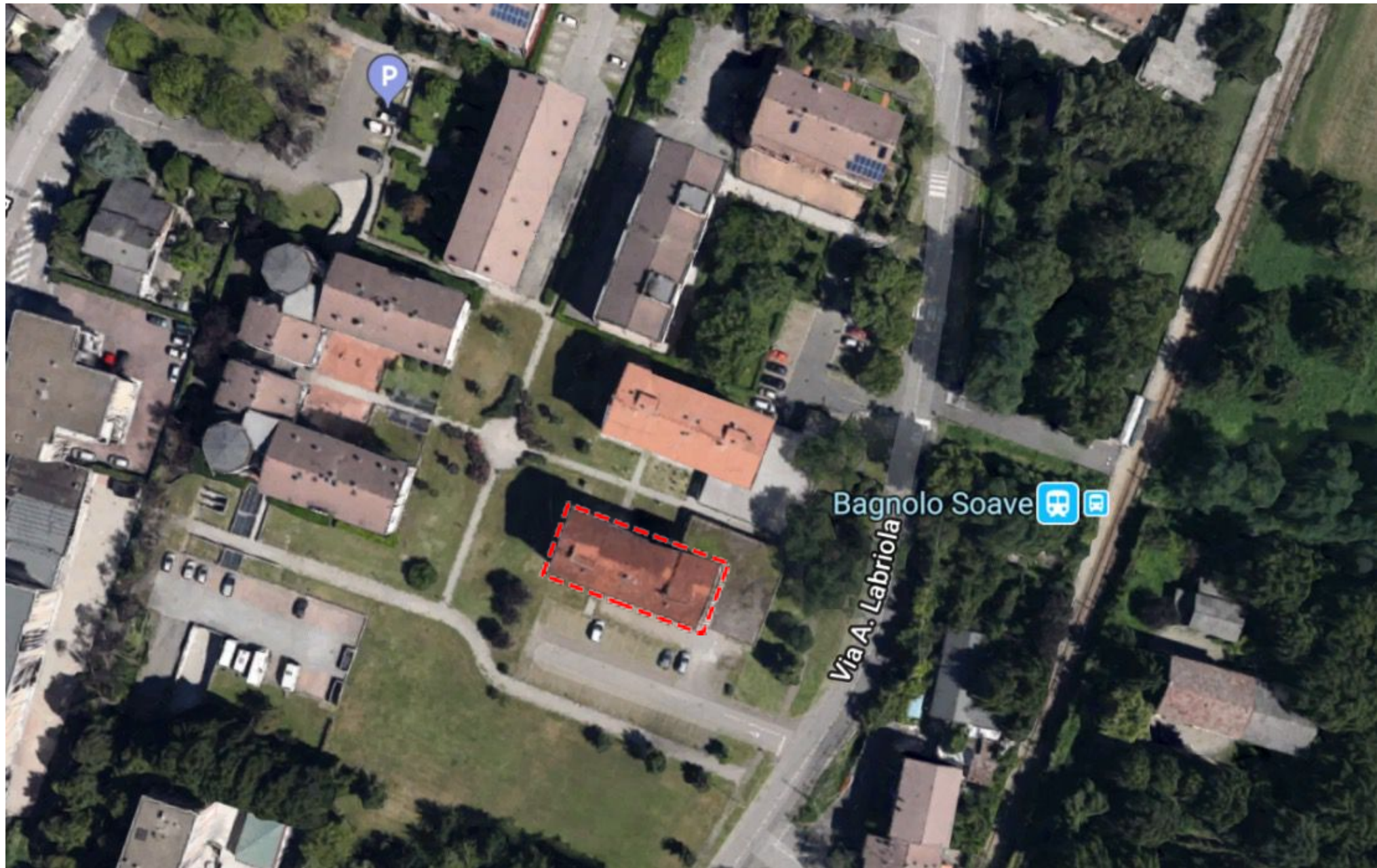
LIMITATIONS

No analysis after insulation panels
- Only few data available



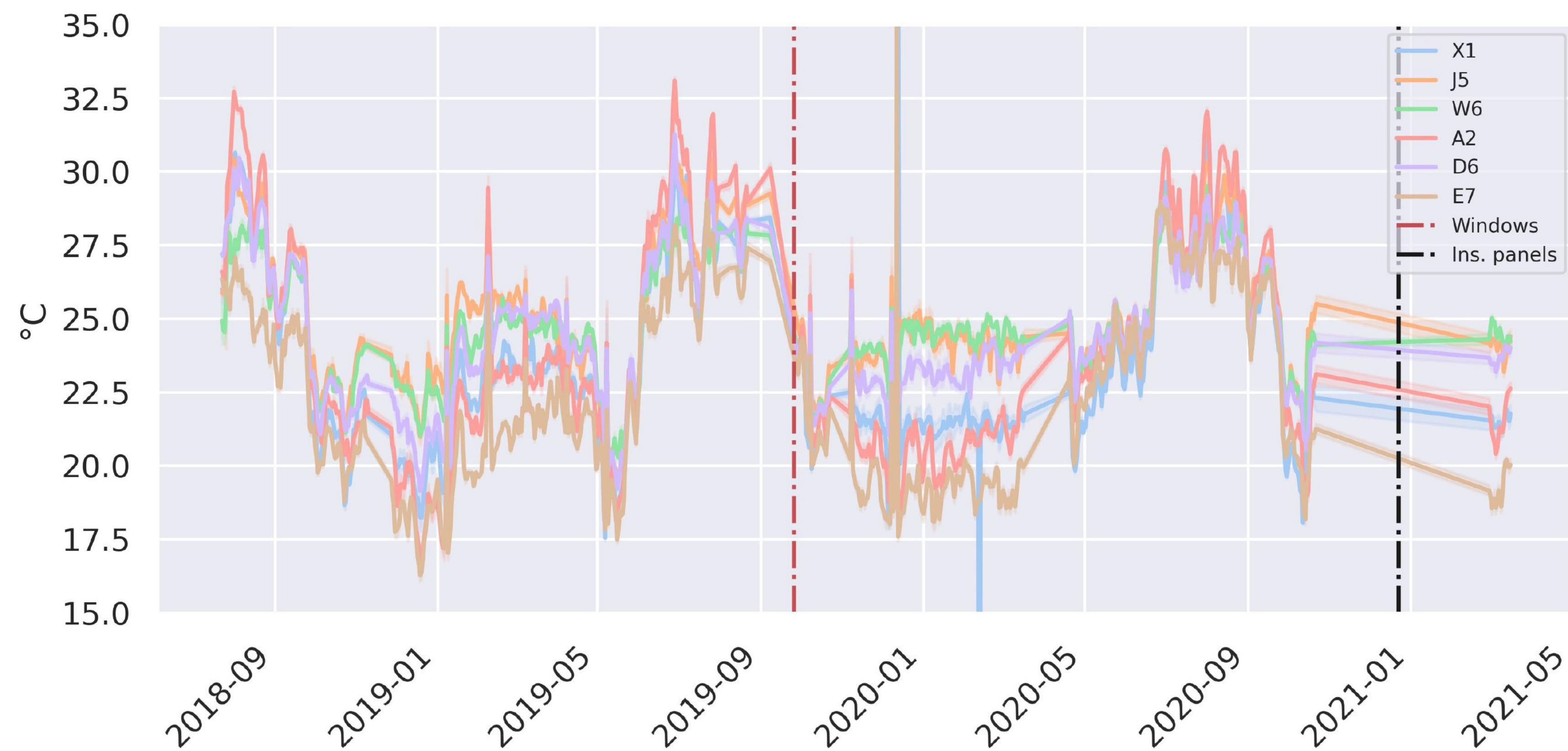
