Wenn Luft sich ihren Weg sucht

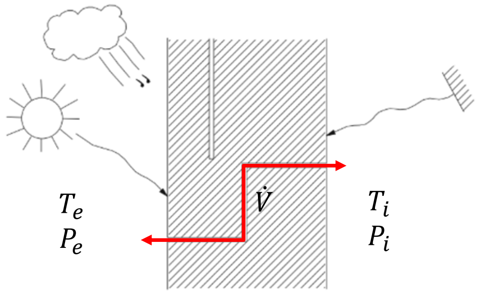
Nur Gefahr oder auch Potenzial?

Andreas Sarkany
Forschungsbereich Bauphysik E207-02

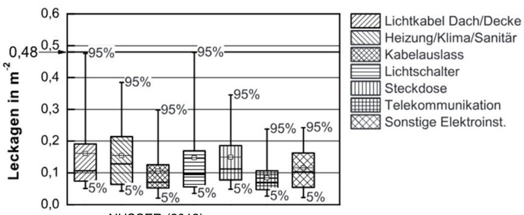
Warum sind Luftströmungen relevant?

- Energietechnisch
- Innenraumluftfeuchtigkeit
- Kondensation
- Dauerhaftigkeit

Warum sind Luftströmungen relevant?



- Energietechnisch
- Innenraumluftfeuchtigkeit
- Kondensation
- Dauerhaftigkeit



NUSSER (2012)

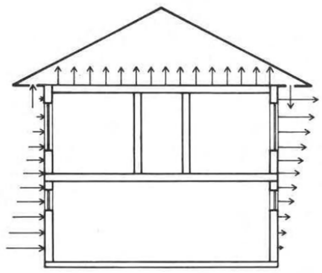


FIG. 1—*Pressure differences in houses without operating chimneys.*

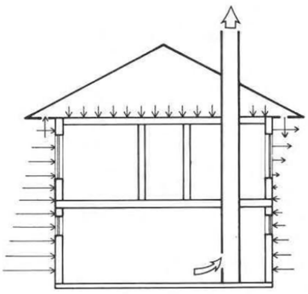
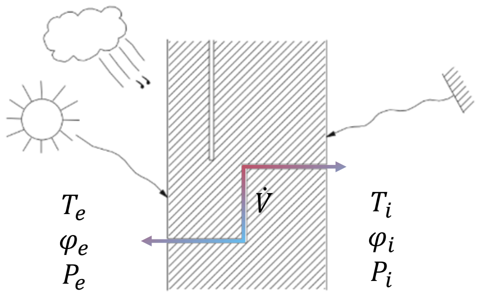


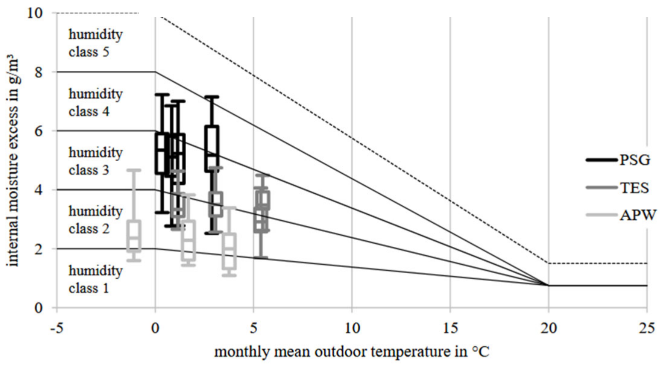
FIG. 2—*Pressure differences in houses with operating chimneys or exhaust fans.*

HANDEGORD (1982)

Warum sind Luftströmungen relevant?



