The influence of ventilation on moisture conditions in facades with wooden cladding

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The influence of ventilation on moisture conditions in facades with wooden cladding

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- Background
- Test design
- Measurement
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Background

- Ventilated cavity
  - Remove moisture behind the cladding in timber framed walls
- Walls with no cavity
  - Less expensive
  - Reduce the risk of a two-faced fire in the cladding

Test design

- Full-size wall elements
- Type of cladding
  - open or more “dense”
- Type of cavity
  - Ventilated cavity, non-ventilated cavity, no cavity
- Type of wind barrier

Test building

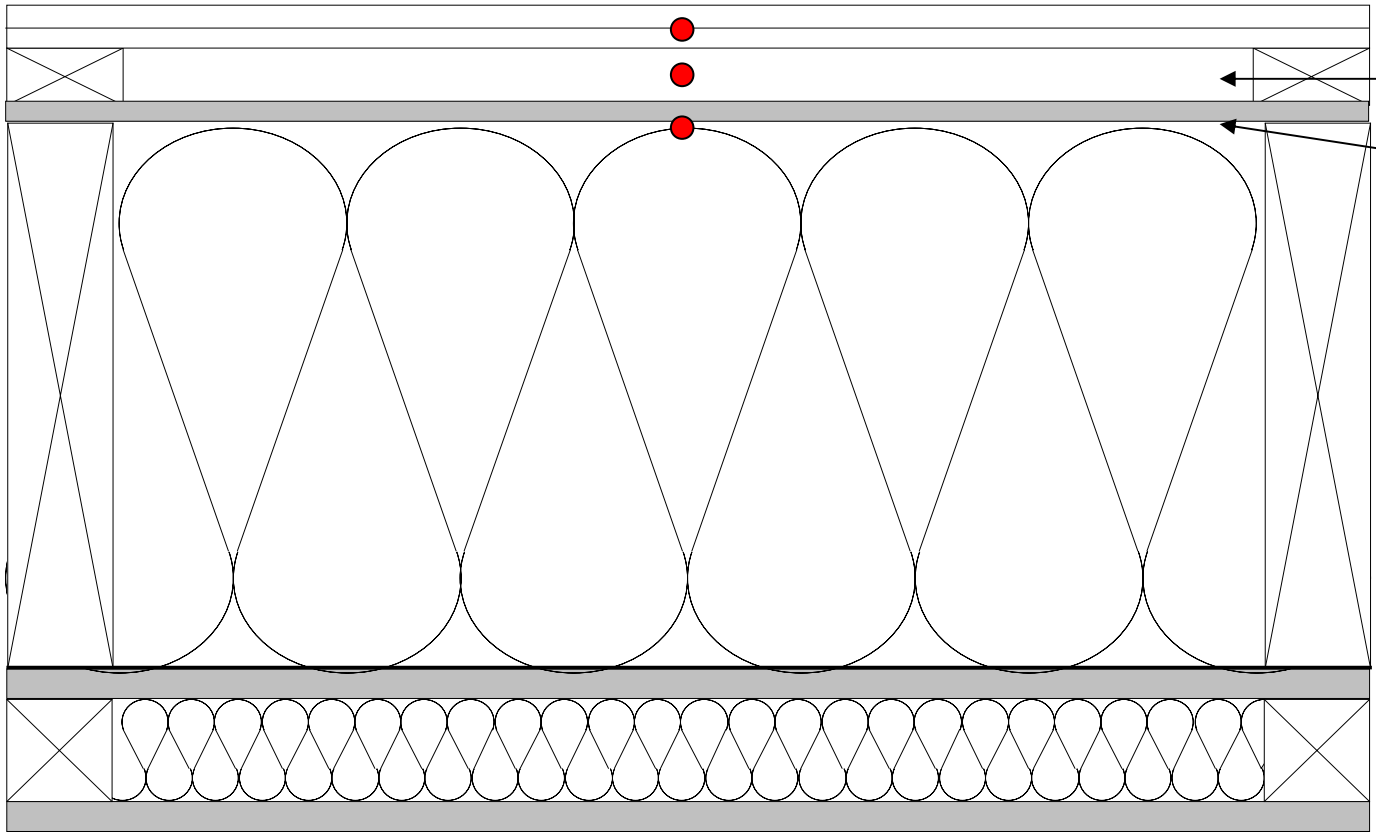
Test building

Measurements

- Full-size wall elements oriented towards north and south
- Moisture content and temperature in wall elements