BAGNOLO IN PIANO

BUILDING AND APARTMENTS



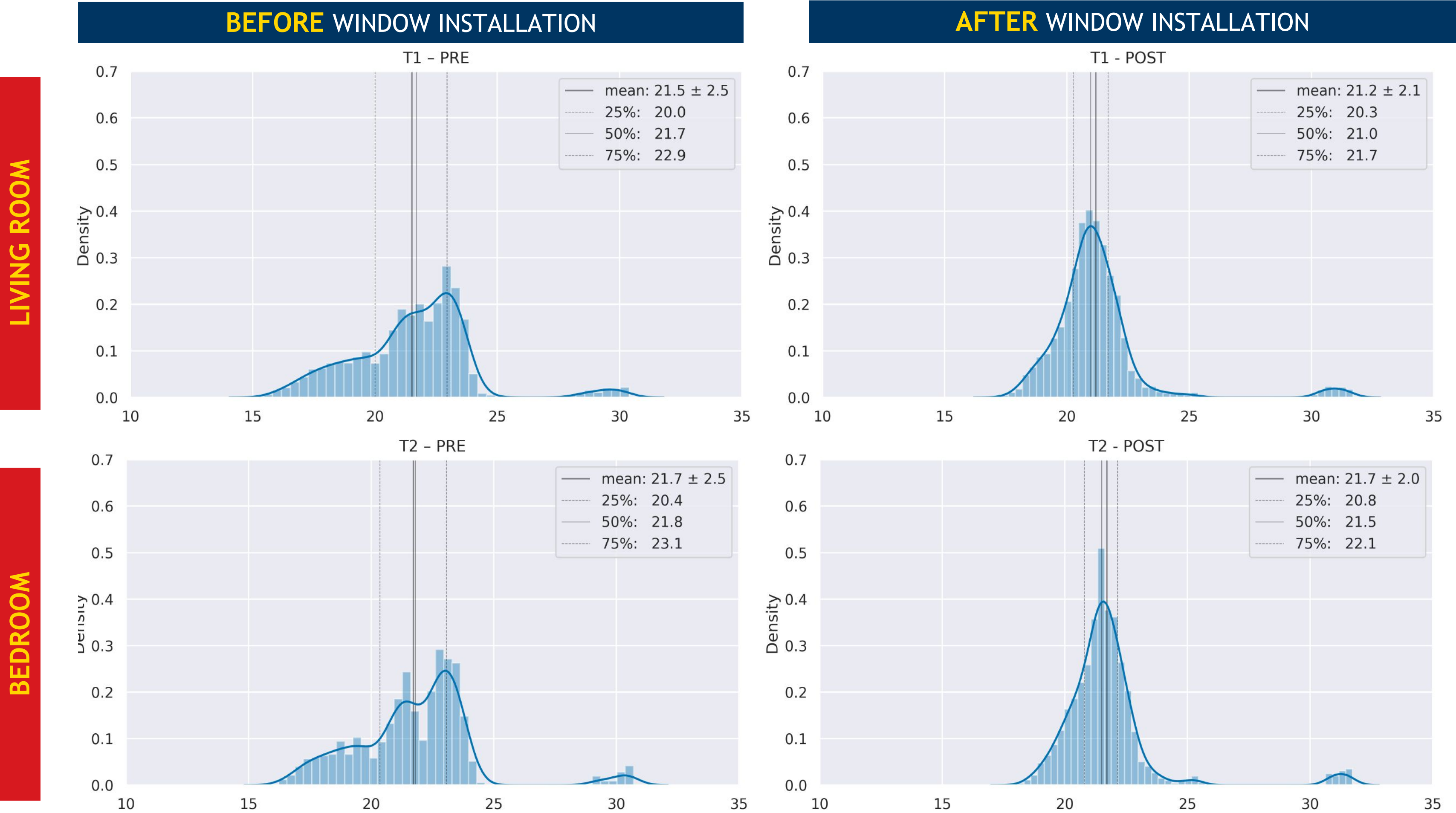
BAGNOLO IN PIANO

INDOOR TEMPERATURE :: LIVING ROOM