- Energietechnisch
- Innenraumluftfeuchtigkeit
- Kondensation
- Dauerhaftigkeit



Außenlufttemperatur θ_e

Bild A.1 — Definition der Luftfeuchteklassen

ÖNORM 8110-2:2020

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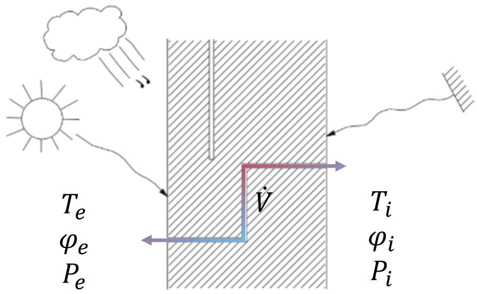
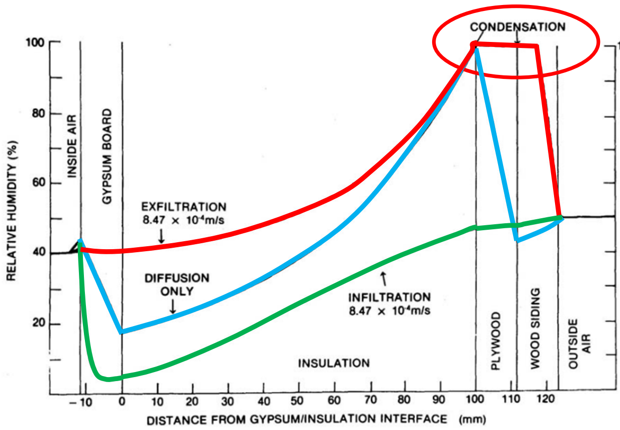
Warum sind Luftströmungen relevant?



- Energietechnisch
- Innenraumluftfeuchtigkeit
- Kondensation
- Dauerhaftigkeit



TENWOLDE (1985)

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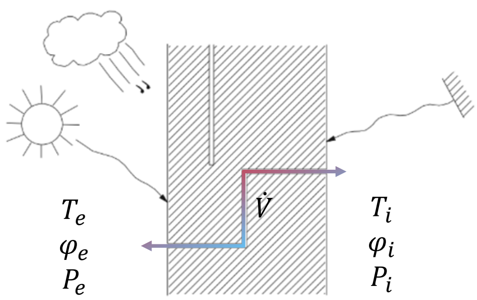
Warum sind Luftströmungen relevant?



- Energietechnisch
- Innenraumluftfeuchtigkeit
- Kondensation
- Dauerhaftigkeit

HENS (2017)

LEWIS ET AL. (2021)

Vertikale Strömung

Befeuchtung
1. Regen
2. Diffusion
3. Einbaufeuchte
4. Bodenfeuchte

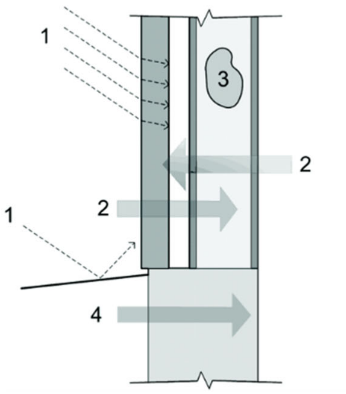
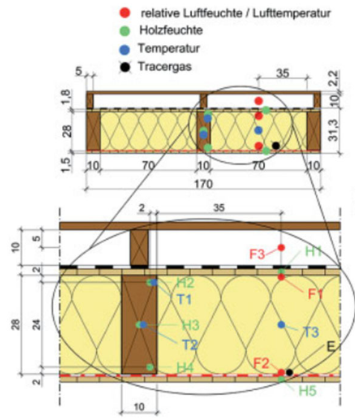


Figure 1 *Wetting (left) and drying (right) mechanisms for walls.*

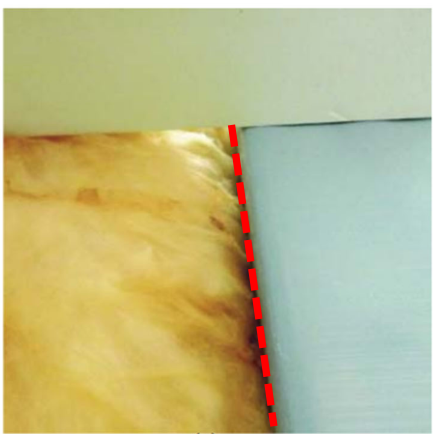
FINCH AND STRAUBE (2007)



