Investigation of hysteresis in biobased insulation

Moisture sorption measurements and dynamic wall-scale experiment

BUILD
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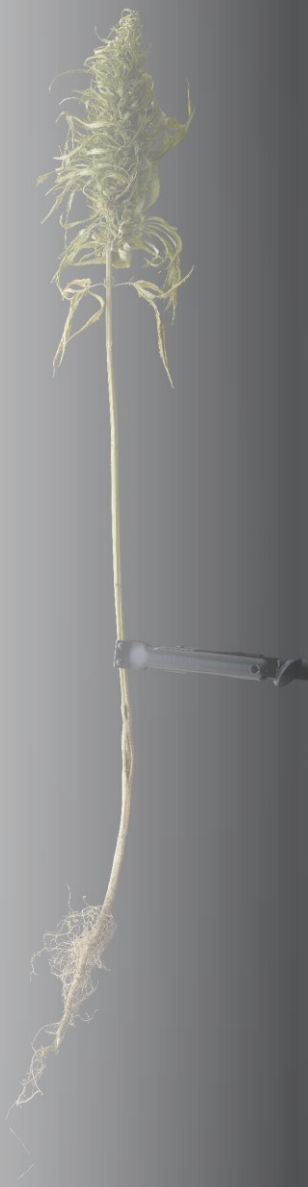
Utilise fast-growing biogenic materials