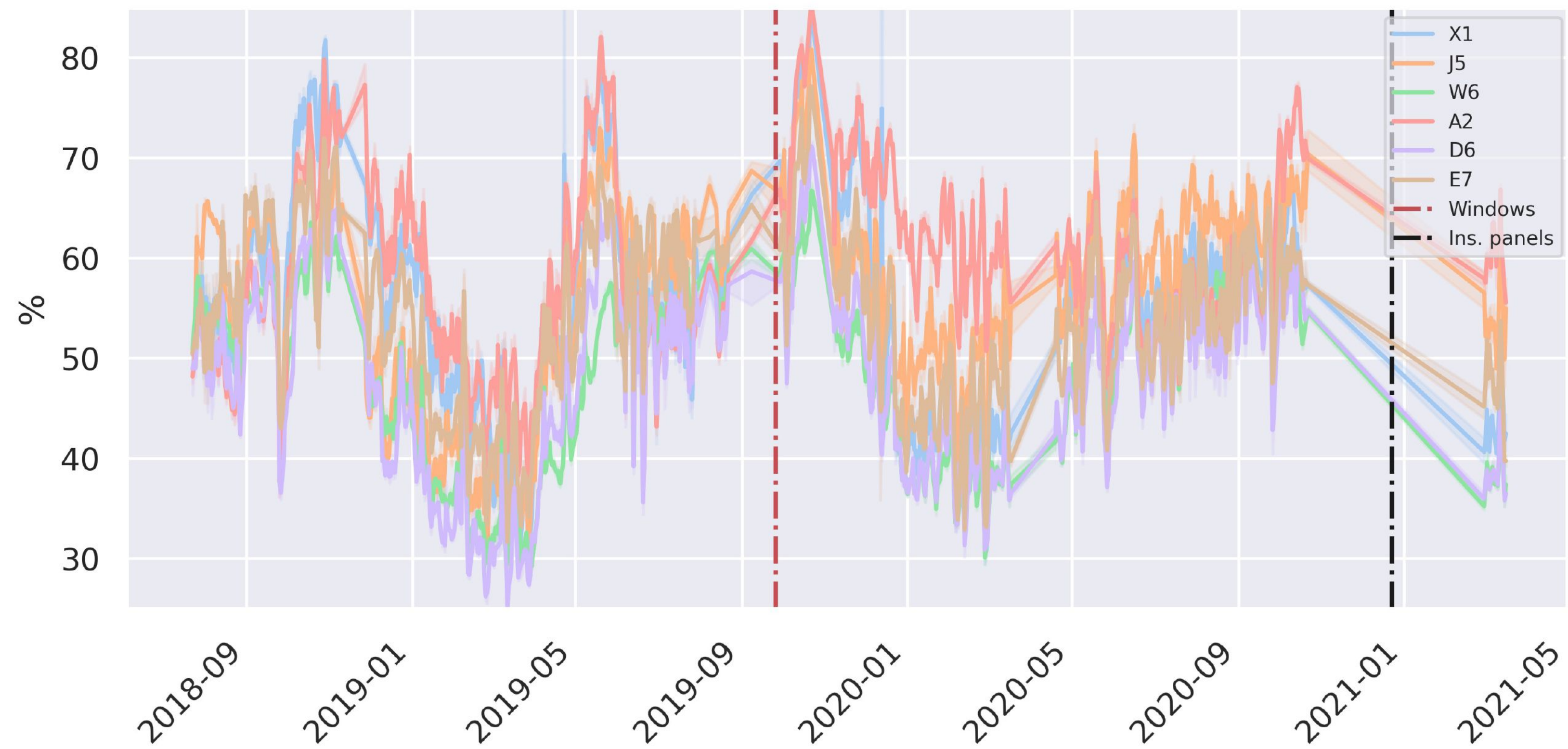
BAGNOLO IN PIANO

INDOOR TEMPERATURE :: LIVING ROOM & BEDROOM - DISTRIBUTION



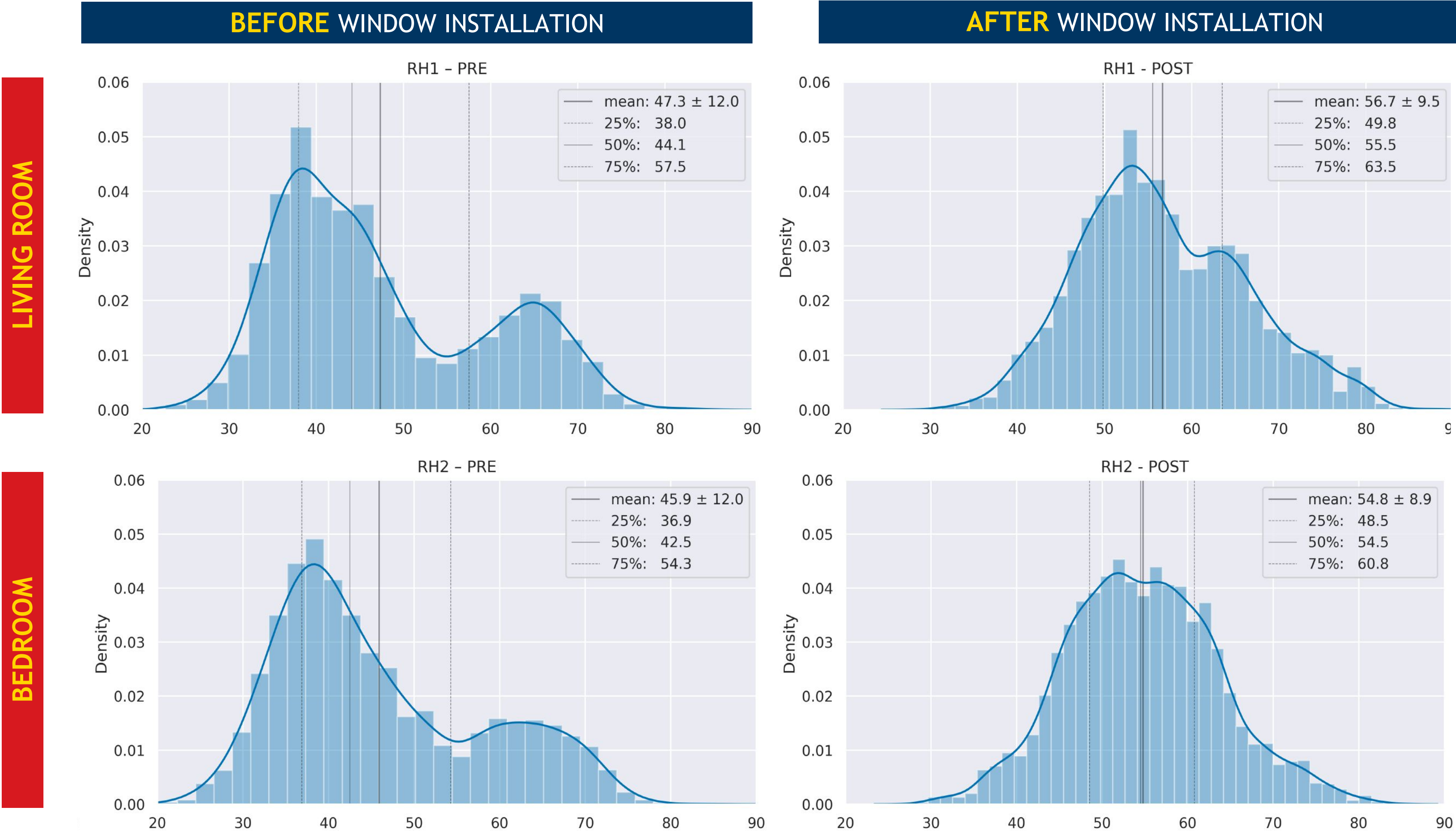