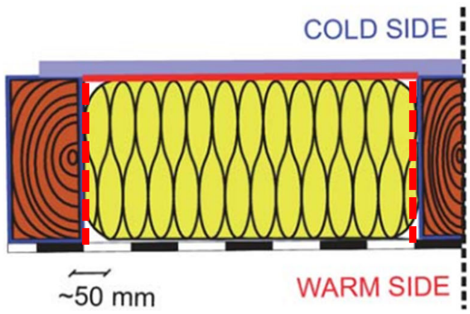
NUSSER ET AL.(2010)

Trocknung
1.-2. Evaporation
2. Abrinnen
3. Belüftung

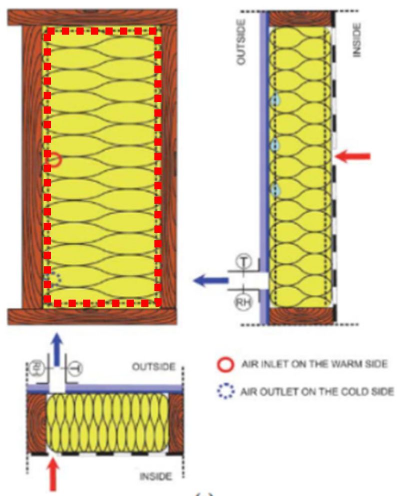
Vertikale Strömung



(a)



(b)



(a)

- Undichtheiten
- Randströmungen

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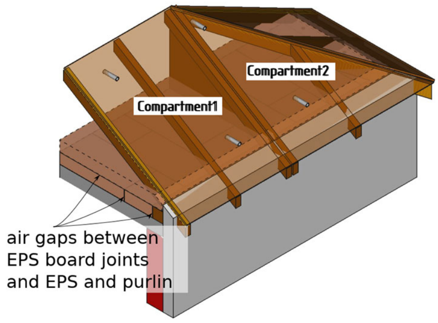
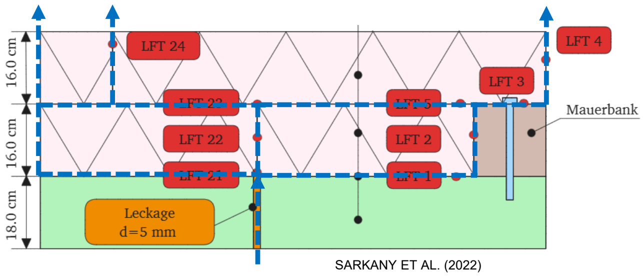
Horizontale Strömung

- „Feuchte Mauerbank“



LEWIS ET AL. (2021)



SARKANY ET AL. (2022)

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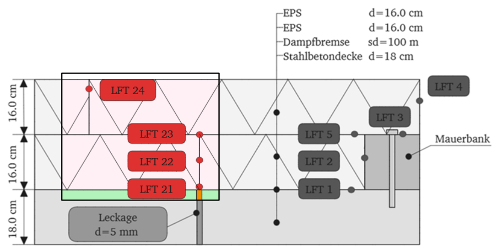
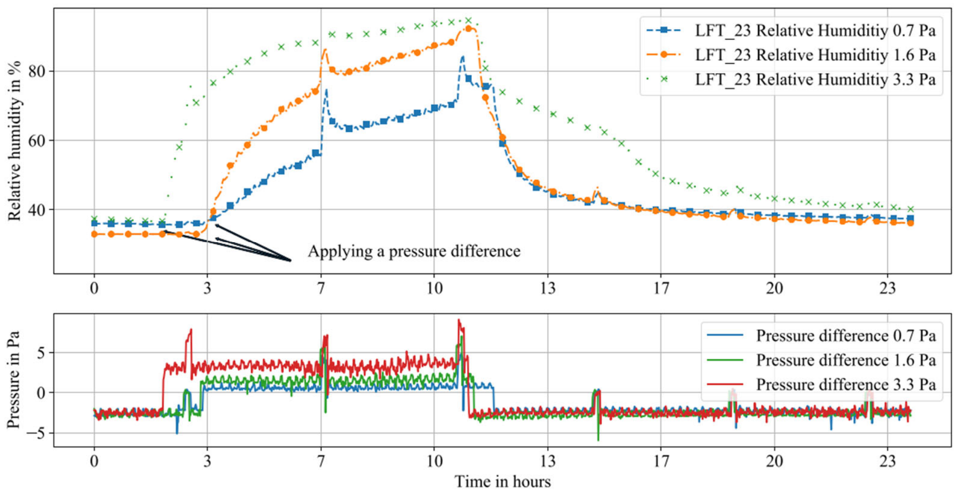
Horizontale Strömung