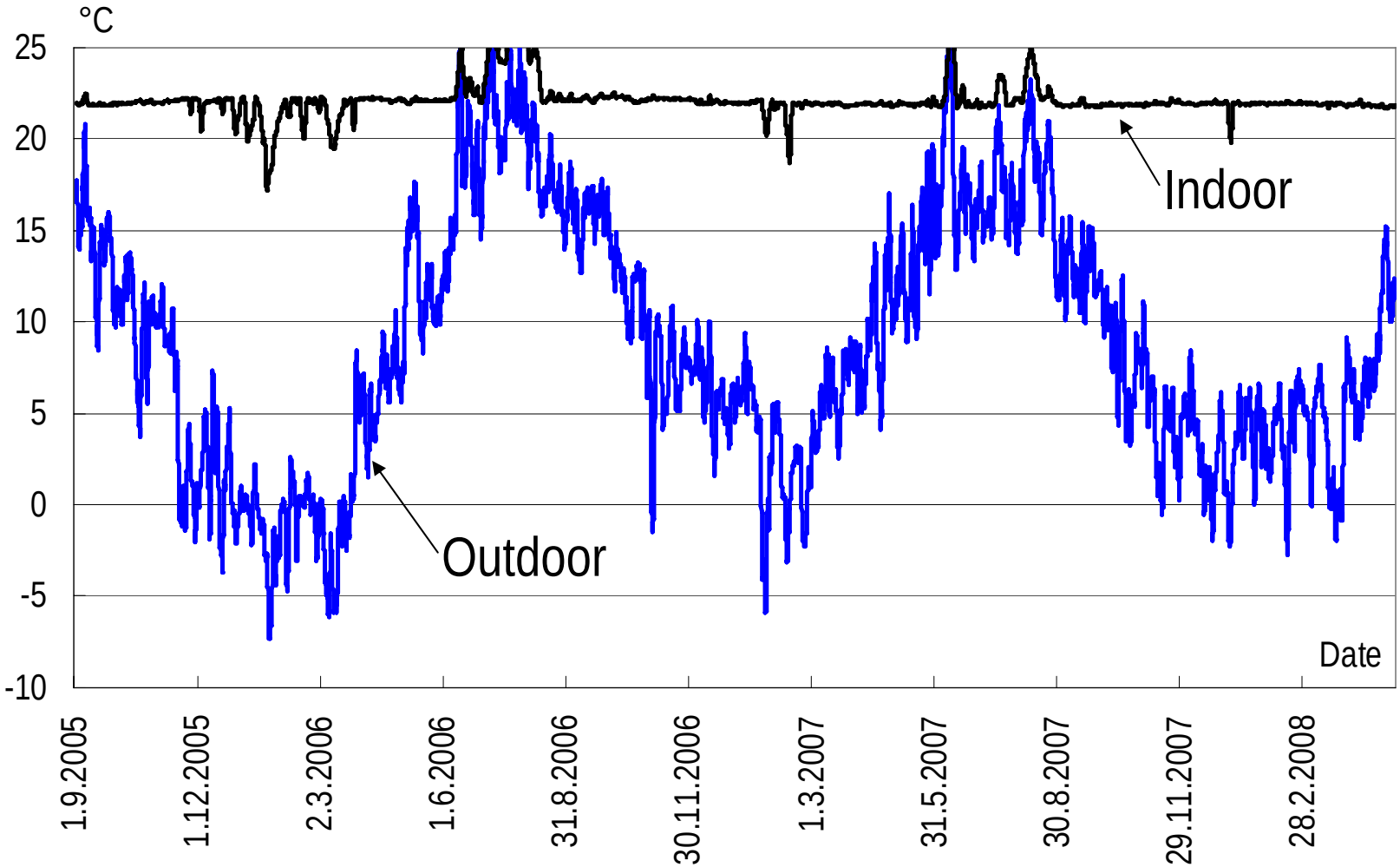
- Temperature and RH of indoor and outdoor air
- Precipitation
- Wind speed and wind direction