BAGNOLO IN PIANO

INDOOR RELATIVE HUMIDITY :: LIVING ROOM



BAGNOLO IN PIANO

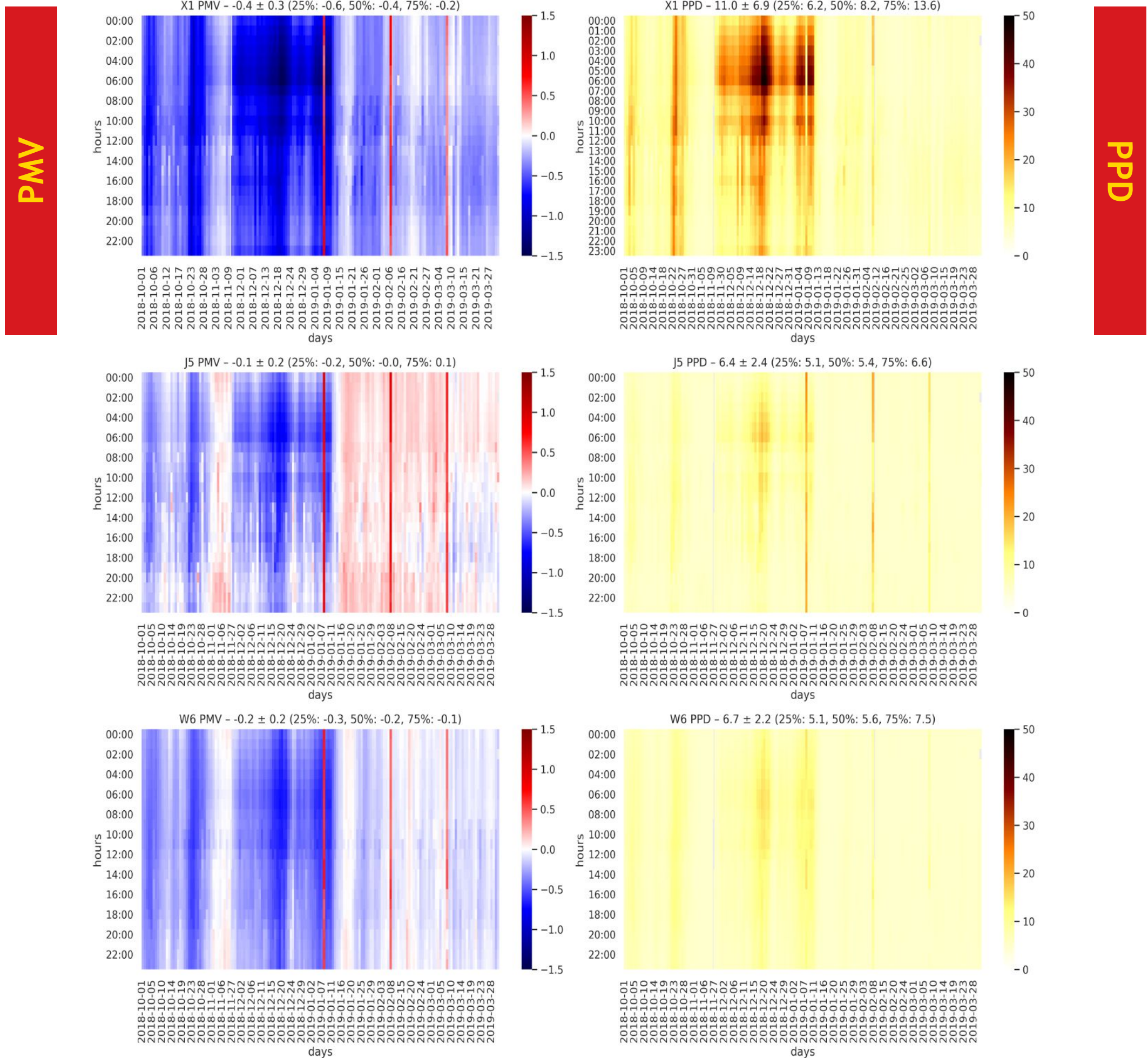