SARKANY ET AL. (2022)

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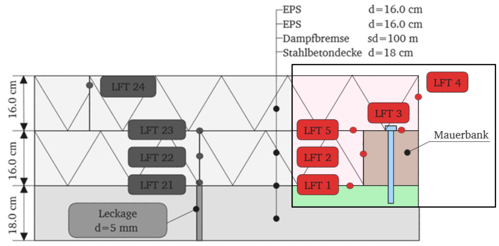
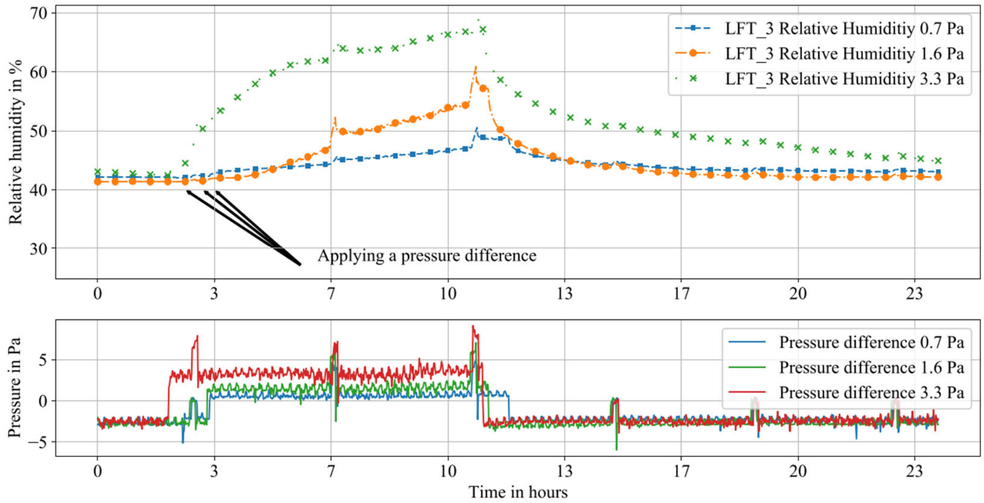
Horizontale Strömung





SARKANY ET AL. (2022)

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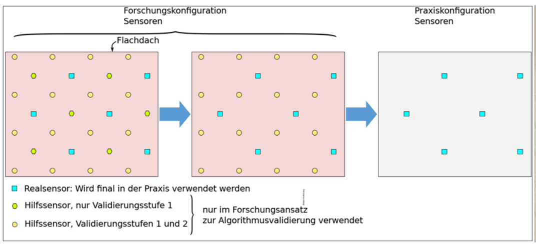
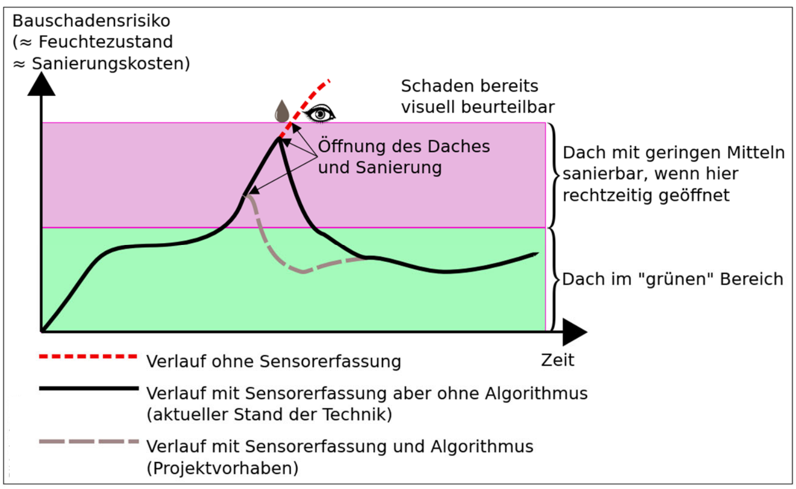
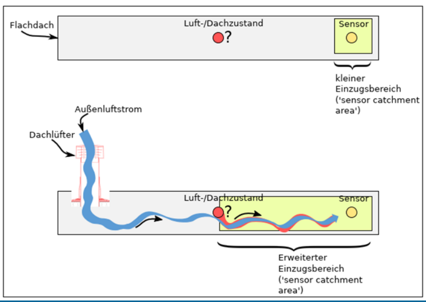
RoofAlarm