Test design
Full-size wall elements

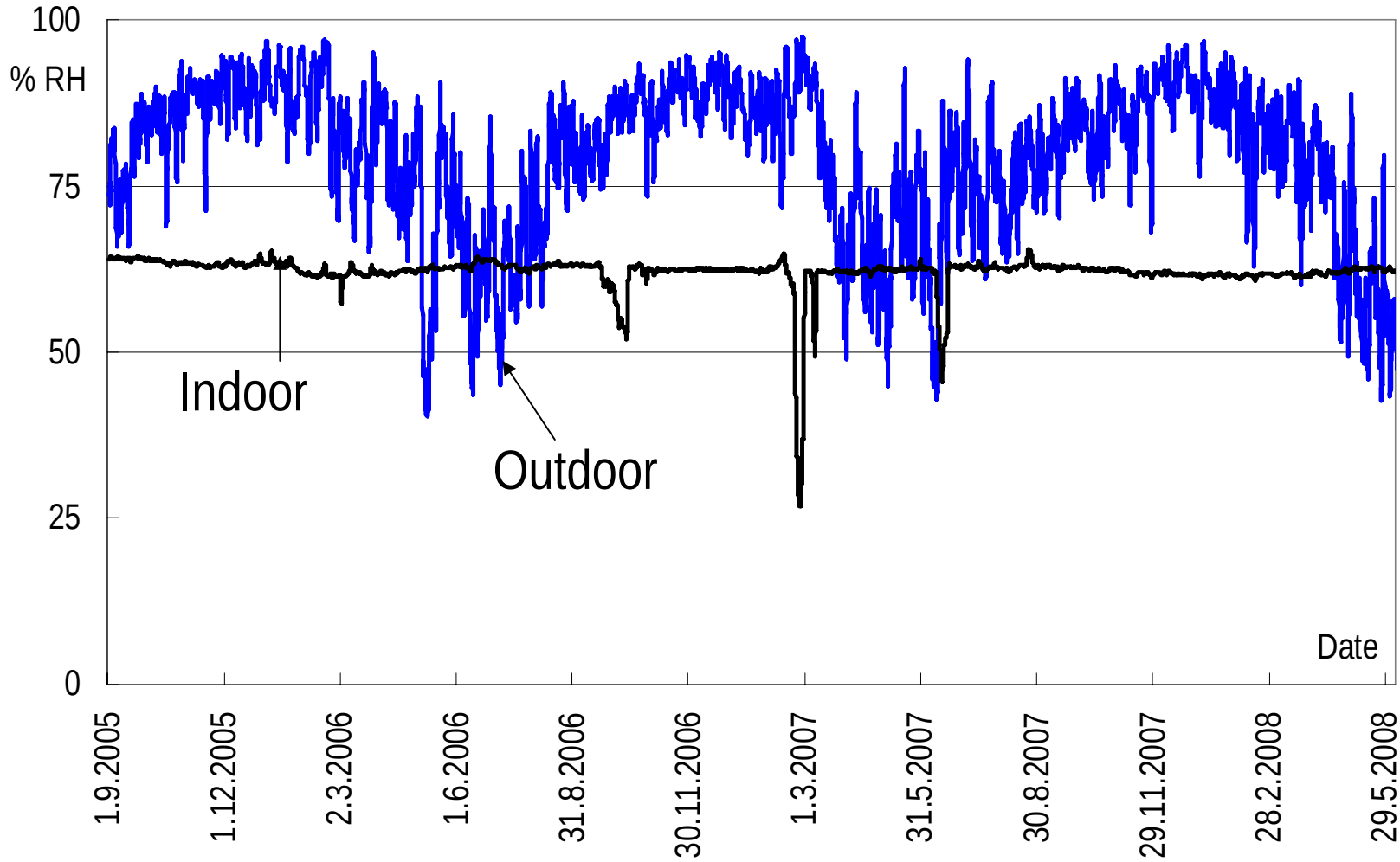


- Position of sensors

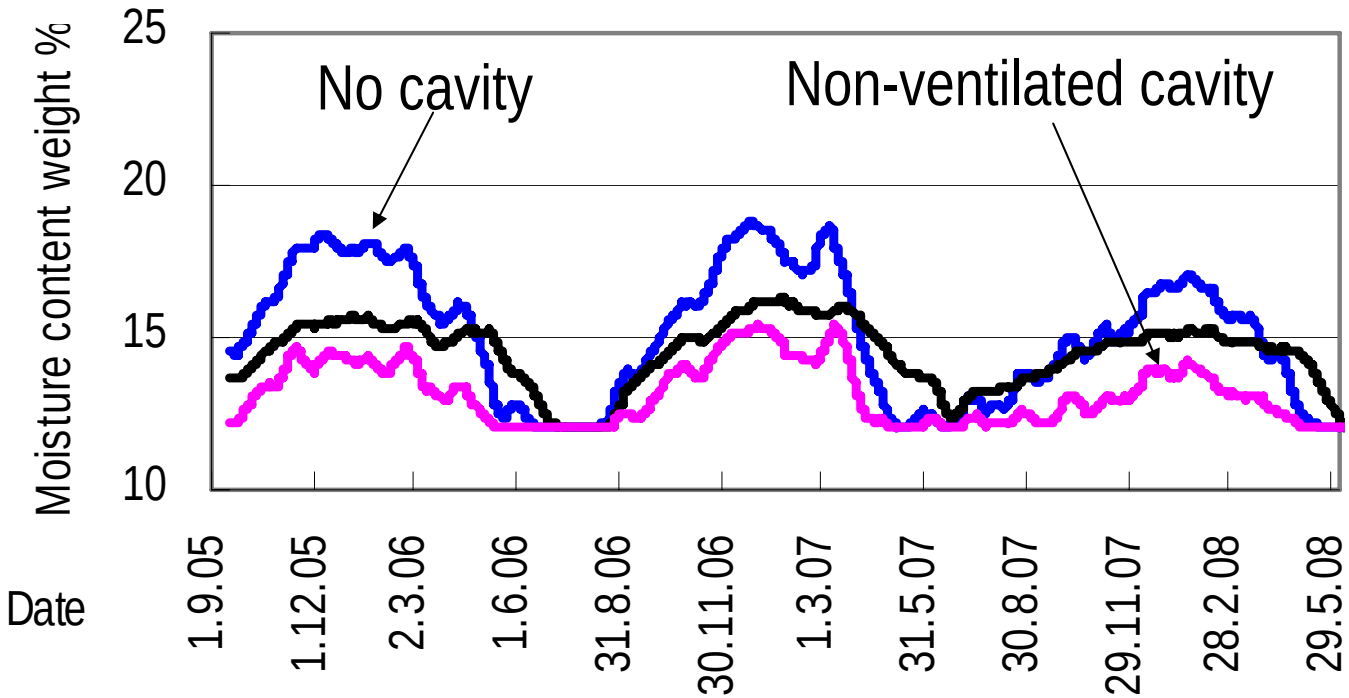
Indoor and outdoor temperature



Indoor and outdoor RH