INDOOR RELATIVE HUMIDITY :: LIVING ROOM AND BEDROOM - DISTRIBUTION



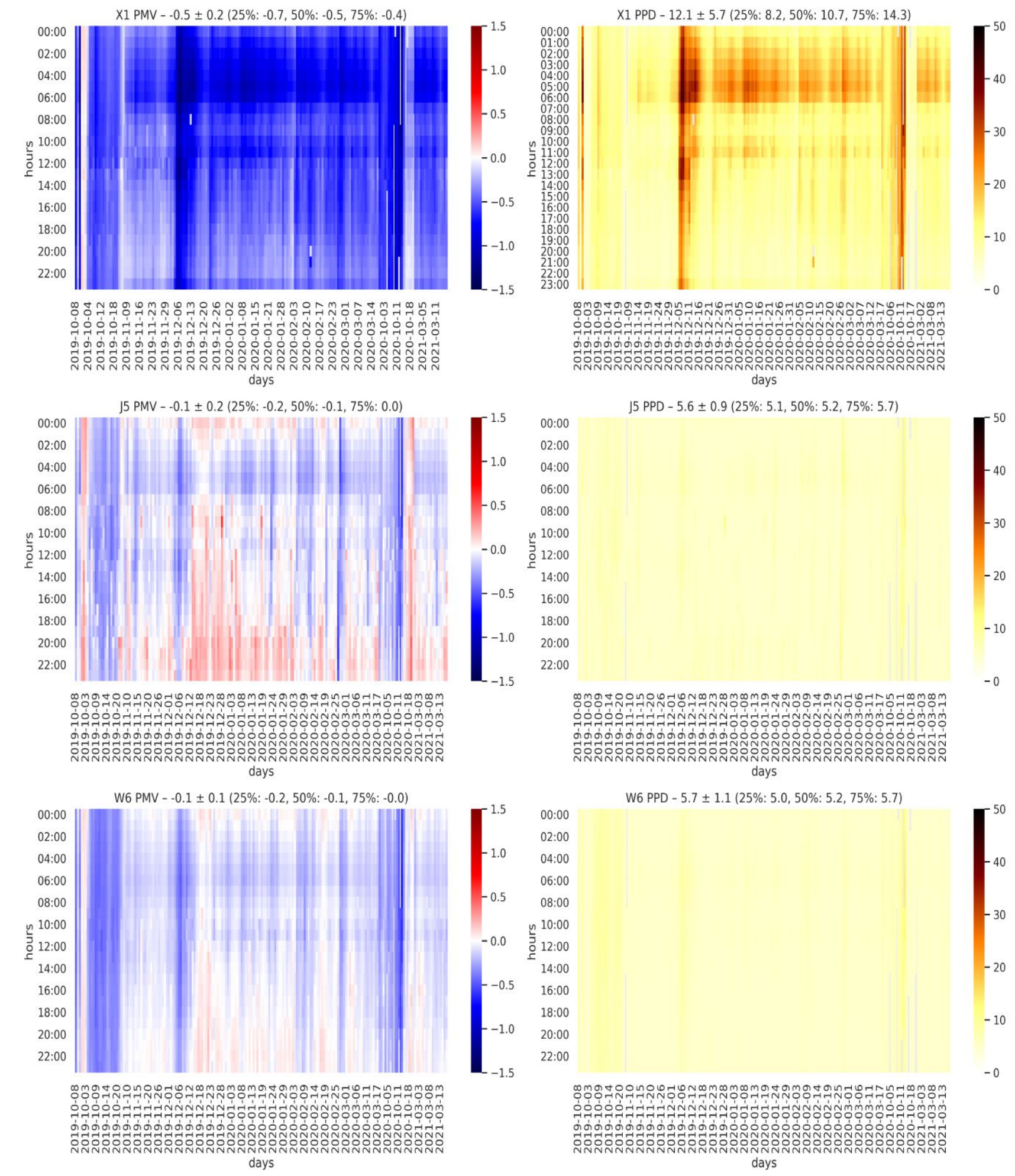
BAGNOLO IN PIANO

PMV & PPD :: HEATING PERIOD [I]