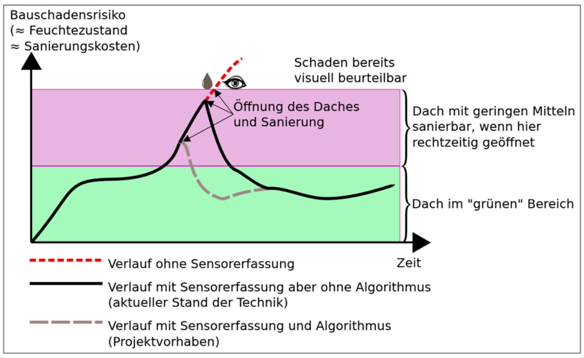
- TU Wien, BMONC, IFB
- 2 Säulen
  - Sensor Algorithmus
  - Luft als Informationsträger



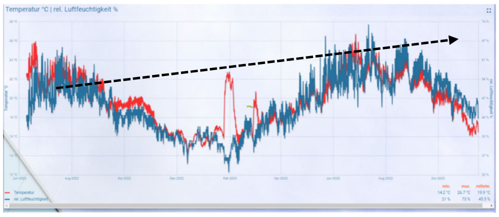


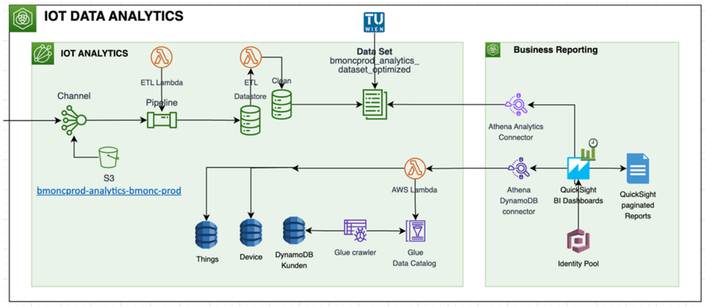


RoofAlarm



- Sensor Algorithmus
  - IoT
  - Regression
  - Spontane Aufeuchtungswarnung





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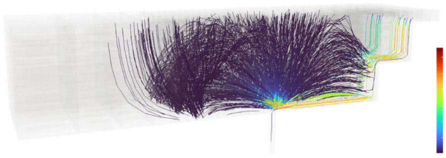
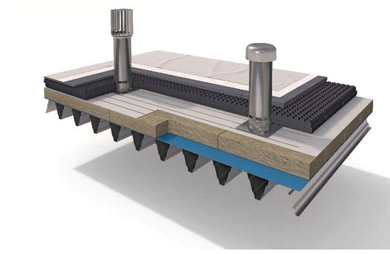
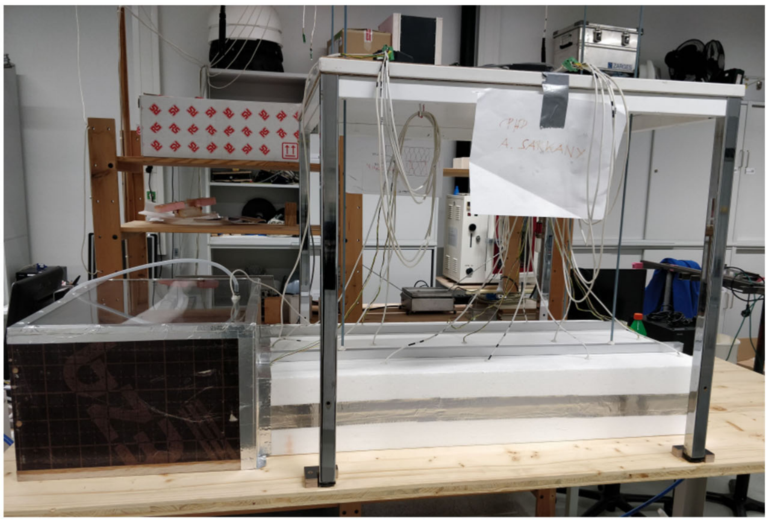