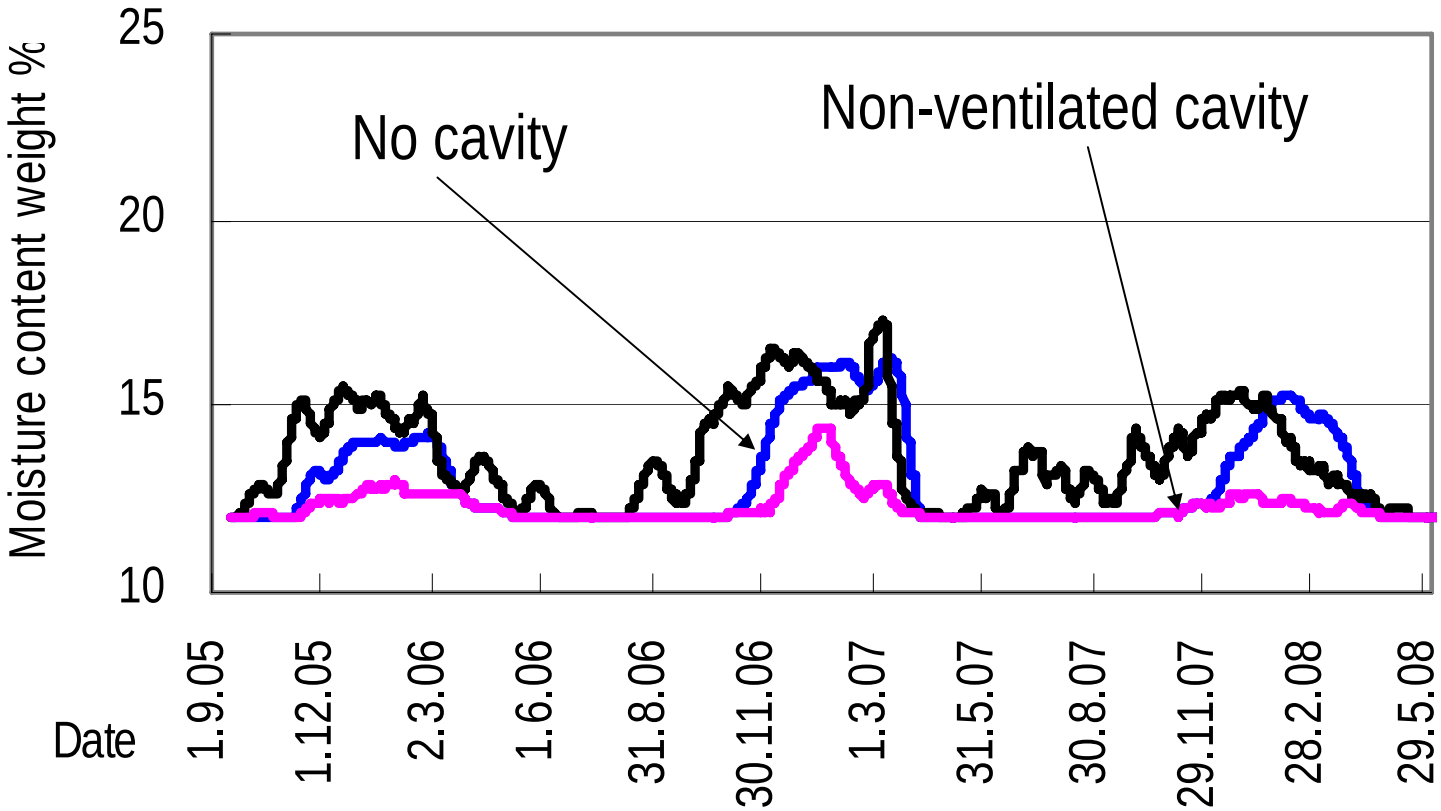


Moisture content – behind wind barrier



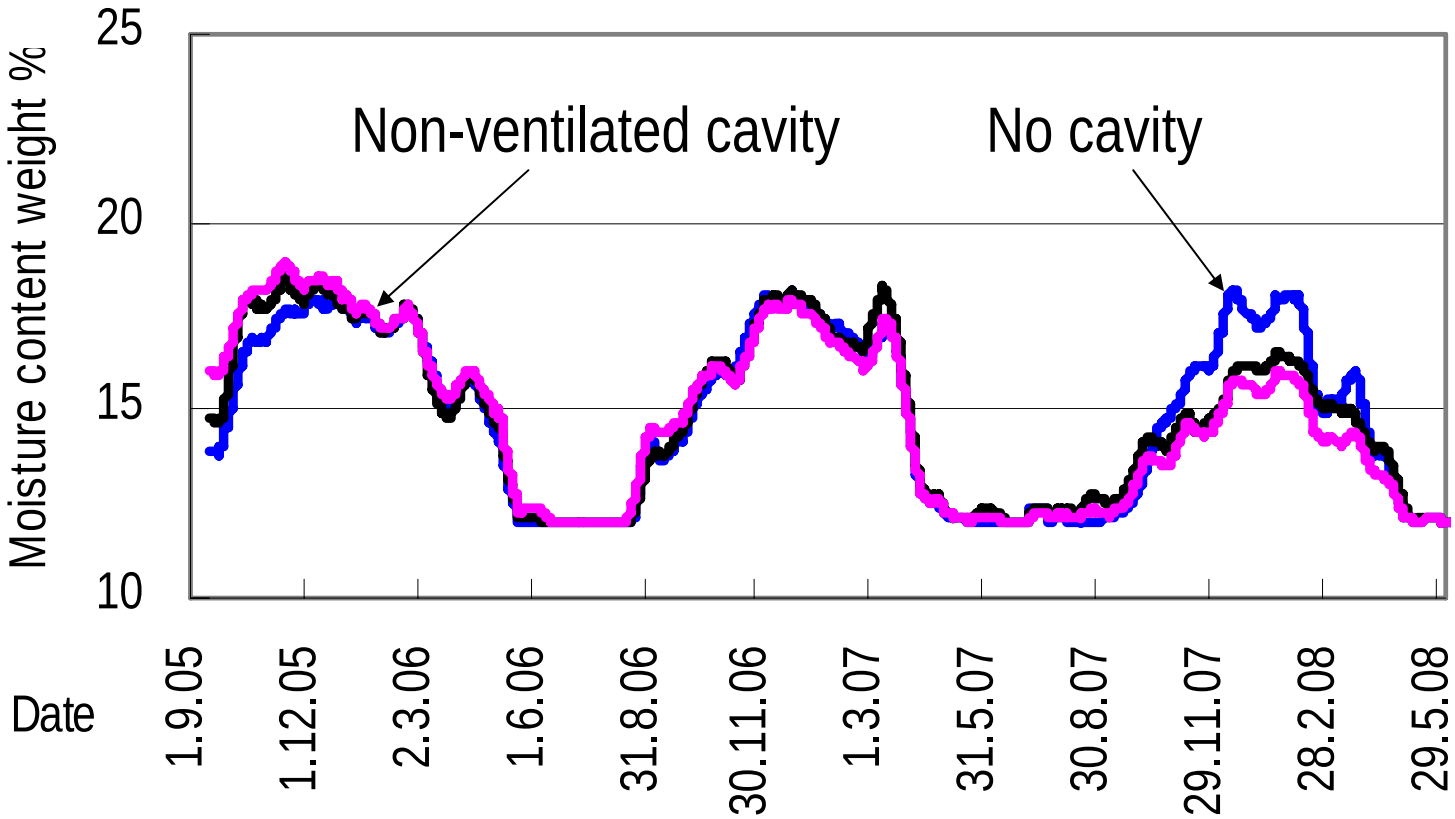
Facade elements facing north. Horisontally lapped boarding