- More biomass sources and waste fractions/biproduct
- Locally sourced materials

Woodfibre Insulation

Hempfiber Insulation



Wall measurements

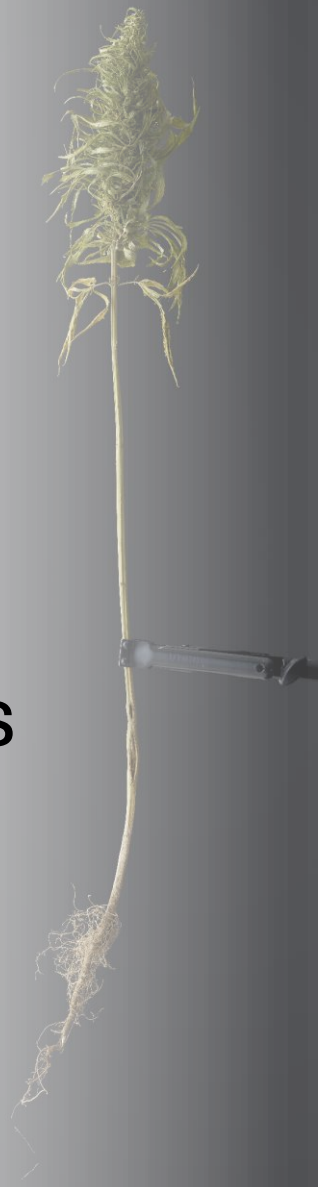
Insulation

Barriers

Material measurements

Realistic RH %

Hysteresis



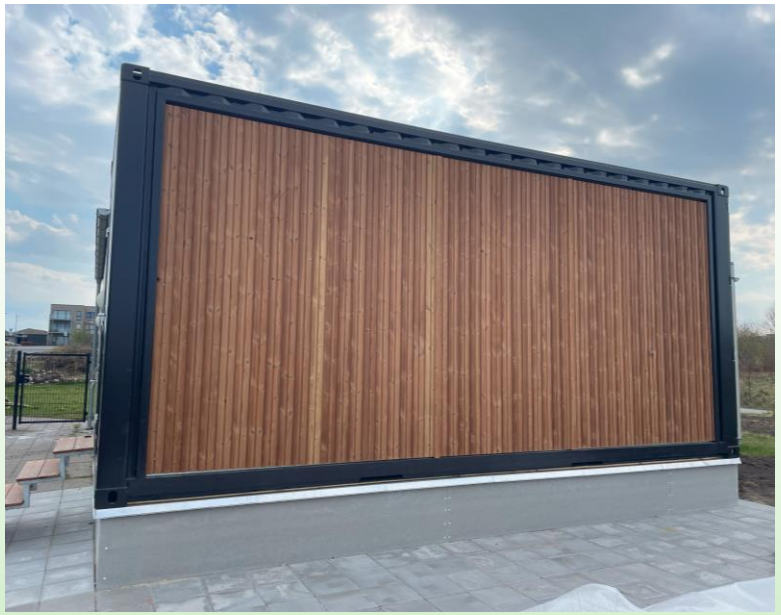