- Luft als Informationsträger
- Modellentwicklung
- Kleinversuche
- Feldversuche



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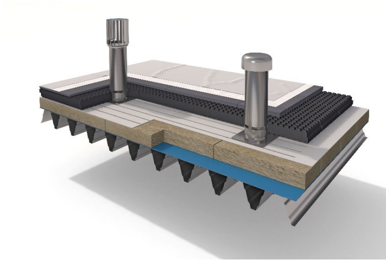

RoofAlarm

- Luft als Informationsträger
- Modellentwicklung
- Kleinversuche
- Feldversuche

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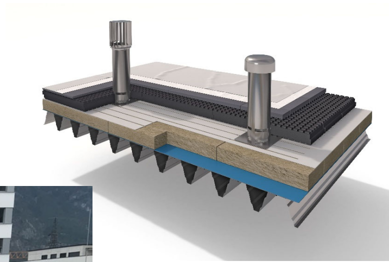
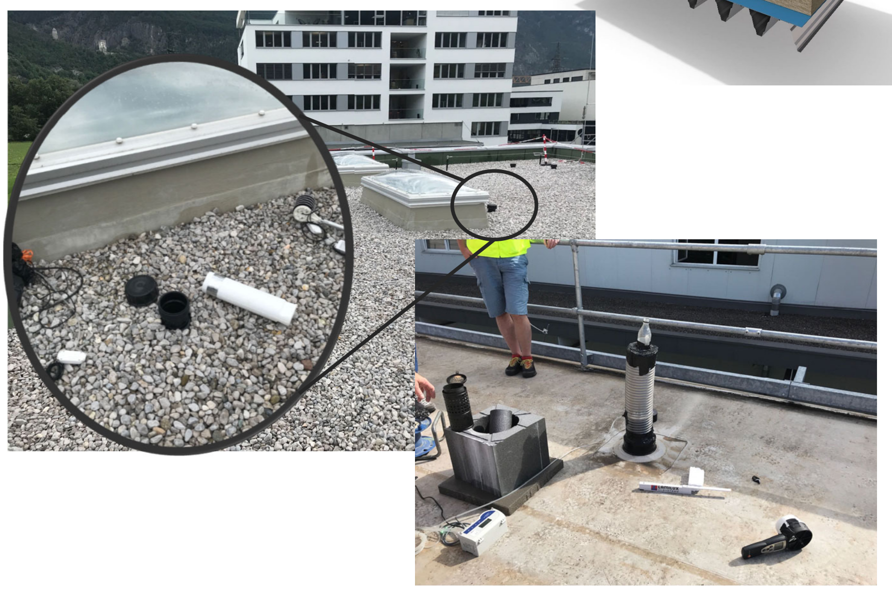


RoofAlarm



- Luft als Informationsträger
- Modellentwicklung
- Kleinversuche
- Feldversuche

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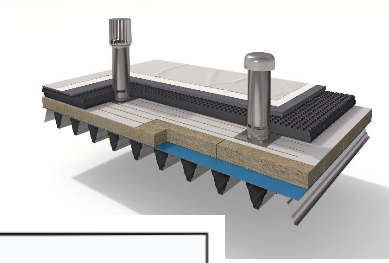