Moisture content – behind wind barrier



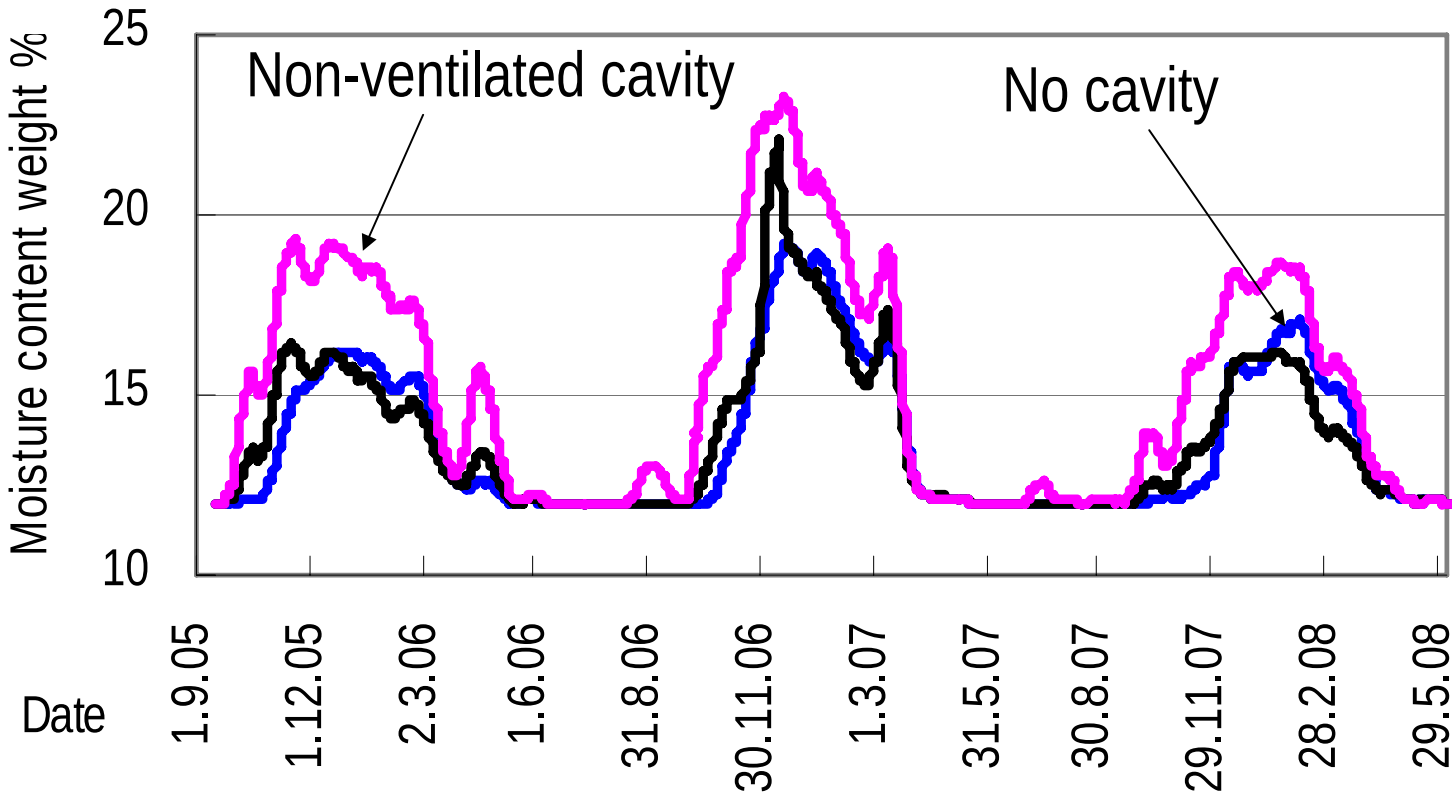
Facade elements facing south. Horisontally lapped boarding

Moisture content – in the cladding



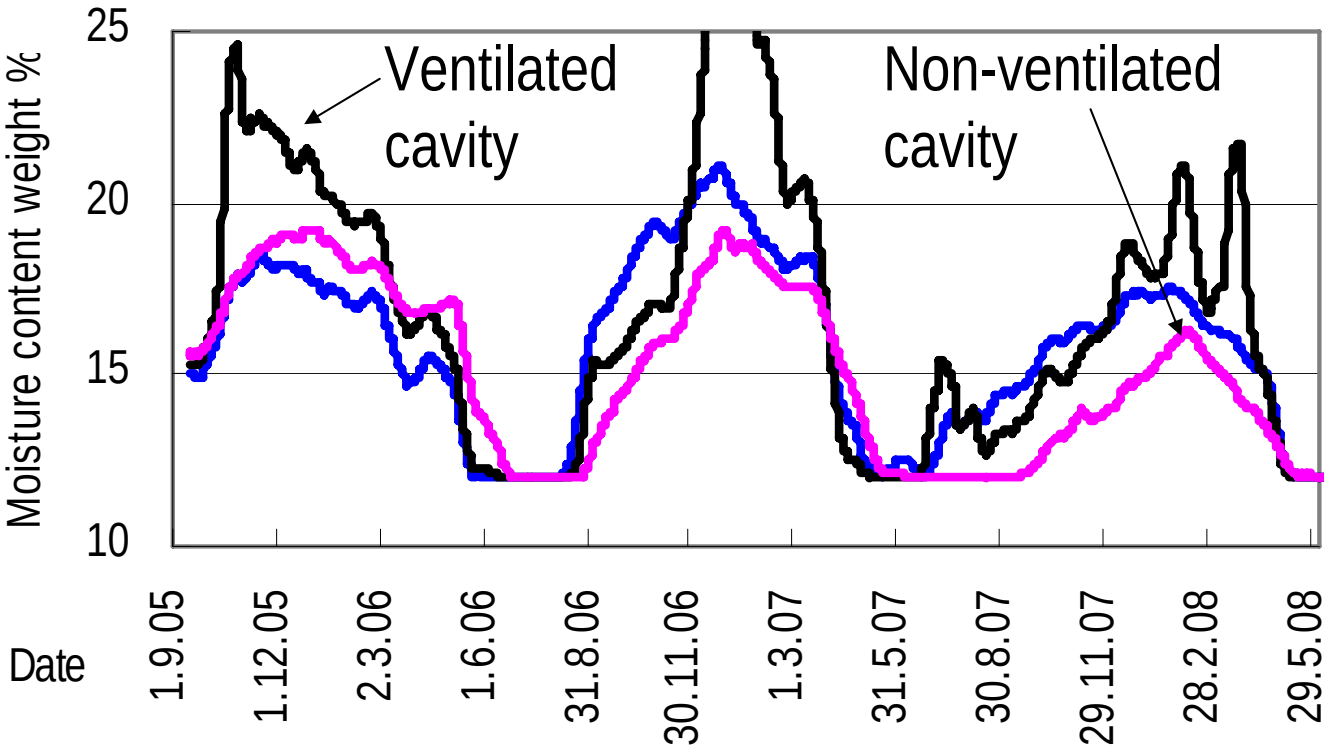
Facade elements facing north. Horisontally lapped boarding