Dynamic Wall testing

Exploratory investigation of moisture performance for biobased walls

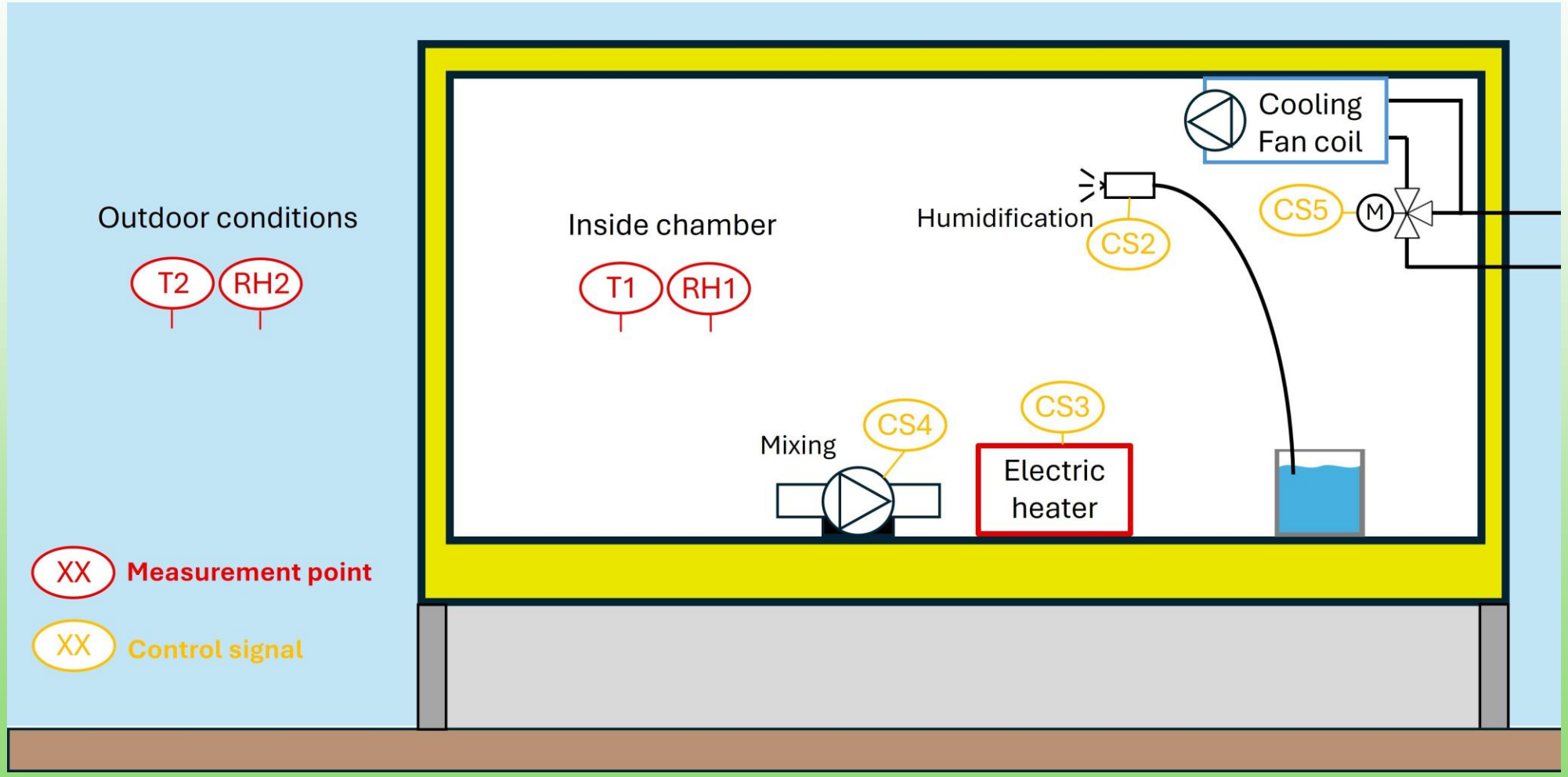
600 mm x 600 mm wall elements

7 wall variations

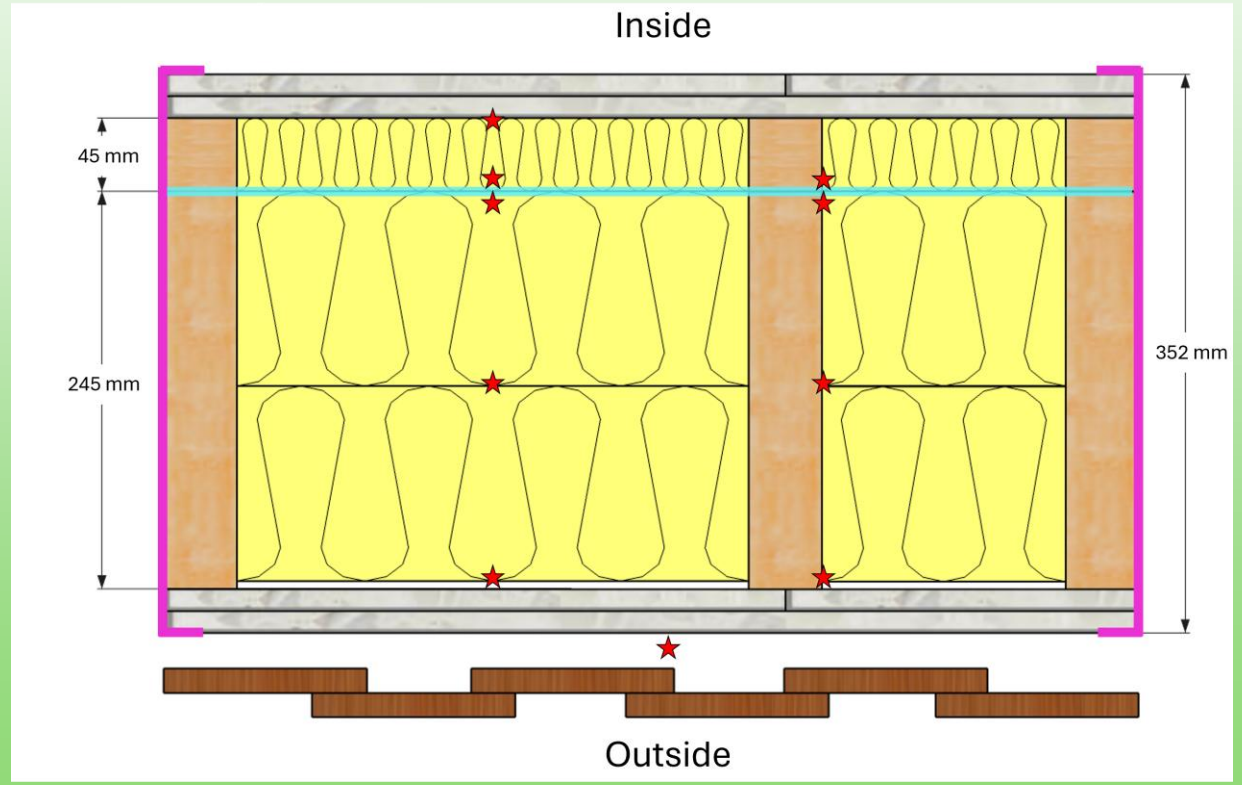
- Insulation materials
- Vapour and wind barrier

