## General Logics

The input epw is:

https://ibis.geog.ubc.ca/~achristn/research/BUBBLE/data/BUBBLE\_AT\_IOP.txt

The output air temperature is: <https://ibis.geog.ubc.ca/~achristn/research/BUBBLE/data/BUBBLE_BSPR_AT_PROFILE_IOP.txt>

UWG and VCWG may not receive preferential consideration in the building performance validation. They'll assume the building model is fine as long as the expected canyon temperature matches.

Based on the summarized thermal properties in UWG (Bueno et al., 2013) paper, (Bueno et al., 2013) and (Moradi et al., 2021, 2022) declaimed that building characteristic in the BUBBLE campaign (Rotach et al., 2005) should be modified based on the post-80s’ mid-rise apartments reference building model (*Commercial Reference Buildings*, n.d.).

## Building performance related validation

### Inclusion of a Drag Approach

Wind, air temperature, momentum exchange, turbulent exchange of heat, surface energy balance

### BEM-TEB

Table

Description automatically generated with medium confidence

## Thermal Properties Comparison

A picture containing text

Description automatically generated

## Replicated and Refining Validation

Maximum Daily UHI effect: 5.2 K

UWG Monthly MBE: -0.6, RMSE: 0.9

Bias Mean(K), RMSE(K), R2(-)

VCWGv2.0.0 MBE: -0.53, RMSE: 0.56, R2: 0.98

('VCWG(v200)-Real Temperature error', -0.26, 0.69, 0.94)

('VCWG(EP-Reference)-Real Temperature error', 0.18, 0.79, 0.93)

('VCWG(EP-Refining)-Real Temperature error', 0.23, 0.67, 0.95)

Chart

Description automatically generated

## References

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