Moisture content – in the cladding



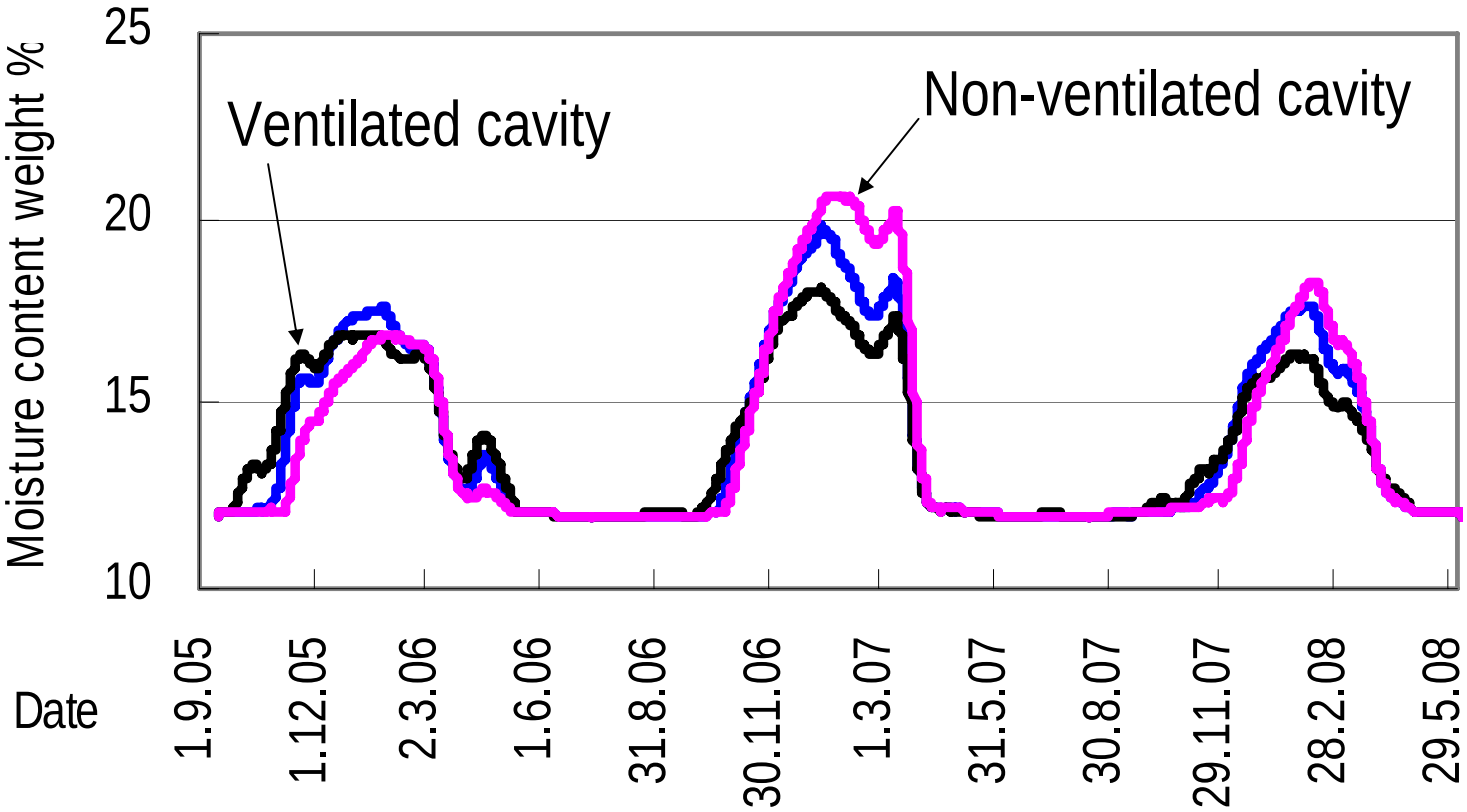
Facade elements facing south. Horisontally lapped boarding

Moisture content – in the cladding



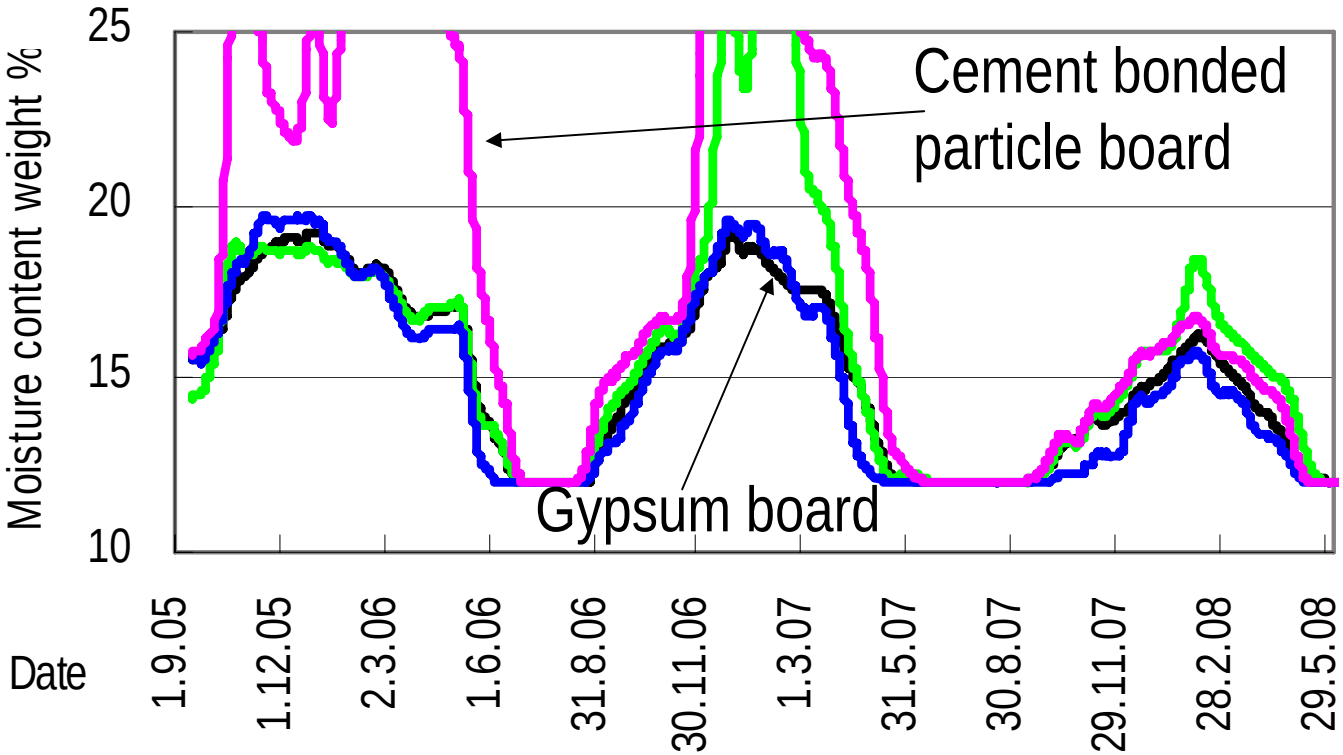
Facade elements facing north. Horisontal weatherboard