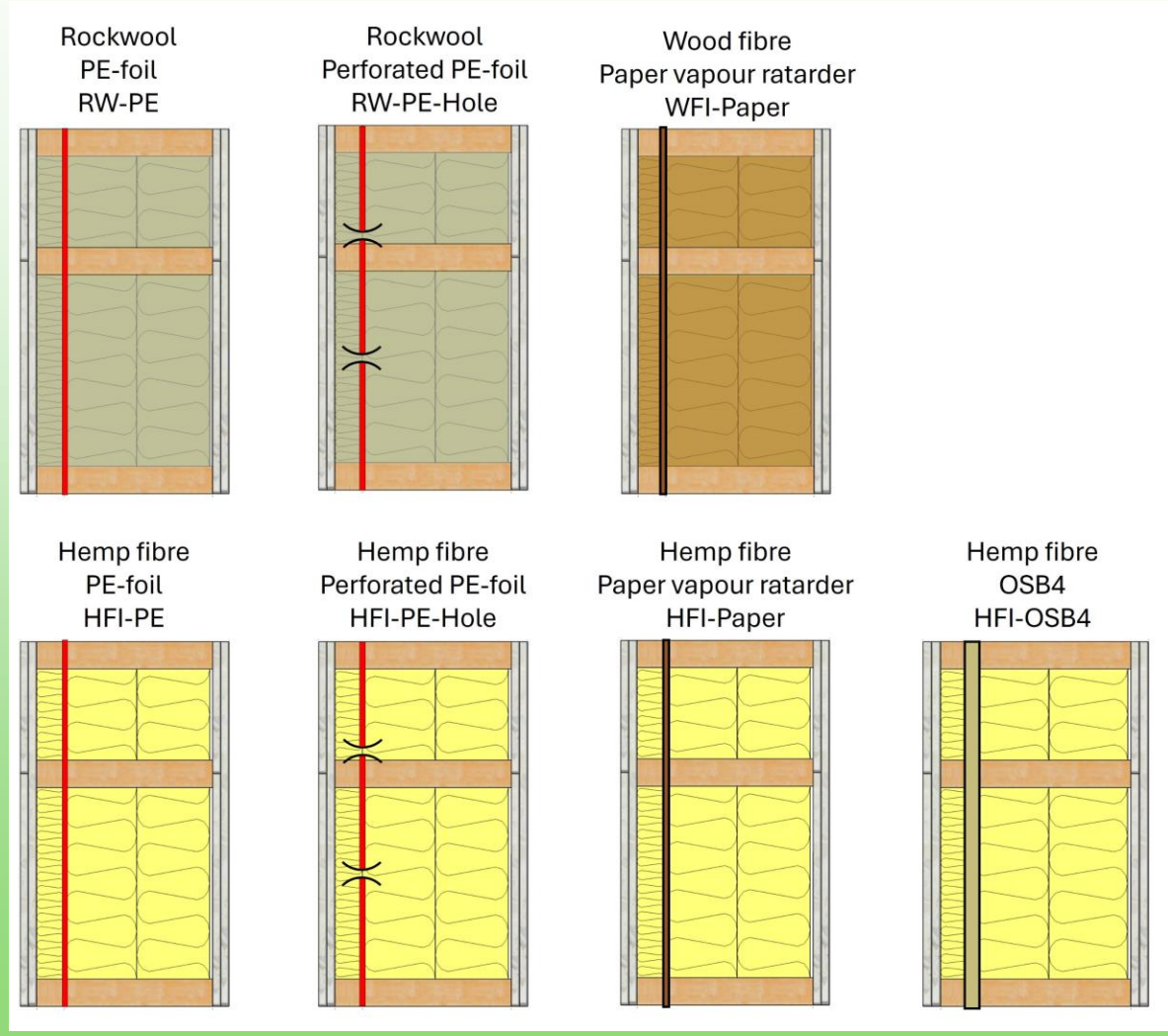


Experimental setup

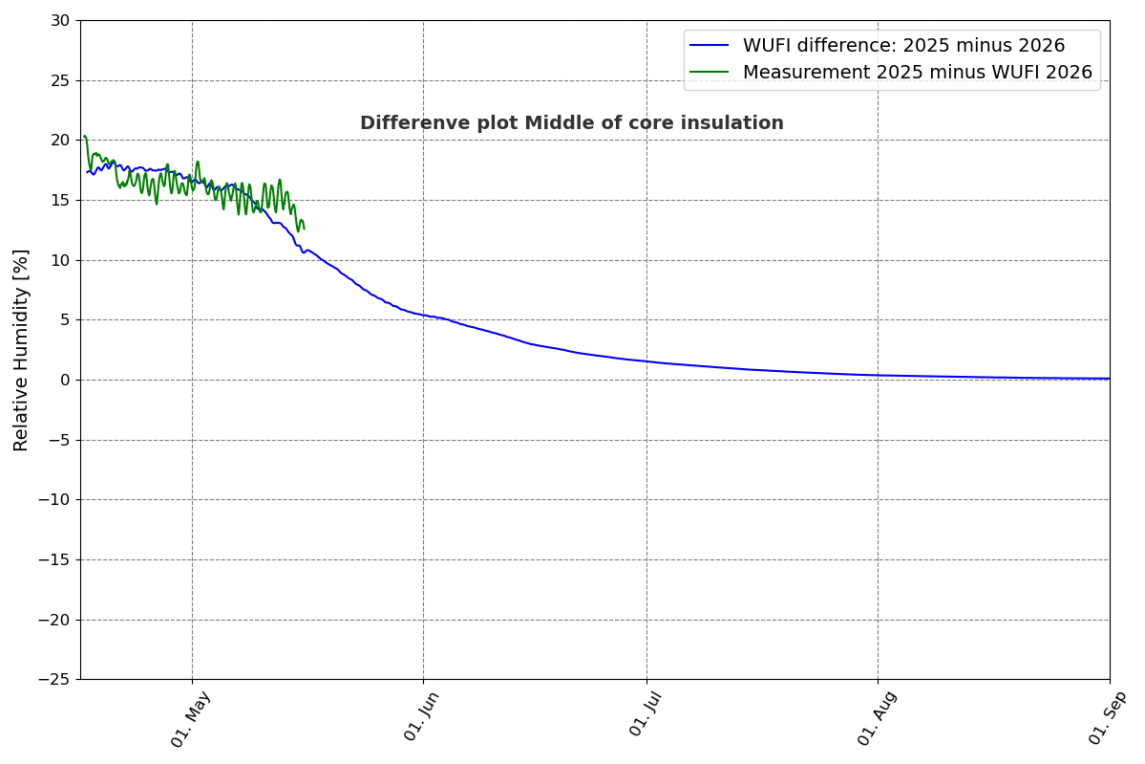


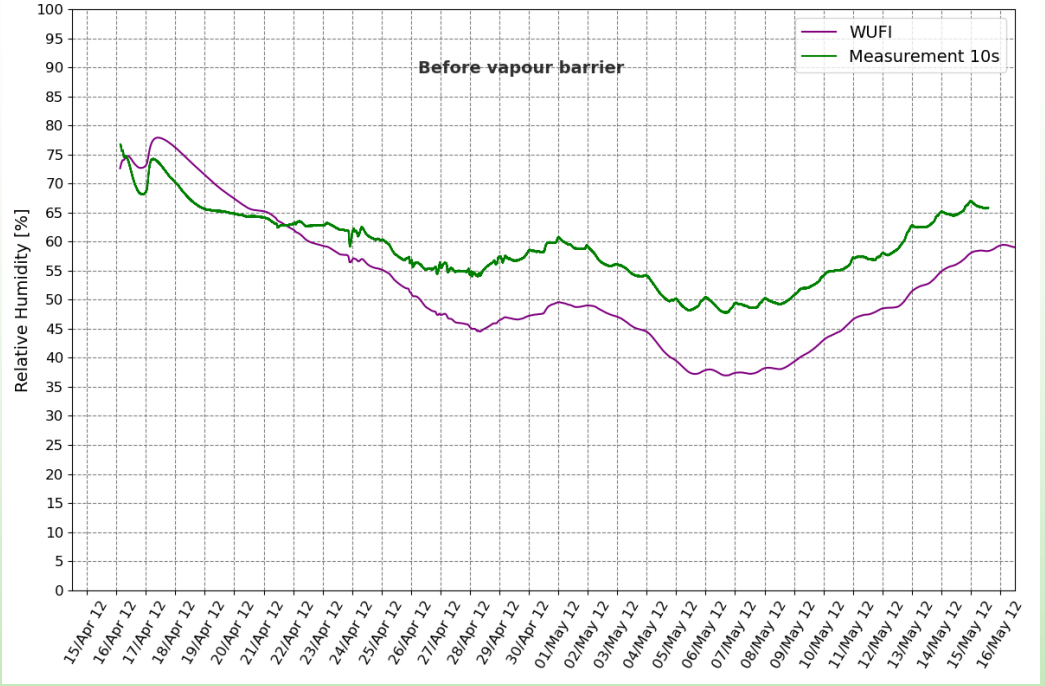
Sensors and elements