BEFORE WINDOW INSTALLATION



AFTER WINDOW INSTALLATION

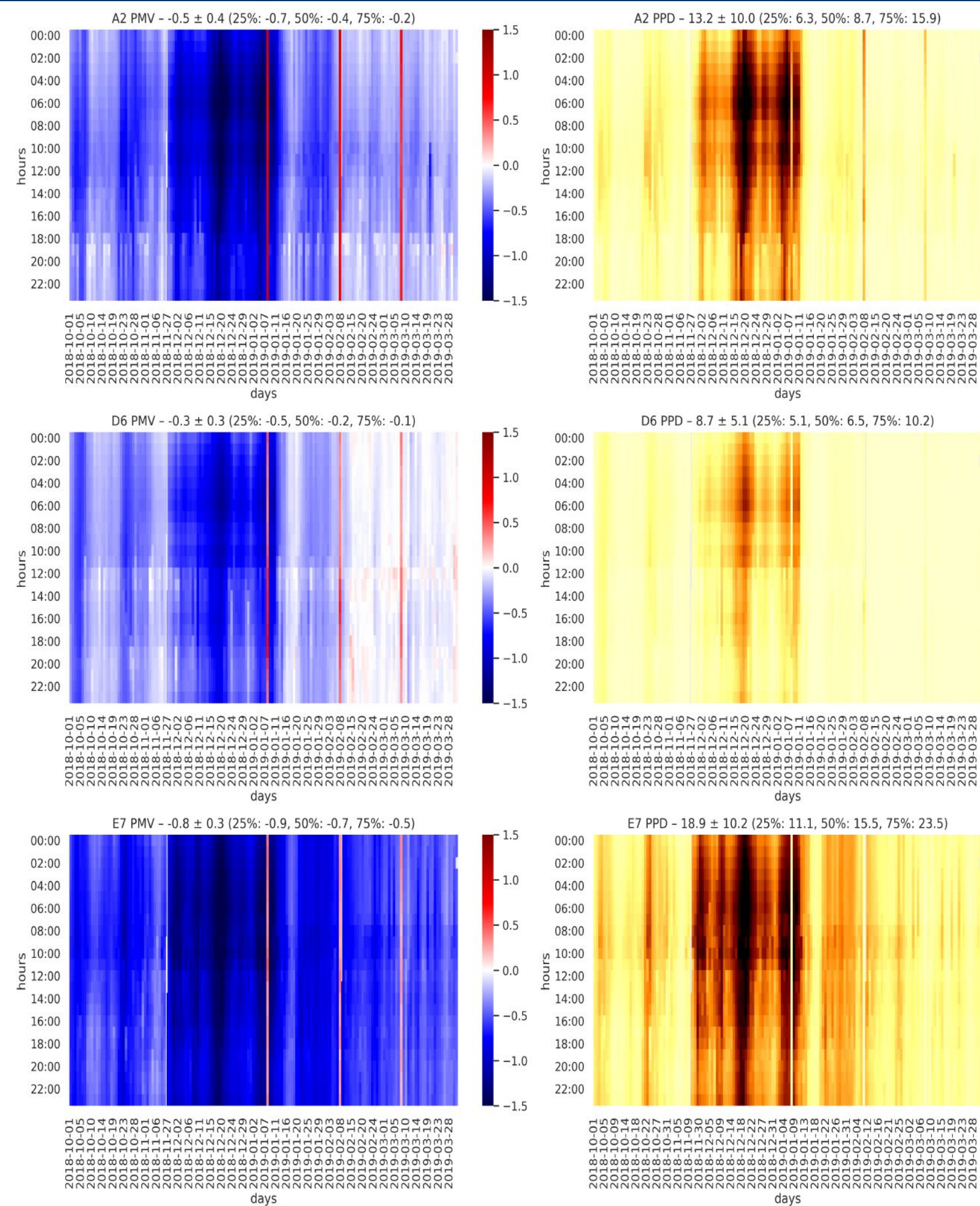


BAGNOLO IN PIANO

PMV & PPD :: HEATING PERIOD [II]