Moisture content – in the cladding



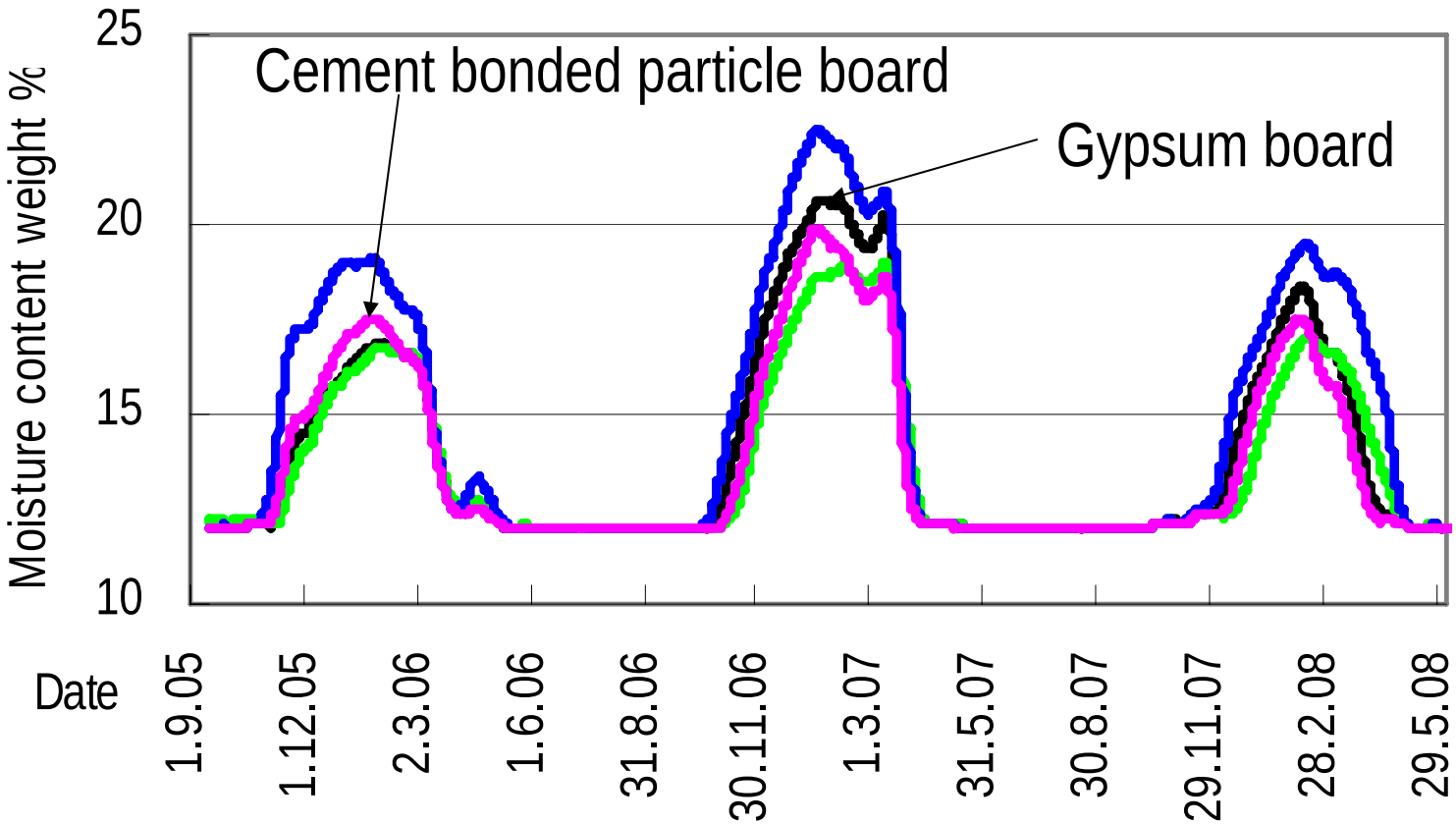
Facade elements facing south. Horisontal weatherboard

Moisture content – non ventilated cavity



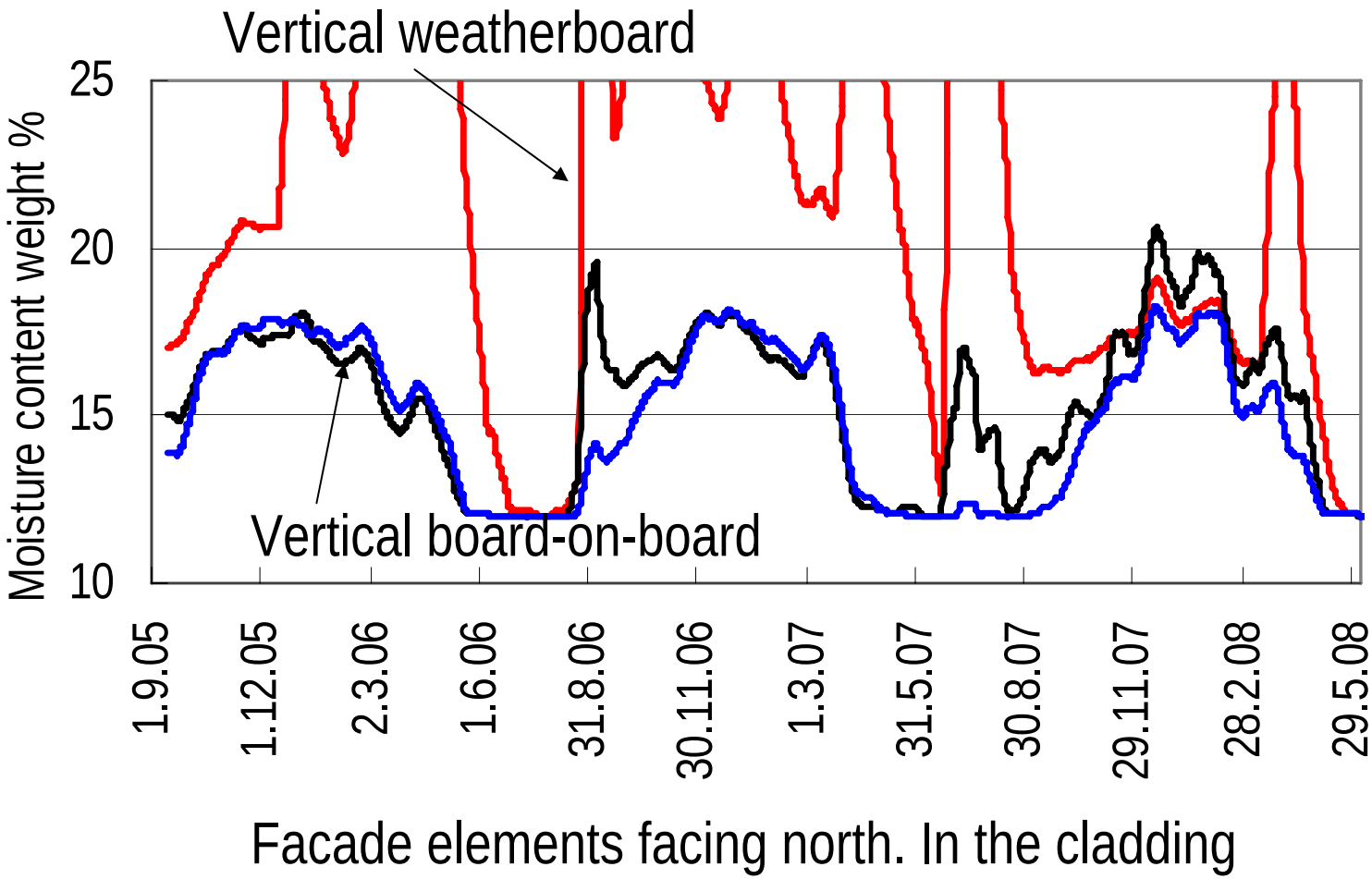
Facade elements facing north. Type of wind barrier