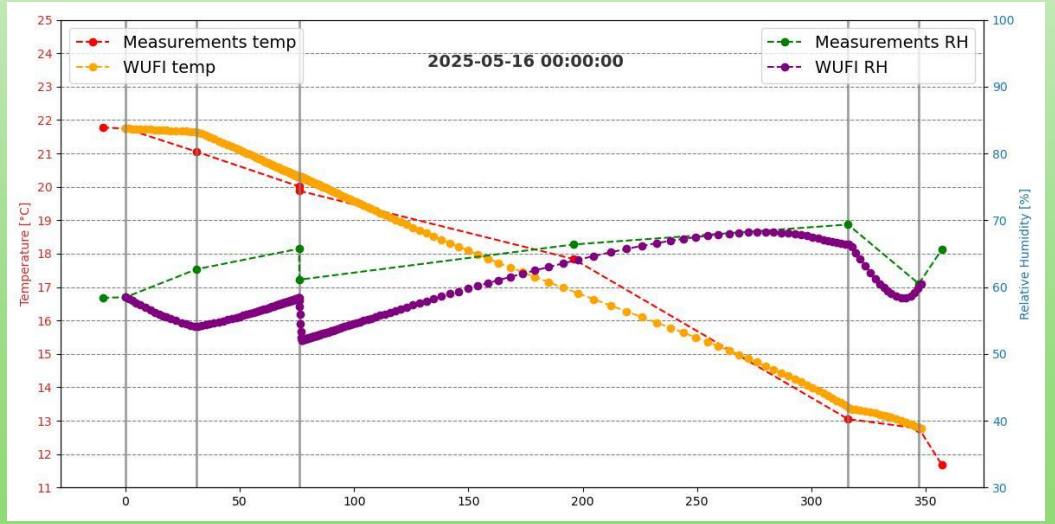




Comparison with WUFI

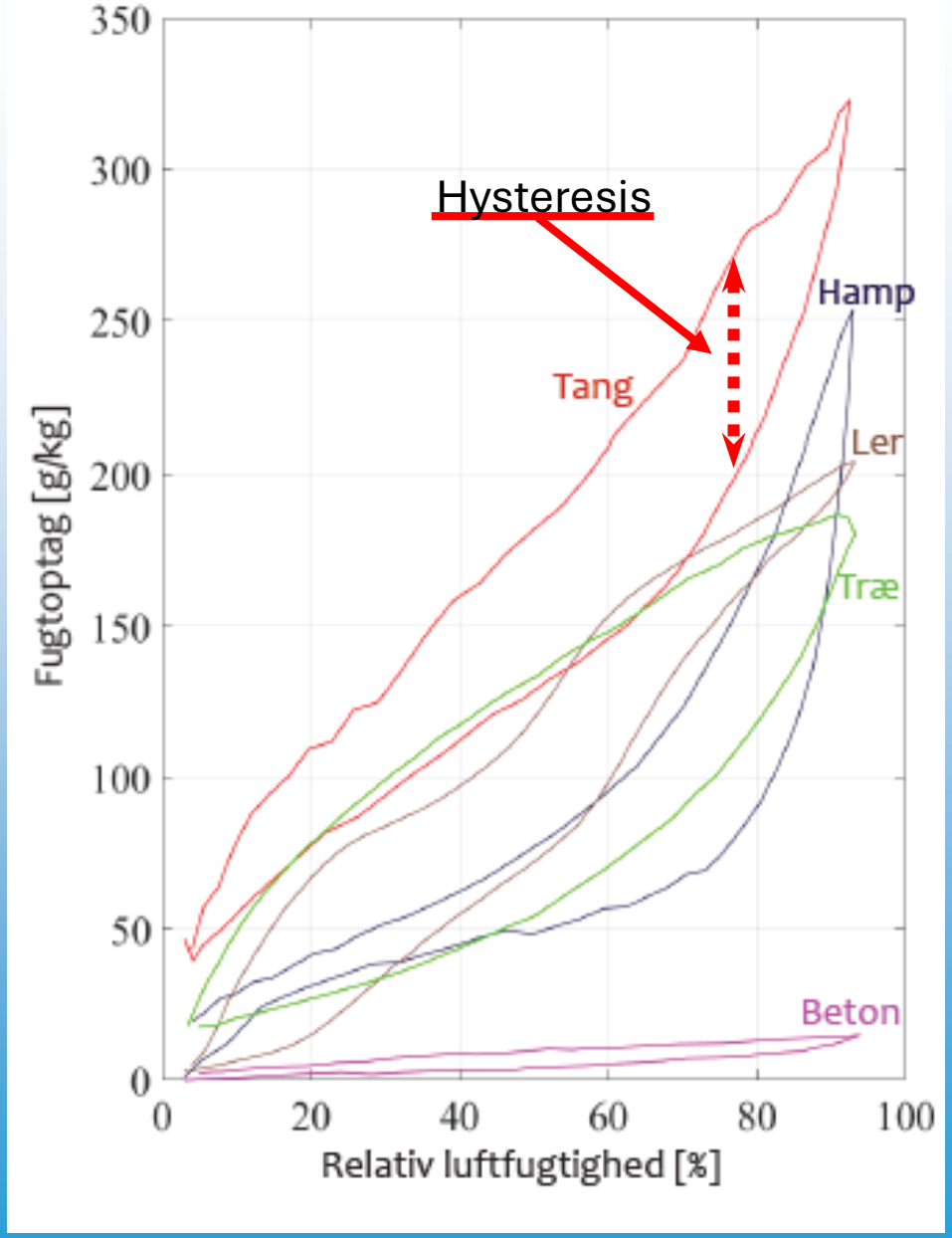






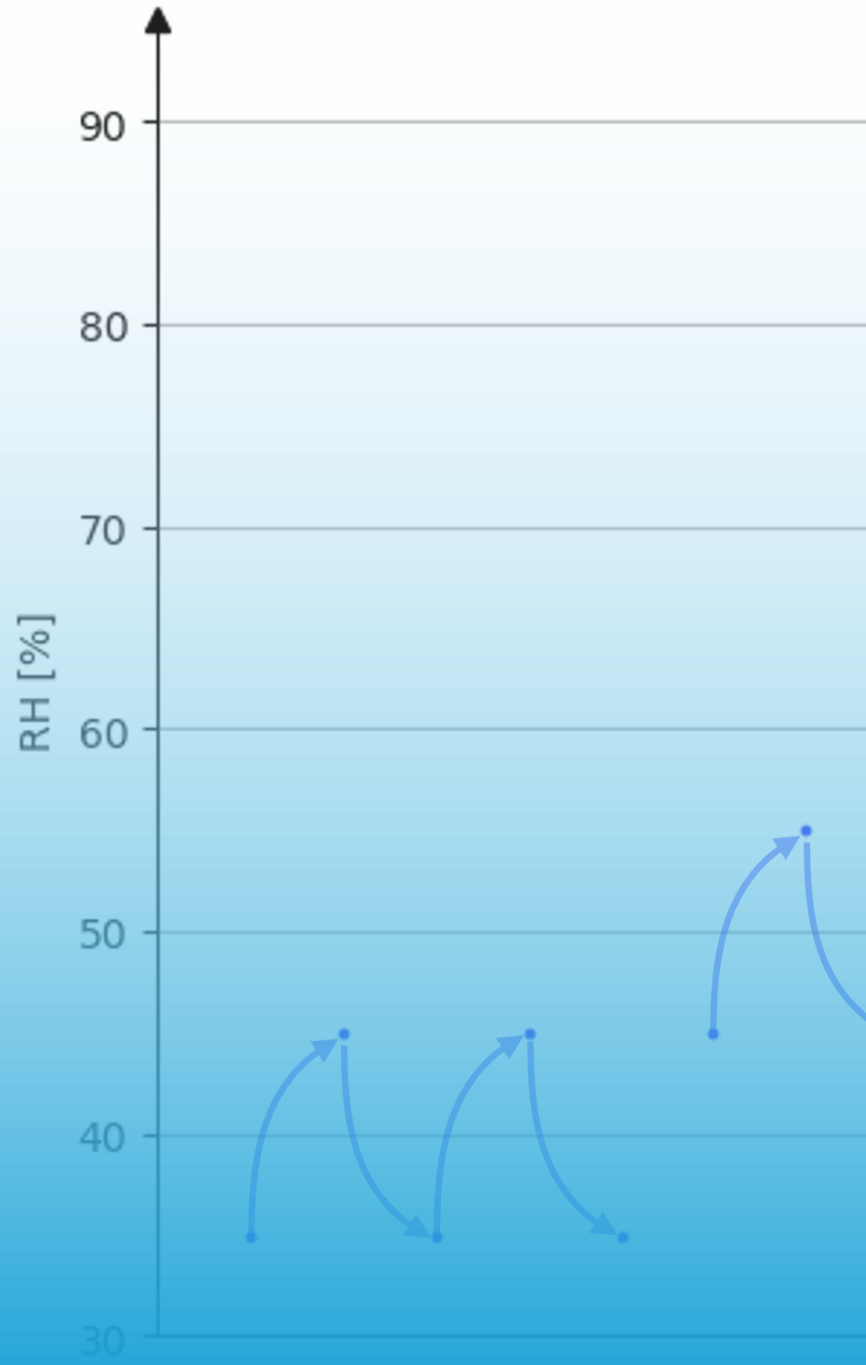
Moisture storage hygroscopic materials

- Sorption isotherms 10-90% RH
- Hysteresis
- Significance at smaller variations in RH%
- Sorption isotherm measurements