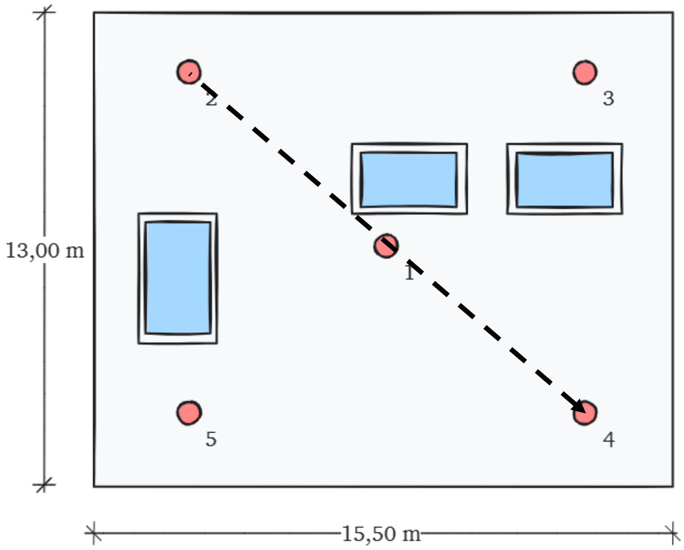

- Luft als Informationsträger
- Modellentwicklung
- Kleinversuche
- Feldversuche

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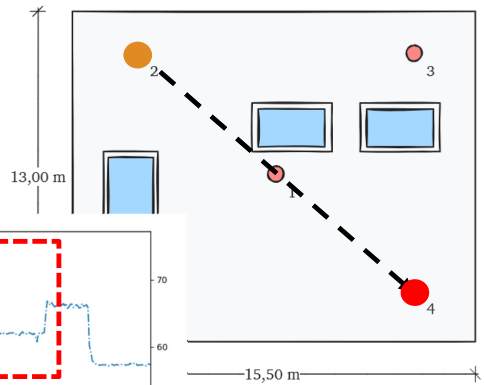
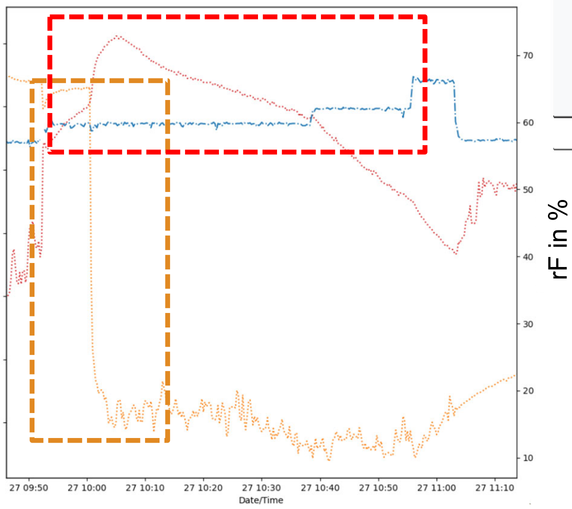
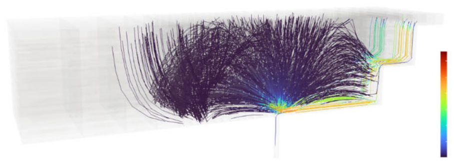
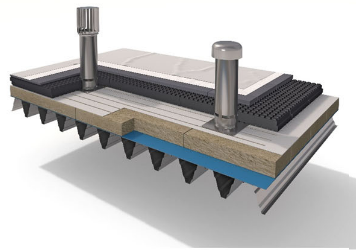




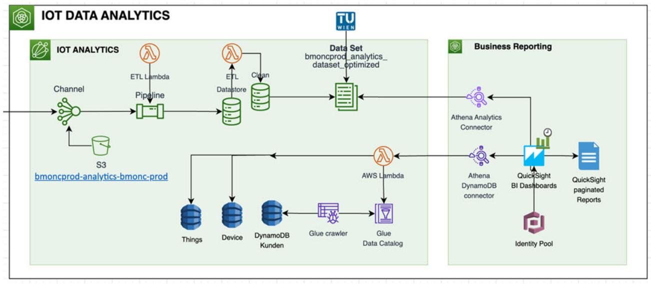
- Luft als Informationsträger
- Modellentwicklung
- Kleinversuche
- Feldversuche