Moisture content – non ventilated cavity



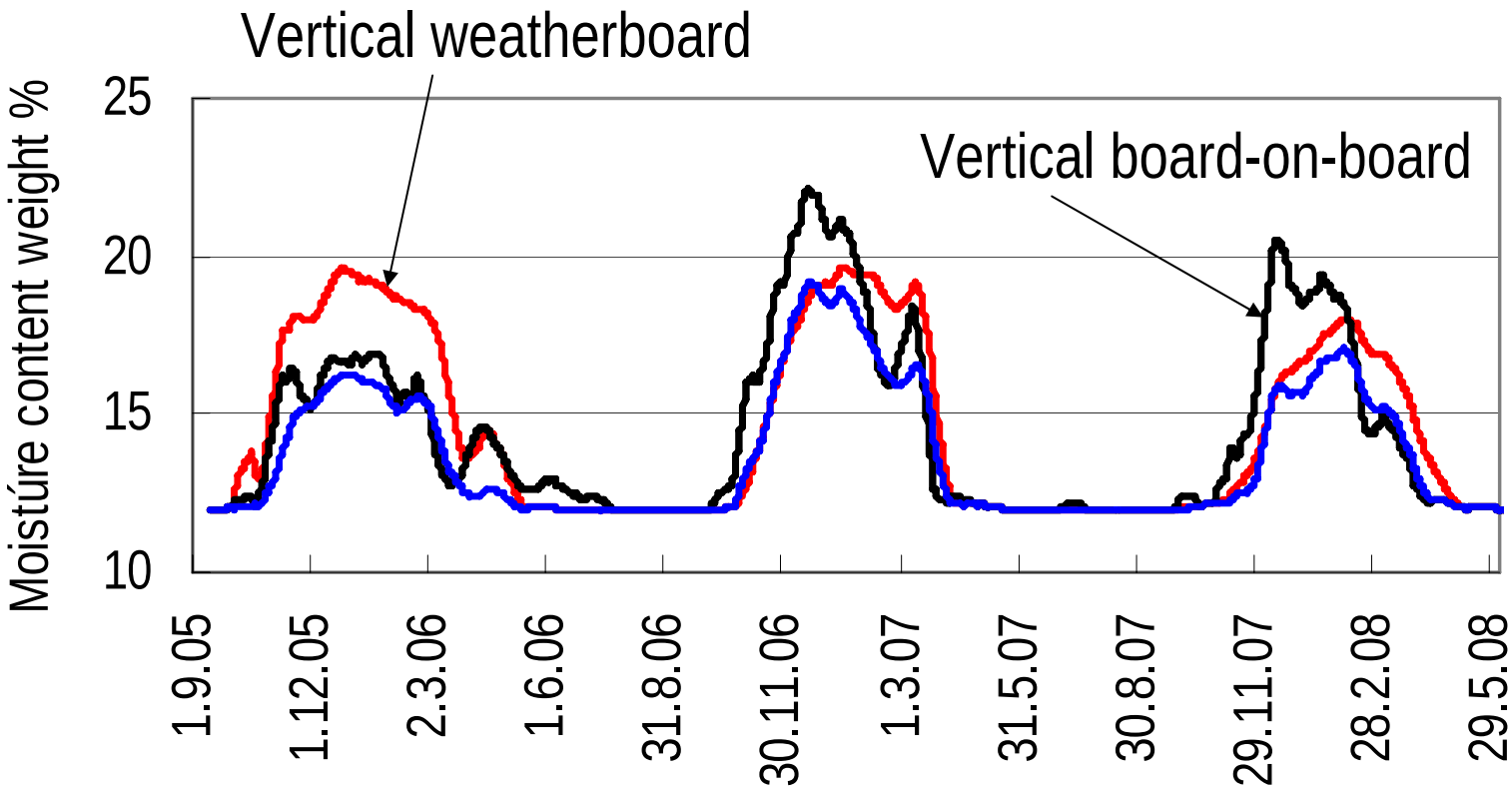
Facade elements facing south. Type of wind barrier

Moisture content – no cavity



Facade elements facing north. In the cladding

Moisture content – no cavity



Facade elements facing south. In the cladding

Conclusions

- Not possible to confirm that a ventilated cavity should be preferred to a non-ventilated cavity behind the cladding in timber framed walls
- If non-ventilated cavities are used the type of wind barrier is important
- Façade elements without a cavity cannot be recommended

Perspectives

- Mould growth – modelling and inspection
- Calibration of full-size tests with calculations of heat, liquid and vapour moisture transfer
- Air-tightness of the vapour barrier