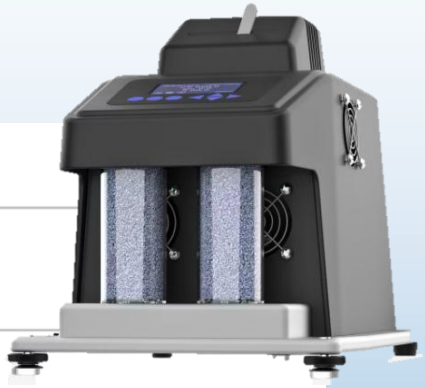


Oscillation of %RH in walls

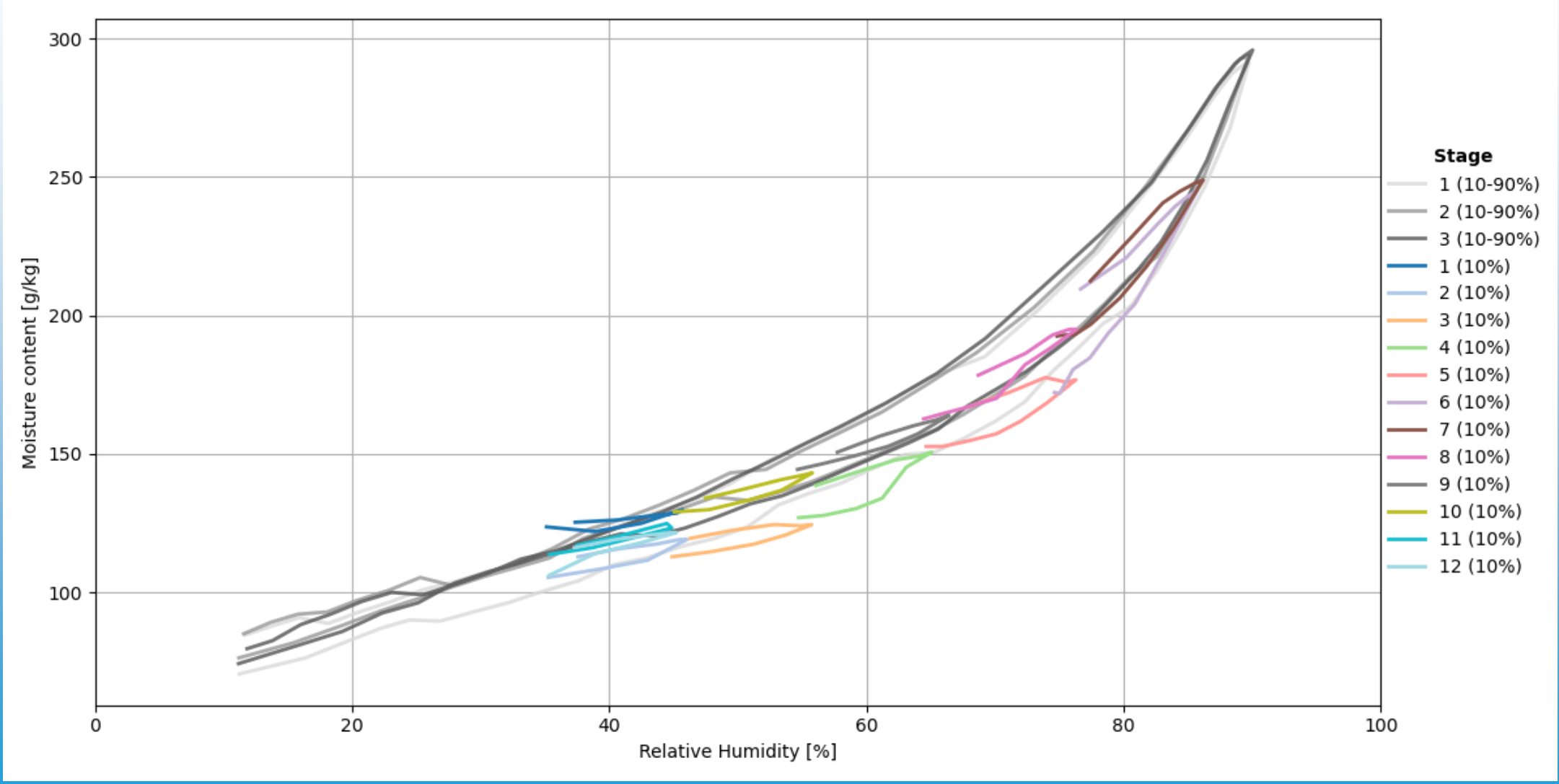
- Dependent on position in construction
- Oscillation period
  - Outside: Hourly to 1 day
  - Middle of insulation: 4 to 14 days
- Oscillation amplitude
  - 0-10 %RH
- Oscillation central value
  - 35 to 85 %RH.