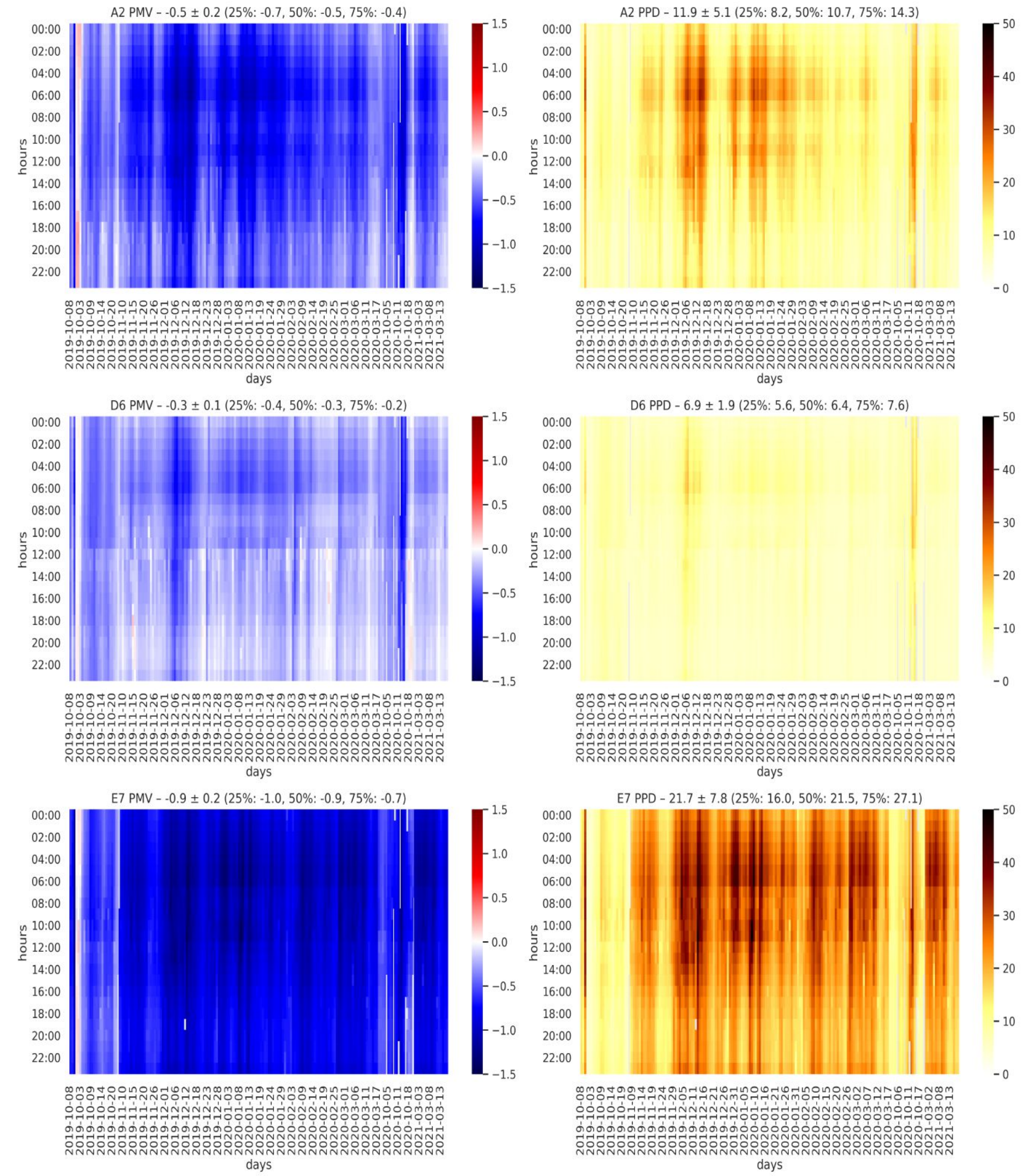
BEFORE WINDOW INSTALLATION

PMV

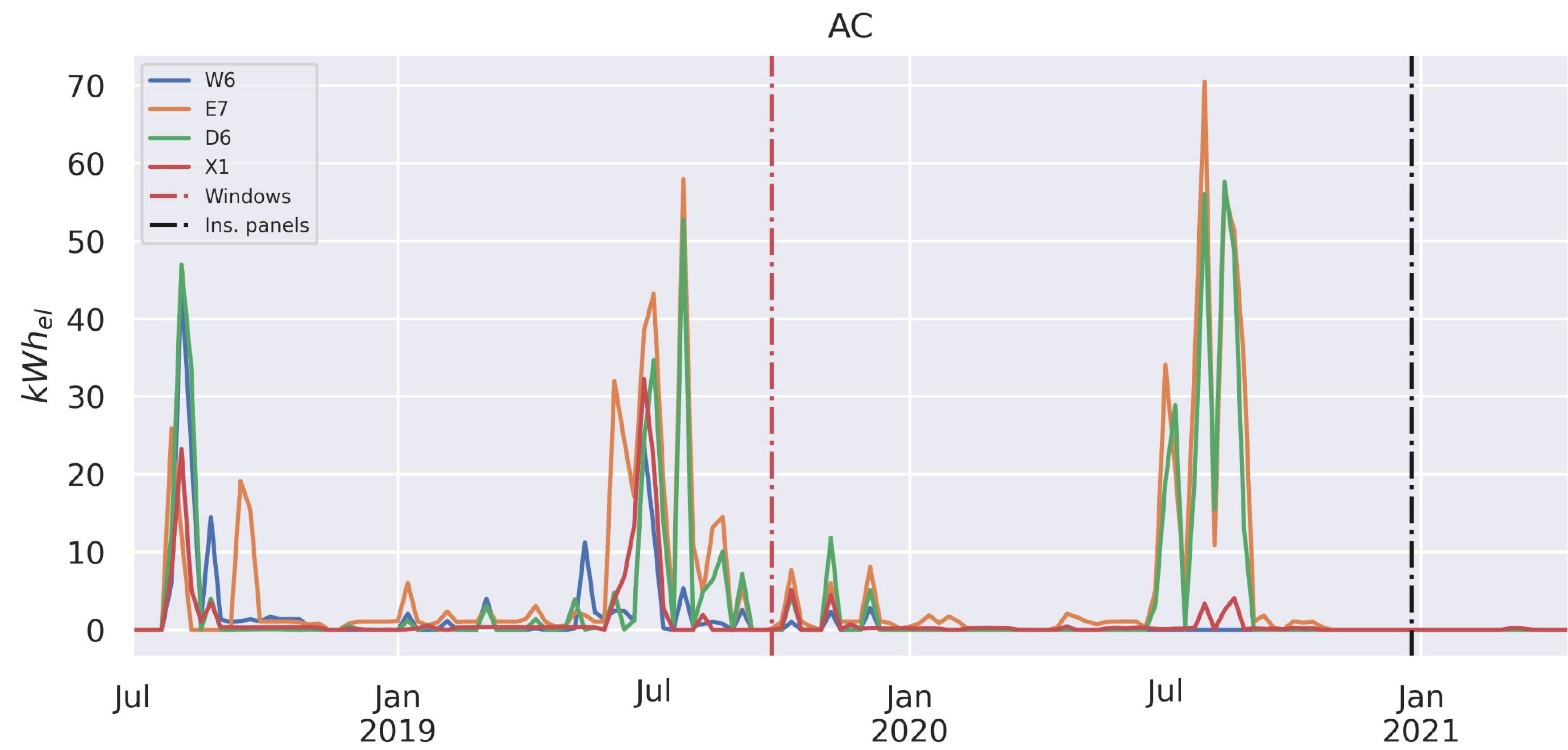


PPD

AFTER WINDOW INSTALLATION

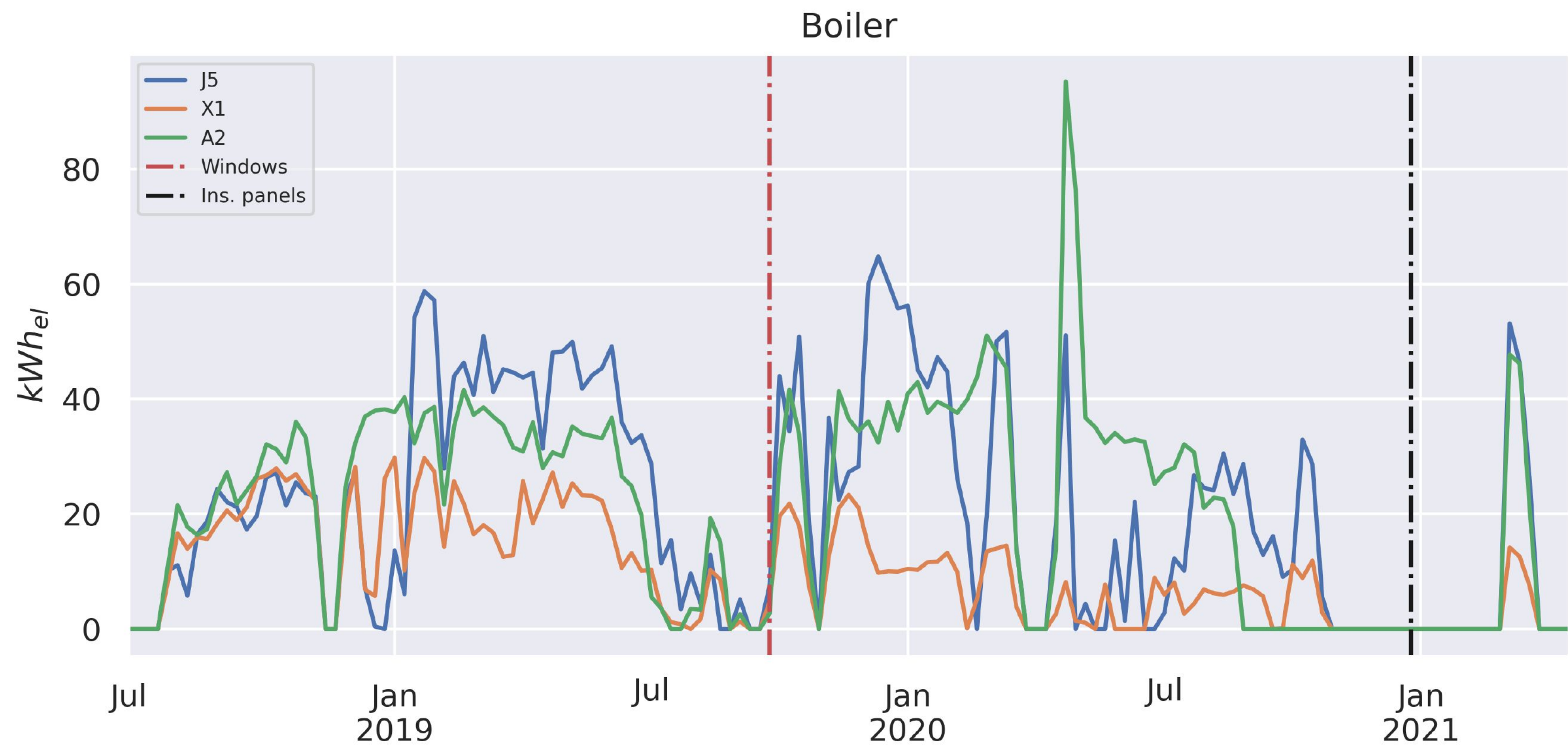


BAGNOLO IN PIANO ENERGY CONSUMPTION :: AIR CONDITIONING



BAGNOLO IN PIANO

ENERGY CONSUMPTION :: BOILER



ASSESSMENT ON MONITORED DATA **CONCLUSIONS**

Lyon (France)

- Only analysis of available data
- More data necessary to **evaluate** the impact of **refurbishment** activities

Bagnolo in Piano (Italy)

- Indoor conditions **improved** after the installation of **windows**
- More data necessary to **evaluate** the impact of **insulation panels**



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Thank you.

Aaron Estrada
aaron.estrada@eurac.edu

Pietro Zambelli
pietro.zambelli@eurac.edu



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