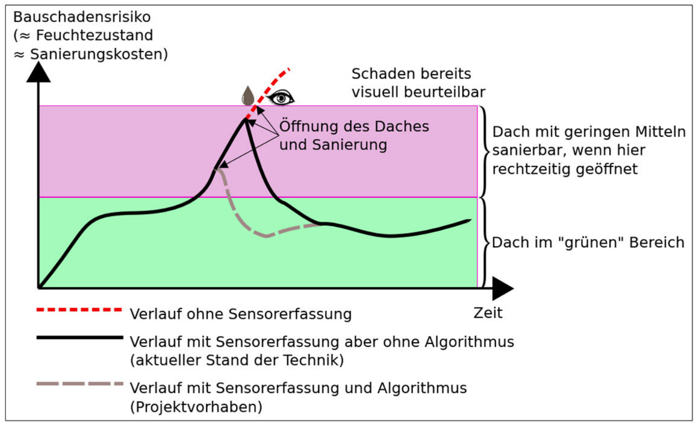




RoofAlarm

- Luft als Informationsträger
- Prototyp des Algorithmus
- Modellentwicklung



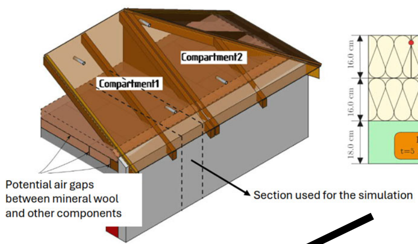


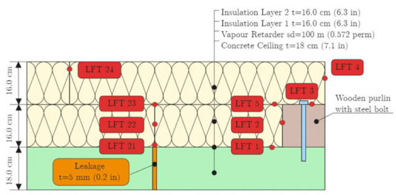
Large scale replica 1:1

Layer Composition

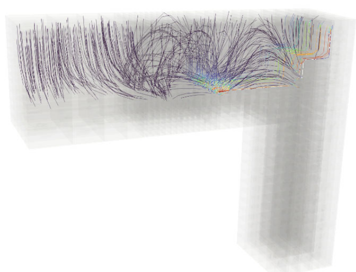
Ausblick

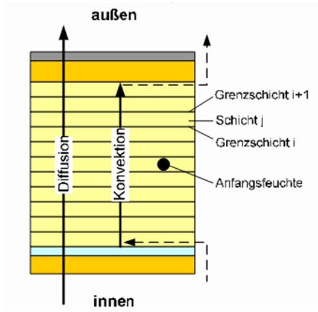
- 1D vs. 2D/3D
- Schleichströmungen in Materialschichten





SARKANY ET AL. (TBP)





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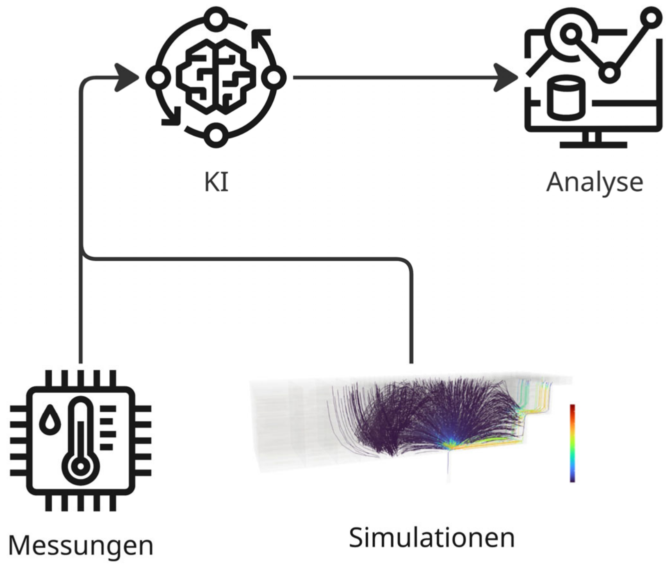
Ausblick

- RoofAlarm 2
  - Verbesserung der Analyse
    - KI
    - Verbesserte Modellierung
  - Reduktion der Sensoren
  - Handlungsempfehlung



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