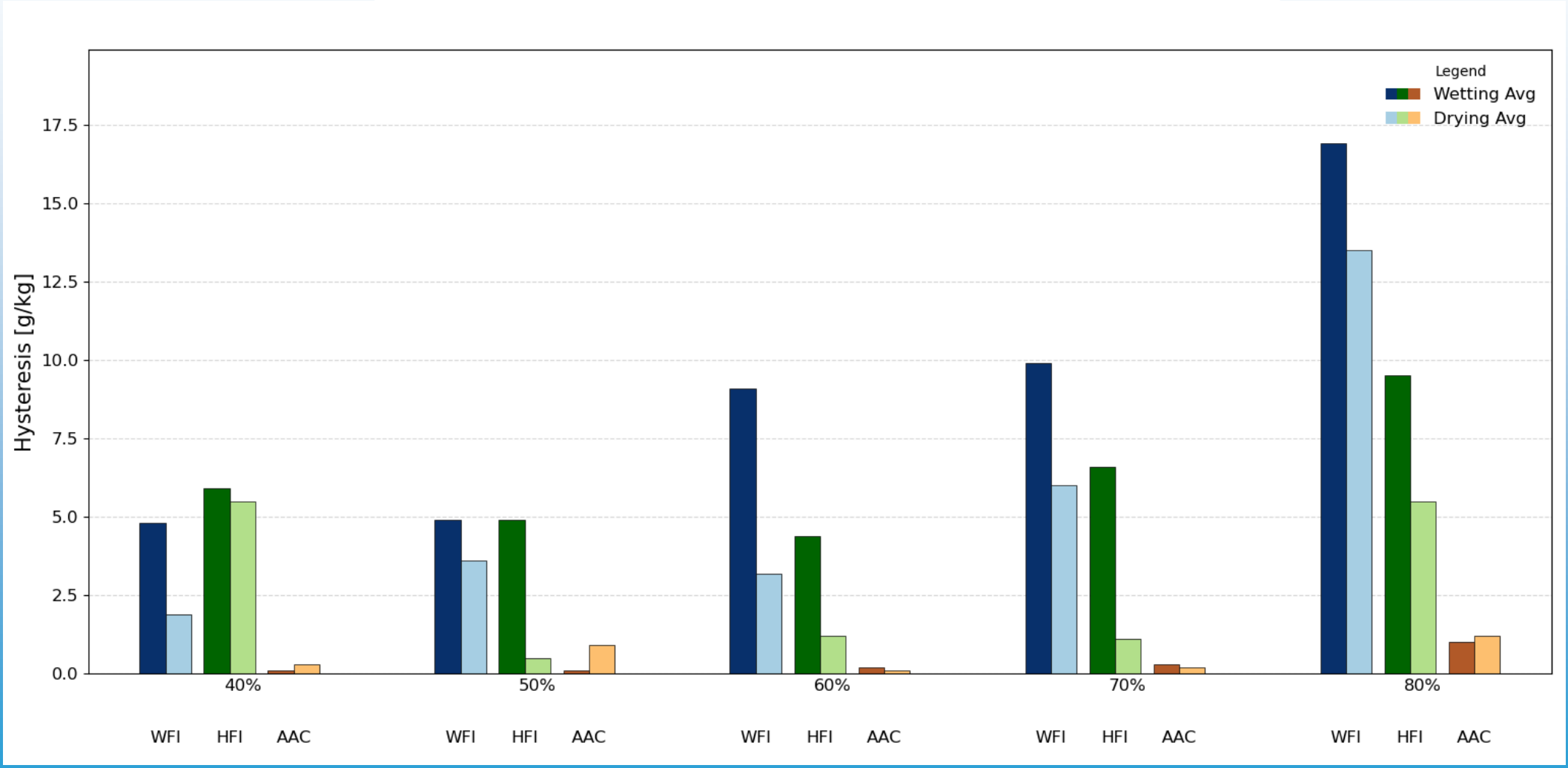
Hysteresis at smaller variations in %RH



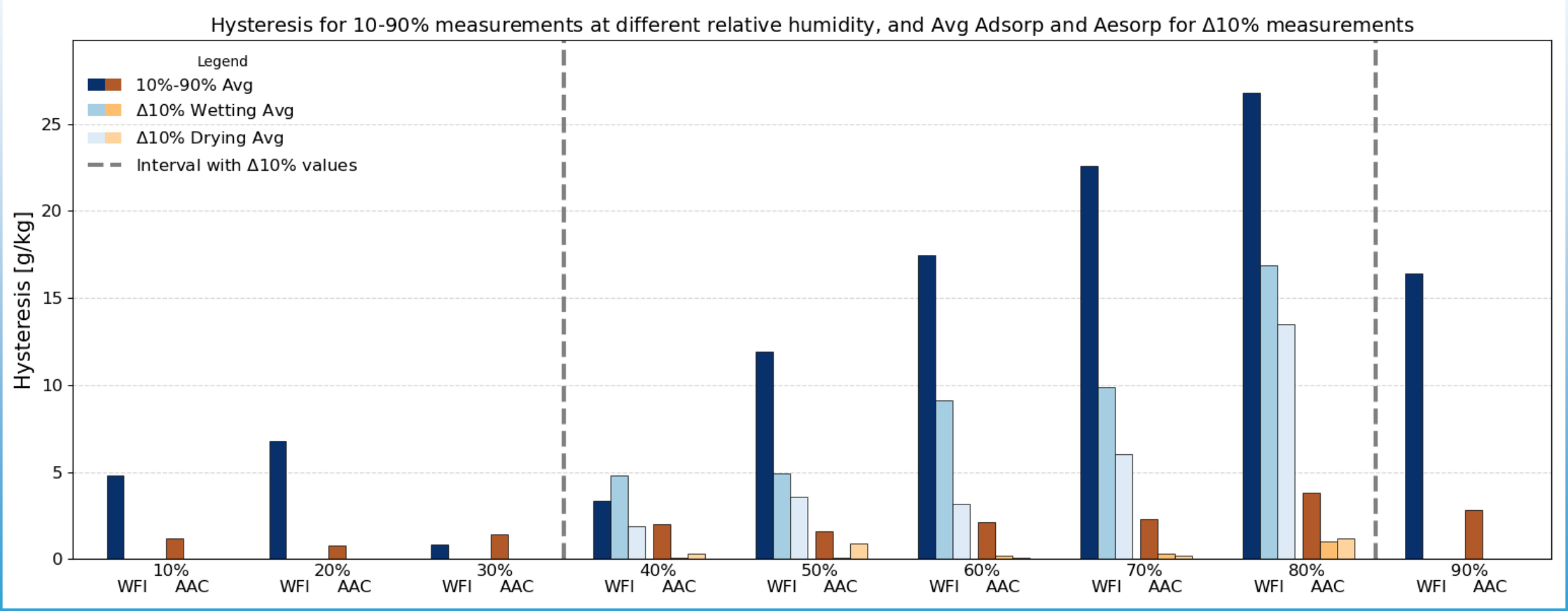
Moisture Sorption for Woodfibre Insulation



Hysteresis at smaller variations in %RH



Comparison of Hysteresis in large and small variations in %RH



Thanks for listening
Questions?

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